APPENDIX D

MEMBRANE INTERFACE PROBE/HYDRAULIC PROFILING TOOL INVESTIGATION MEMO WITH ATTACHED DAKOTA MiHPT REPORT

memorandum

To:	Mr. Mike Gipson; DEQ
From:	Mr. Mitchell Olson; Trihydro
cc:	Mr. Andrew Vann; Trihydro
Date:	May 10, 2019
Re:	Membrane Interface Probe/Hydraulic Profiling Tool Investigation

This technical memorandum provides a detailed description of methods and results of the membrane interface probe (MIP) and hydraulic profiling tool (HPT) soil investigation conducted at the Billings PCE Groundwater Facility (Facility) located in Billings, Montana. The combined MIP/HPT (hereinafter referred to as MiHPT) investigation was conducted as part of the Remedial Investigation (RI), in accordance with the RI Work Plan (Trihydro 2017). This memorandum supplements the RI Report (Trihydro 2019).

The soil portion of the RI was conducted to evaluate known and potential source areas for contamination, and to provide high-resolution data for developing conceptual site model (CSM) components including contaminant distribution, fate and transport, and aquifer hydraulic characteristics. To accomplish these goals, the soil investigation included MiHPT and soil sampling. This memorandum presents MiHPT data for each of the known or potential source areas for which related data were collected:

- Big Sky Linen (BSL)
- Central Avenue Laundry (CAL)
- Rex Cleaners (REX)
- District 7 Human Resource Council (D7HRC)

A tabulated list of MiHPT locations for each of the areas listed above is shown in Table D-1 (related soil sample depth intervals are also shown). MiHPT locations for each of the source areas are shown in RI Report (Trihydro 2019) Figures 8-1 through 8-4 (these figures are not duplicated in this technical memorandum). MiHPT data for BSL, CAL, REX, and D7HRC are summarized in Figures D-1a, D-2, D-3, and D-4, respectively. MiHPT data are presented in transect, within each source area, to aid data interpretation.

The MIP provides high-resolution data for contaminant distribution, using three types of detectors that are sensitive to organic analytes. Additional information on the MIP measurement technique, including equipment specifications and calibration, is provided in the Dakota project report (Attachment A). MIP data includes halogen specific detector (XSD), flame ionization detector (FID), and photo ionization detector (PID); the XSD data are selective for halogenated organic compounds, and results are indicative of presence of chlorinated volatile organic compounds (CVOCs). The FID and PID analyses provide

results for most organic compounds, including hydrocarbons. The FID is more sensitive to a broader range of organics including lower molecular-weight compounds such as methane. The overlay charts include corrected data; the lowest value from each location was subtracted and data are presented on a log scale. This data presentation approach was used to highlight the difference relative to baseline readings, which were highly variable. The raw data charts are presented in the Dakota report (Attachment 1). In addition, the MIP data are compared to soil concentration data for each of the potential source areas on Figure D-5.

HPT data provide information on the aquifer characteristics. The HPT involves injection of water as the tool is advanced through the formation; the injection pressure and flow rate provide information about the formation hydraulic conductivity; information on the HPT measurement technique, including specifications and calibration, is provided in the Dakota project report (Attachment A). HPT data includes static water pressure readings, which are used to calculate water table elevation. HPT output includes estimated hydraulic conductivity (K) values, which are calculated below the water table. Electrical conductivity (EC) data are plotted along with HPT data, as these also provide information about the aquifer. Finer-grained materials (e.g., clays and silts) generally result in higher EC readings (on the order of 100 mS/m [millisiemens per meter]) and coarser materials (e.g., sands and gravels) result in lower EC readings (on the order of 10 mS/m). Overall, HPT and EC data provide high-resolution, semi-quantitative information on relative permeability zones.

Additional details regarding the MiHPT data collection, including system calibration and quality control (QC) testing, are provided in the MiHPT report provided by Dakota (Attachment 1).

1.0 BIG SKY LINEN

MiHPT probing was completed at 21 locations near BSL on November 16, 2017 and between November 28 and December 1, 2017 (Table D-1). Of the 21 MiHPT locations identified for BSL in the Work Plan, 19 were installed in the locations as planned. Two of the planned locations, BSL-MIP-09 and MIP-T18, were unable to be completed due to access limitations; both are located on BSL property. Two additional locations, MIP-T20 and MIP-T21, were added to the alley north of 711 Central Ave. MIP and HPT data for each BSL-area transect are shown on Figure D-1a.

For the MiHPT evaluation, data are presented as five transects. Each of these transects, with locations oriented from west to east, are as follows.

- BSL – South Central Ave Transect (BSL-MIP-01, MIP-T10, BSL-MIP-02, MIP-T11, BSL-MIP-03, and MIP-T12)
- BSL – North Central Ave Transect (BSL-MIP-04, MIP-T13, BSL-MIP-05, MIP-T14, and BSL-MIP-06)
- BSL – 711 Building Area Transect (MIP-T15, BSL-MIP-07, BSL-MIP-08, and MIP-T17)

- BSL – 711 Parking Area Transect (MIP-T16, BSL-MIP-10, MIP-T19, and BSL-MIP-11)
- BSL – 711 North Alley Transect (MIP-T20 and MIP-T21)

1.1 BSL: MIP INVESTIGATION

A description of MIP data for each of the five transects is provided below, followed by a summary of MIP results. Contours of maximum XSD readings in the BSL area are shown on Figure D-1b. Subsequently, the HPT data are presented.

- *BSL – South Central Ave Transect*. MIP responses are relatively low, indicating that soil volatile organic compound (VOC) concentrations are low, although potential CVOCs are noted in sparse vadose zone and saturated zone depth intervals (e.g., BSL-MIP-01 at 7.9, 9.0, and 18 to 19 ft bgs; MIP-T11 at 11 ft bgs; MIP-T20 at 14.6 ft bgs. The magnitude of XSD detection in these intervals appears small, as indicated by relatively low XSD values relative to background, and do not suggest elevated CVOC concentrations.
- *BSL – North Central Ave Transect*. Elevated responses are observed in XSD, FID, and PID data. Responses for each of the detectors tend to be elevated in similar depth intervals, which suggests that the CVOCs are driving the detections (noting that the XSD is only sensitive to halogenated compounds, while the PID and FID are sensitive to most organic compounds including hydrocarbons). Elevated CVOCs appear to be present across much of the smear zone (i.e., soil within approximately 5 ft of the water table vertically) and across the water table, with highest concentrations apparent near the center of the transect (i.e., locations MIP-T13, BSL-MIP-05, and MIP-T14). In general, XSD values suggest elevated vadose-zone CVOC concentrations in MIP-T13 through MIP-T14, with an increasing trend from west to east. In the saturated zone, elevated XSD values of similar magnitude are detected in MIP-T13 through MIP-T14. In the easternmost location, BSL-MIP-06, XSD results suggest CVOCs may be present throughout much of the evaluated interval, including both vadose zone and saturated zone, but the XSD values are smaller in magnitude than the other North Central Transect locations. The observation of elevated CVOCs in this transect is consistent with the proximity of this zone to historical DNAPL.
- *BSL – 711 Building Transect*. In this transect, elevated XSD, FID, and PID data suggest the highest potential CVOC concentrations are found at MIP-T15. Elevated concentrations may be present over a wide depth interval (5 to 15 feet below ground surface [ft bgs]), primarily in the vadose zone, in MIP-T15. Conversely, elevated detected values suggest CVOCs may be present just below the water table in BSL-MIP-07 and MIP-T17. Scattered vadose zone detections occur in BSL-MIP-07, BSL-MIP-08, and MIP-T17.
- *BSL – 711 Parking Area Transect*. The highest magnitude site-wide detections occur in MIP-T16, where elevated signals occur in both the vadose and saturated zone, with peak values near the water table. The other three locations in this transect have sparse detections, at low to moderate levels, occurring primarily in the vadose zone. Some shallow PID and FID detections, which occur at a

higher magnitude than associated XSD peaks, may indicate hydrocarbons in BSL-MIP-10, MIP-T19, and BSL-MIP-11.

- *BSL – 711 North Alley Transect*. Both locations in this transect have apparent low-level XSD detections throughout the vadose zone. Elevated PID and FID detections occur scattered in the vadose zone but are more pronounced at the smear zone, with relatively low corresponding XSD detections, which may suggest the presence of hydrocarbons. Elevated PID and FID responses continue into the saturated zone but decrease with depth into the aquifer.

MIP data from BSL are compared to soil concentrations from adjacent locations on Figure D-5. Soil samples were collected from four locations at BSL (described in detail in the RI Report [Trihydro 2019]), two of which had associated MIP logs: BSL-MIP-01 and MIP-T20. The remaining two locations, BSL-MIP-09 and MIP-T18, were sampled at a later time when the MiHPT rig was not present, and therefore do not have associated MIP logs. At location BSL-MIP-01, PCE concentrations were non-detect at shallow to intermediate depths (<13 ft bgs), which corresponded with no evidence of CVOCs as indicated by the low XSD signal ($<10 \times 10^4$ microvolts [μV]). At 17-18 ft bgs, PCE was detected at 0.037 milligrams per kilogram (mg/kg); this corresponded with a minor detection via XSD (up to approximately 15×10^4 μV). Conversely, MIP data at location MIP-T20 was characterized by elevated hydrocarbons at the water table elevation, as indicated by PID and FID signals (100 to $1{,}000 \times 10^4$ μV) with no corresponding increase in the XSD signal. With a water table of 14.2 ft bgs, a soil sample collected from 14-15 ft bgs had a low PCE detection (0.049 mg/kg) but elevated extractable petroleum hydrocarbon (EPH) and volatile petroleum hydrocarbon (VPH) values of 28.5 and 211 mg/kg, respectively.

1.2 BSL: HPT INVESTIGATION

HPT results across the five BSL-area transects suggest some similar trends. Results from each location indicate characteristic shallower and deeper zones. In the shallower zones, HPT and EC data suggest finer-grained, lower permeability materials. The shallow portion also tends to be heterogeneous. Where K values were calculated in the shallow zone (most shallow-zone data are from above the water table, where K values are not calculated) values typically ranged from <1 to 10 feet per day (ft/d). However, despite the widespread heterogeneity, the HPT and EC data suggest little consistency in low/high permeability layers within or between transects. Conversely, the deeper zone appears to be homogeneous and of higher permeability. This is indicted by low EC values (typically less than 1 mS/m) and low HPT injection pressures (approximately 1 psi, when corrected for hydrostatic head). The estimated K values are relatively uniform in the deeper zone, typically ranging from 60 to 100 ft/d. The transition from shallower to deeper zone characteristics occurs above or below the water table at various locations. Additional observations by transect are as follows:

- *BSL – South Central Ave Transect*. The transition from shallower to deeper aquifer characteristics occurs at shallower depths, moving from west to east, ranging from approximately 15 to 20 ft bgs.

Little to no consistency in shallow-zone characteristics is noted. The deeper zone appears highly uniform.

- *BSL – North Central Ave Transect*. The aquifer-characteristic transition occurs between approximately 15 and 19 ft bgs with aquifer transition occurring at progressively shallower depths from west to east. Little to no consistency in shallow-zone characteristics is noted. The deeper zone appears uniform across most locations.
- *BSL – 711 Building Transect*. Contrary to the transects described above, the aquifer-characteristic transition appears deeper in the eastern locations, ranging from approximately 14 to 20 ft bgs. The shallowest transition is noted in BSL-MIP-07, which is approximately 20 feet north of the line connecting other locations in this transect. Little to no consistency in shallow-zone characteristics is noted. The deeper zone appears uniform, with minor exceptions.
- *BSL – 711 Parking Area Transect*. The aquifer-characteristic transition appears deepest in the easternmost location; the apparent transition occurs at depths ranging from approximately 13 to 19 ft bgs. The shallowest transition is noted in BSL-MIP-07, which is approximately 20 feet north of the line connecting other locations in this transect. A transition from high to low permeability is noted in the upper 3 feet of the shallow zone, which may be attributed to construction-type fill soils, and the remaining shallow-zone soils appear to be low permeability with some heterogeneity. The deeper zone appears uniform, with minor exceptions.
- *BSL – 711 North Alley Transect*. The aquifer-characteristic transition occurs are a fairly consistent depth, ranging from approximately 14 to 16 ft bgs. A transition from high to low permeability is noted in the upper 3 feet of the shallow zone, which may be attributed to construction-type fill soils, and the remaining shallow-zone soils appear to be low permeability with some heterogeneity. The deeper zone appears highly uniform.

1.3 BSL: CSM

MIP data near BSL suggest that zones with potentially high CVOC concentrations exist, and the highest concentrations are apparent near the center of the BSL-North Central Area transect (located south of the building at 711 Central Ave) and in locations MIP-T15 and MIP-T16 (located west of the building at 711 Central Ave). Elevated CVOC concentrations are also apparent near the western sides of the BSL-711 Building Area and Parking Area transects, but appear to decline moving east through these transects. Possible CVOC impacts are also observed in the 711 North Alley transect, although at lower apparent levels than in the other transects, and petroleum hydrocarbon impacts are also noted in the 711 North Alley transect. South of Central Avenue, CVOCs may be present but lower at lower apparent concentrations (i.e., plume levels). These results are consistent with the understanding of PCE releases originating from the French drain on BSL property, as well as from the historically leaking sewer line in Central Avenue. Additionally, the petroleum hydrocarbons detected in BSL soils are consistent with the historical BSL leaking underground storage tank (LUST) on the north side of the building. These results are also consistent with groundwater data from BSL, which indicate PCE concentrations in monitoring

wells east of BSL (BPG51B, BPGP46, and BPGP61) ranging from 80 to 15,500 micrograms per liter (µg/L) (2nd quarter 2018).

The characteristic shallow and deeper zones, indicated by the HPT data, are consistent with understanding of site geology. In the BSL area, the transition between shallow and deep characteristic zones occurred at depths ranging from approximately 13 to 20 ft bgs. The shallow zone is typically low permeability (K values ranging from <1 to 10 ft/d) and heterogeneous. The deep zone is relatively homogeneous and high permeability, with HPT-estimated K values ranging from 60 to 100 ft/d. By comparison, the BSL-area hydraulic conductivity values cited in the Data Summary Report were 7.7 ft/d to 71.5 ft/d, which were reported by the EPA based on slug testing conducted near BSL (URS Operating Services, Inc. 2010). Thus, the values are consistent with existing data, but supplement this data with high-resolution information.

2.0 CENTRAL AVENUE LAUNDRY

MiHPT probing was completed at 15 locations near CAL between November 13 and 30, 2017 (Table D-1). Four of the locations included in the Work Plan, CAL-MIP-03, MIP-T01, MIP-T04, and MIP-T05, were not completed due to lack of detections in nearby locations (three of these locations were listed as "tentative" in the Work Plan, and were only intended to be monitored to assist in source delineation if local detections occurred in fixed MiHPT locations). MIP and HPT data for each CAL-area transect are shown in Figure D-2.

For the MiHPT evaluation, data are presented as four transects. Each of these transects, with locations oriented from west to east, are as follows:

- CAL – Background Transect (north to south locations: CAL-MIP-01 and CAL-MIP-02)
- CAL – South Transect (MIP-T02, CAL-MIP-04, MIP-T03, CAL-MIP-05, CAL-MIP-06)
- CAL – North Transect (CAL-MIP-10, MIP-T09, CAL-MIP-09, MIP-T08, CAL-MIP-08, MIP-T07)
- CAL – East Transect (north to south locations: MIP-T06 and CAL-MIP-07)

2.1 CAL: MIP INVESTIGATION

A description of MIP data for each of the four transects is provided below, followed by a summary of MIP results. Subsequently, the HPT data are presented.

- *CAL – Background Transect*. The data for CAL-MIP-01 is not considered reliable; the XSD was unstable and the FID was not lit (see Dakota report, Attachment 1). In CAL-MIP-02, CVOCs may be present over a narrow depth interval at 20 ft bgs.
- *CAL – South Transect*. Low level detection of possible CVOCs, as indicated by FID and XSD detections at moderate levels, occur across the vadose zone and into the saturated zone in the westernmost borings, MIP-T02 and CAL-MIP-04. Note, the PID controller was out for all locations

in this transect, thus no PID data are available. The XSD was unstable and provided no useful data in MIP-T03.

- *CAL – North Transect*. The XSD was determined to be unstable in MIP-T09, CAL-MIP-09, MIP-T08, CAL-MIP-08, and MIP-T07 (see Dakota report). In the only location with useful XSD data (CAL-MIP-10), low levels of CVOCs are suggested across much of the vadose and saturated zones. By comparison of FID and PID data across other locations in the transect, CVOCs may be present in CAL-MIP-09, MIP-T08, and MIP-T07; however, the FID/PID responses are small enough such that presence of organics is probably limited.
- *CAL – East Transect*. Low-level detections suggest that CVOCs may be present, primarily in the saturated zone for MIP-T06, and in sparse intervals in the vadose and saturated zones in CAP-MIP-07. PID data are not available for CAL-MIP-07 (see Dakota report, Attachment 1).

MIP data from CAL are compared to soil concentrations from adjacent locations on Figure D-5. Soil samples were collected from four locations at CAL (described in detail in the RI Report [Trihydro 2019]) with associated MIP logs: CAL-MIP-02, CAL-MIP-04, CAL-MIP-09, and MIP-T03. In CAL-MIP-02, soil samples were analyzed for VOCs from depths of 0-0.5 and 8.5-9.0 ft bgs. Both soil samples were non-detect for PCE, which corresponds with MIP log data that suggests no CVOCs were present (XSD signals $<1 \times 10^4$ μV). At CAL-MIP-04, low level PCE detections (up to 0.17 mg/kg) generally corresponded with intervals of minor elevations in the XSD signal. In CAL-MIP-09 and MIP-T03, MIP interpretation is complicated by elevated XSD baseline in all or part of the measured interval; however, PCE was non-detect in all but one soil sample (0.071 mg/kg in a surface sample from CAL-MIP-09). This is consistent with the lack of large-scale deviation in XSD signal from the baseline at these locations.

2.2 CAL: HPT INVESTIGATION

HPT results across the four CAL transects exhibit similar trends. Similar to BSL, results from each location indicate characteristic shallow and deep zones. In the shallow zones, HPT and EC data suggest relatively finer-grained, lower permeability media. The shallow portion also exhibits a higher degree of heterogeneity than the deep zone. Where K values were calculated in the shallow zone (several shallow-zone data are from above the water table, where K values are not calculated) values typically ranged from <1 to 10 ft/d. The HPT and EC data do not suggest spatially extensive zones occurring in the shallow zone; the defining characteristic of the shallow zone appears to be low permeability with moderate heterogeneity. Conversely, the deeper zone appears to be homogeneous and to exhibit higher permeability. Within the deep zone, EC values, HPT injection pressures, and estimated K values are consistent with the values reported above for BSL. The transition from shallower to deeper zone characteristics occurs above or below the water table at various locations. Additional observations by transect are as follows:

- *CAL – Background Transect*. The transition from shallower to deeper aquifer characteristics occurs at 20 to 23 ft bgs. The shallow zone appears to be generally low permeability, but a coarser-grained

zone of moderate permeability exists between 10 and 15 ft bgs. The deeper zone appears generally uniform.

- *CAL – South Transect*. The transition from shallower to deeper aquifer characteristics occurs at approximately 17 ft bgs across this transect. The shallow zone appears to be generally low permeability, but a coarser-grained zone of moderate permeability exists between 10 and 15 ft bgs. The deeper zone appears generally uniform, with sparse zones of heterogeneity.
- *CAL – North Transect*. The transition from shallower to deeper aquifer characteristics occurs at approximately 17 to 18 ft bgs across this transect. The shallow zone appears to be heterogeneous, with a coarser-grained zone of moderate permeability existing between 8 and 15 ft bgs (the width of this interval varies across the transect, with no distinct pattern observed). The deeper zone appears generally uniform, with sparse zones of heterogeneity.
- *CAL – East Transect*. The transition from shallower to deeper aquifer characteristics occurs at approximately 16 to 18 ft bgs. The shallow zone appears to be heterogeneous, with a coarser-grained zone of moderate permeability existing between 9 and 15 ft bgs. The deeper zone is generally uniform.

2.3 CAL: CSM

In comparison to BSL, the levels of detections at CAL suggest that sources associated with the CAL property are relatively minor. Possible CVOC detections occur in most transects (the CAL-Background transect is inconclusive) at low levels occurring in sparse intervals. Also, possible CVOC detections in depth intervals associated with shallow groundwater occur in the CAL-South transect. The low-level CVOCs suggested by the MIP data are consistent with groundwater concentrations reported for wells near CAL. Detected PCE concentrations in the area ranged from 2.7 to 185 µg/L (2nd quarter 2018).

Existing geology data in the CAL area (prior to this investigation) are relatively limited, as compared to BSL. Overall, the HPT results near CAL are consistent with current site understanding, and supplement the knowledge base with high-resolution data for several additional locations. Observations related to the HPT data, in terms of properties of the characteristic shallow and deep zones, are consistent with those noted above for BSL. The shallow/deep transition occurs at approximately 20 to 23 ft bgs in the background area west of CAL, and from approximately 16 to 18 ft bgs in the CAL area. More lithologic evidence would be necessary to corroborate whether or not the basal sandy/gravel layer (more permeable unit) pinches out as the alluvial terrace transition (Qa2-Qa3) is approached. Basal narrowing of the sandy/gravel unit is shown on the Gosling et al. 1973 geologic map, A – A' cross section proportional with perpendicular distance from the SW to NE trending terrace step.

3.0 REX CLEANERS

MiHPT probing was completed at 10 locations near REX between December 2 and 20, 2017 (Table D-1). Of the 17 MiHPT locations identified for REX in the Work Plan, 10 were installed in the locations as

planned. Of the eight locations identified as "tentative" in the Work Plan, seven were not probed; the exception was MIP-T27, which was included in the MiHPT investigation. Most of the tentative locations were excluded due to limited levels of contamination indicated via MIP data from fixed locations. MIP and HPT data for both REX-area transects are shown in Figure D-3.

For the MiHPT evaluation, data are presented as two transects. Each of these transects, with locations oriented from southwest to northeast, are as follows.

- REX – South Transect (REX-MIP-01, REX-MIP-04, REX-MIP-02, REX-MIP-05, and REX-MIP-03; note these locations are not in a straight line, as shown on Figure 8-3 of the RI)
- REX – North Transect (REX-MIP-06, REX-MIP-07, REX-MIP-08, MIP-T27, and REX-MIP-09)

3.1 REX: MIP INVESTIGATION

A description of MIP data for both REX-area transects is provided below, followed by a summary of MIP results. Subsequently, the HPT data are presented.

- *REX – South Transect*. Possible minor XSD detections were observed, but peaks are very small, which suggests little to no impacts by CVOCs. FID detections occur at 11-13 and 17-19 ft bgs at REX-MIP-04, with no corresponding PID, which may suggest methane (which is not detected by the PID), a potential breakdown product formed by biodegradation of organic chemicals. One location in this transect, REX-MIP-03, is distinguished by elevated PID and FID readings in the vadose zone and just below the water table. The lack of XSD detections in these intervals suggests that hydrocarbons may be present at this location.
- *REX – North Transect*. Moderate FID and PID responses were noted between 5 and 10 ft bgs at each location in this transect except the westernmost location, REX-MIP-06. Corresponding XSD increases are generally not observed in these intervals, which suggests that elevated FID/PID readings may result from hydrocarbons. A large FID/PID response, with no corresponding increase in XSD levels, is noted in one location (REX-MIP-08). The elevated FID/PID results at REX-MIP-08 persist from the water table, at about 15 ft bgs, through the bottom of the probed interval at 25 ft bgs. This may suggest hydrocarbon impacts, but the apparent wide interval may suggest smearing of a narrower hydrocarbon interval.

MIP data from REX are compared to soil concentrations from adjacent locations on Figure D-5. Soil samples were collected from four locations at REX (described in detail in the RI Report [Trihydro 2019]) with associated MIP logs: REX-MIP-03, REX-MIP-04, REX-MIP-07, and REX-MIP-08. Low-level PCE detections (up to 0.083 mg/kg) occurred in shallow soil samples collected from three of the REX locations: REX-MIP-03, REX-MIP-04, and REX-MIP-07. PCE was non-detect in subsurface soil samples collected from the four REX locations. This is consistent with a general lack of elevated XSD signal throughout the REX area. However, the presence of hydrocarbons at the water table are suggested by elevated PID and FID signals in REX-MIP-03 and REX-MIP-08. Hydrocarbons were included in the

analytical suite for REX-MIP-08 (but not for REX-MIP-03). In a soil sample collected near the water table (17-17.5 ft bgs), EPH and VPH concentrations were observed at 55 and 241 mg/kg, respectively; elevated PID and FID readings were also observed at this depth. An inconsistency is observed at shallower depths, in which elevated EPH concentrations do not appear to correspond with elevated PID/FID signals. This may indicate that EPH is present in a non-volatile form, for which the MIP is insensitive.

3.2 REX: HPT INVESTIGATION

HPT results across the two REX transects exhibit similar trends to each other. Most REX locations, but not all, indicate characteristic shallow and deep zones. In the shallow zones, HPT and EC data suggest relatively finer-grained, lower permeability media. However, some Rex-South transect locations (described below) exhibit low EC and low HPT injection pressure in the shallow zone, which suggests coarse-grained, high-permeability media. In general, the shallow portion also exhibits a higher degree of heterogeneity than the deep zone. The HPT and EC data do not suggest consistent, extensive layers occurring in the shallow zone. The deep zone appears to be homogeneous and to exhibit higher permeability. Within the deep zone, EC values, HPT injection pressures, and estimated K values are consistent with the values reported above for other MiPHT investigation areas. The transition from shallow to deep zone characteristics occurs above or below the water table at various locations. Additional observations by transect are as follows:

- *REX – South Transect*. Two locations (REX-MIP-01 and REX-MIP-02) appear to consist of coarse-grained, high-permeability media in the shallow zone, which is contrary to other MiPHT locations across the facility. These locations occur in a parking lot, where historical modifications may have been made. A third location (REX-MIP-04), which occurs in the same parking lot, appears to be more hetereogeneous. Notwithstanding the locations described above, shallow-zone characteristics are highly variable across this transect. Deep zone characteristics are generally similar to those observed elsewhere.
- *REX – North Transect*. The transition from shallower to deeper aquifer characteristics occurs at approximately 12 to 13 ft bgs. Two locations met refusal at shallow depths: REX-MIP-07 (15 ft bgs) and REX-MIP-09 (13 ft bgs). Shallow zone characteristics are similar to those observed elsewhere, with no spatially-extensive layers noted. The remaining three locations exhibit deep-zone characteristics that appear similar to those observed elsewhere.

3.3 REX: CSM

The magnitude of XSD detections throughout the REX area does not suggest a local CVOC source. However, moderately elevated PID and FID levels are apparent in some locations in both transects (REX-MIP-03, REX-MIP-07, REX-MIP-08, MIP-T27, and REX-MIP-09). The PID/FID detections with lack of associated XSD readings suggests the presence of hydrocarbons in limited areas around REX.

Existing geology data in the REX area (prior to this investigation) are relatively limited, as compared to BSL. Overall, the HPT results near REX are consistent with current site understanding, and supplement the knowledge base with high-resolution data for several additional locations. Some of the locations near REX exhibit different shallow zone properties than those observed at the other areas. These locations, which exhibit relative high permeability and homogeneity, occur in a parking lot, and may not represent native soils. Overall, shallow-zone characteristics more variable across REX than at other areas, but deep zone characteristics are generally similar to those observed elsewhere.

4.0 DISTRICT 7 HUMAN RESOURCE COUNCIL

MiHPT probing was completed at three locations near D7HRC on November 17, 2017 (Table D-1). The MiHPT points were located in accordance with the Work Plan (Trihydro 2017) except for D7HRC-MIP-03, which was moved approximately 200 feet northwest due to local traffic and utilities, and to provide data downgradient of the potential source. MiHPT and related soil sampling locations associated with D7HRC are shown on Figure 8-4. The three locations included D7HRC-MIP-01 (upgradient/west), D7HRC-MIP-02 (downgradient/north), and D7HRC-MIP-03 (downgradient/east).

4.1 D7HRC: MIP INVESTIGATION

MIP and HPT data for D7HRC are shown on Figure D-4. An unstable XSD baseline is noted in the vendor report (See Attachment A, Appendix A table: *MiHpt (MIP section) Field Summary Log*); however, some interpretations can be made with the MIP data. Minor fluctuations in XSD data, which correspond with FID/PID spikes, may suggest that low levels of CVOCs are present in the vadose zone at depth intervals including D7HRC-MIP-02 at 6.75 to 7.5 ft bgs and D7HRC-MIP-03 between 6.5 and 10.4 ft bgs (although the apparent detections occur below background, due to the elevated baseline at this location, the fluctuating XSD results combined with spikes in the FID/PID response may suggest CVOCs in D7HRC-MIP-03). The small magnitude of XSD detections does not suggest a local CVOC source. Based on potential XSD detections in the vadose zone, coupled with FID/PID spikes (both of which appear to be relatively minor in scale), small-scale CVOCs impacts in the vadose zone cannot be ruled out for this area.

4.2 D7HRC: HPT INVESTIGATION

The HPT and EC data suggest characteristic shallow and deep zones, which is consistent with observations at the other potential source areas included in the MiHPT evaluation. The transition depth interval at D7HRC is relatively shallow, occurring at about 12 ft bgs. The shallow zone is highly heterogeneous, with HPT injection pressures spanning multiple orders of magnitude and EC values that fluctuate substantially. Within the deep zone, EC values, HPT injection pressures, and estimated K values are relatively stable, with values that are consistent with those reported above for other MiPHT investigation areas. Estimated K values at D7HRC range from approximately 60 to 100 ft/d.

4.3 D7HRC: CSM

The number of MiHPT locations at D7HRC is limited, as compared to the other potential source areas, but insights are obtained that supplement the CSM. Low-level MIP detections, particularly via XSD, suggest that small quantities of CVOCs may be present in local vadose-zone soils or groundwater, but do not suggest a local DNAPL source zone. The HPT data suggest characteristic shallow and deep zones, as noted elsewhere, with a transition occurring at about 12 ft bgs.

5.0 CONCLUSIONS

The MiHPT investigation was conducted to guide location selection for subsequent soil/groundwater sampling, screen potential source areas, and to enhance the CSM with high-resolution data. The soil sampling intervals shown on Table D-1 were selected largely based on results from the MIP evaluation (the soil sampling methods and results are presented in the RI Report [Trihydro 2019]).

This evaluation includes a comparison of XSD data to "background" levels. Concentrations are considered as background in locations/depth intervals where XSD data, supported by FID and PID data, suggested that CVOCs were not present. Background levels spanned multiple orders of magnitude, typically ranging from 0.1×10^4 to 10×10^4 µV. An XSD response of 1×10^4 µV was selected as a background value, since it is representative of the observed range.

The MiHPT investigation included screening of four potential source areas (BSL, CAL, REX, and D7HRC). Of these, the strongest evidence of a local source zone occurred at BSL. At BSL, XSD detections occurred in several locations, with maximum XSD values approximately 10 to 300 times background levels. XSD detections occurred in minor amounts at CAL, REX, and D7HRC, but at much smaller levels. Maximum XSD values at CAL ranged from approximately 1 to 10 times background levels. At both REX and D7HRC, maximum XSD values typically did not exceed the assumed background level, aside from depth intervals with an elevated baseline signal. These results do not suggest that major CVOC sources exist in these areas, although additional evidence collected during the RI indicate a release location at or near REX.

The HPT data provided useful insights that may be applied in an enhanced CSM. The geology at most locations comprises a shallow zone that is heterogeneous and typically low permeability, underlain by a more homogeneous, high-permeability layer. Hydraulic conductivity values estimated using HPT suggested typical values ranging from <1 to 10 ft/d in the shallow zone and 60 to 100 ft/d in the deep zone. The depth of transition between the shallow (low-permeability) and deep (high-permeability) layers varies across the facility, but typically ranged from 12 to 20 ft bgs. The spatially extensive geologic transition was supported by both EC and HPT data.

6.0 REFERENCES

Trihydro. 2017. Remedial Investigation Work Plan, Billings PCE Groundwater Facility, Billings, Montana. November 10, 2017.

Trihydro. 2019. Remedial Investigation Report, Billings PCE Groundwater Facility, Billings, Montana. In Progress.

URS Operating Services, Inc. 2010. "Site Assessment and Remediation Alternatives Report." Billings.

776-036-001

TABLE

TABLE D-1. MiHPT DIRECT PUSH PROBING LOCATION SUMMARY
BILLINGS PCE GROUNDWATER FACILITY, BILLINGS, MONTANA

Source Area	Location	Probing Date	Total Probed Depth (ft bgs)	Preprobed Depth (ft bgs)	Sample Depths (ft bgs)
BSL	BSL-MIP-01	11/29/2017	28.5	4	0-0.5*, 4-4.5, 12-13, 17-18
BSL	BSL-MIP-02	12/1/2017	30.3	4	
BSL	BSL-MIP-03	11/29/2017	19.3	4	
BSL	BSL-MIP-04	11/30/2017	24.0	4	
BSL	BSL-MIP-05	11/30/2017	24.8	4	
BSL	BSL-MIP-06	11/28/2017	30.3	4	
BSL	BSL-MIP-07	11/28/2017	27.2	4	
BSL	BSL-MIP-08	11/28/2017	29.5	4	
BSL	BSL-MIP-09	NA - location excluded			0-0.5*, 1-2*, 8-8.5, 12-12.5, 16-16.5, 25-25.5
BSL	BSL-MIP-10	11/28/2017	30.3	4	
BSL	BSL-MIP-11	11/16/2017	30.3	4	
BSL	MIP-T10	12/1/2017	30.2	4	
BSL	MIP-T11	11/30/2017	28.8	4	
BSL	MIP-T12	11/29/2017	33.0	4	
BSL	MIP-T13	11/30/2017	23.4	4	
BSL	MIP-T14	11/30/2017	26.2	4	
BSL	MIP-T15	11/28/2017	28.4	4	
BSL	MIP-T16	11/29/2017	27.4	4	
BSL	MIP-T17	11/29/2017	28.0	4	
BSL	MIP-T18	NA - location excluded			0-0.5*, 9.5-10, 13-14
BSL	MIP-T19	11/29/2017	30.1	4	
BSL	MIP-T20	12/1/2017	31.1	4	0-0.5*, 12-13, 14-15
BSL	MIP-T21	12/1/2017	28.3	4	
BSL Total locations: 21 (23 planned)					
CAL	CAL-MIP-01	11/13/2017	34.5	4	
CAL	CAL-MIP-02	11/30/2017	38.4	4	0-0.5*, 8-9, 8.5-9, 11-12, 20-21
CAL	CAL-MIP-03	NA - location excluded			
CAL	CAL-MIP-04	11/14/2017	28.1	4	0-0.5*, 1-2*, 3-3.5, 6-6.5, 14-14.5, 23-23.5
CAL	CAL-MIP-05	11/29/2017	27.6	4	
CAL	CAL-MIP-06	11/14/2017	21.2	4	
CAL	CAL-MIP-07	11/14/2017	28.0	4	

TABLE D-1. MiHPT DIRECT PUSH PROBING LOCATION SUMMARY
BILLINGS PCE GROUNDWATER FACILITY, BILLINGS, MONTANA

Source Area	Location	Probing Date	Total Probed Depth (ft bgs)	Preprobed Depth (ft bgs)	Sample Depths (ft bgs)
CAL	CAL-MIP-08	11/15/2017	28.8	4	
CAL	CAL-MIP-09	11/15/2017	30.4	4	0-0.5*, 5.5-6.5, 19-19.5
CAL	CAL-MIP-10	11/13/2017	34.2	4	
CAL	MIP-T01	NA - location excluded			
CAL	MIP-T02	11/14/2017	31.8	4	
CAL	MIP-T03	11/14/2017	27.2	4	0-0.5*, 3.5-4.5, 4.5-5, 5-7.5, 10-18.5, 20-25
CAL	MIP-T04	NA - location excluded			
CAL	MIP-T05	NA - location excluded			
CAL	MIP-T06	11/16/2017	31.3	4	
CAL	MIP-T07	11/16/2017	29.5	4	
CAL	MIP-T08	11/16/2017	29.5	4	
CAL	MIP-T09	11/16/2017	31.0	4	
CAL Total locations: 15 (19 planned)					
Rex	REX-MIP-01	12/20/2017	24.4	4	
Rex	REX-MIP-02	12/19/2017	29.5	4	
Rex	REX-MIP-03	12/20/2017	30.7	4	0-0.5*, 10-10.5, 17-17.5
Rex	REX-MIP-04	12/19/2017	27.1	4	0-0.5*, 12-12.5
Rex	REX-MIP-05	12/19/2017	26.7	4	
Rex	REX-MIP-06	12/20/2017	27.2	4	
Rex	REX-MIP-07	12/19/2017	15.1	4	0-0.5*, 3.5-4
Rex	REX-MIP-08	12/2/2017	26.4	4	0-0.5*, 1-2*, 5-5.5, 9.5-10, 15-15.5, 17-17.5, 23-23.5
Rex	REX-MIP-09	12/2/2017	12.1	4	
Rex	MIP-T27	12/2/2017	25.7	4	
REX Total locations: 10 (10 planned)					
D7HRC	D7HRC-MIP-01	11/17/2017	20.4	4	7-9
D7HRC	D7HRC-MIP-02	11/17/2017	20.0	4	
D7HRC	D7HRC-MIP-03	11/17/2017	20.2	4	
D7HRC Total locations: 3 (3 planned)					

Notes:

* indicates surface sample, defined as being collected from the upper 2 feet

ft bgs: feet below ground surface

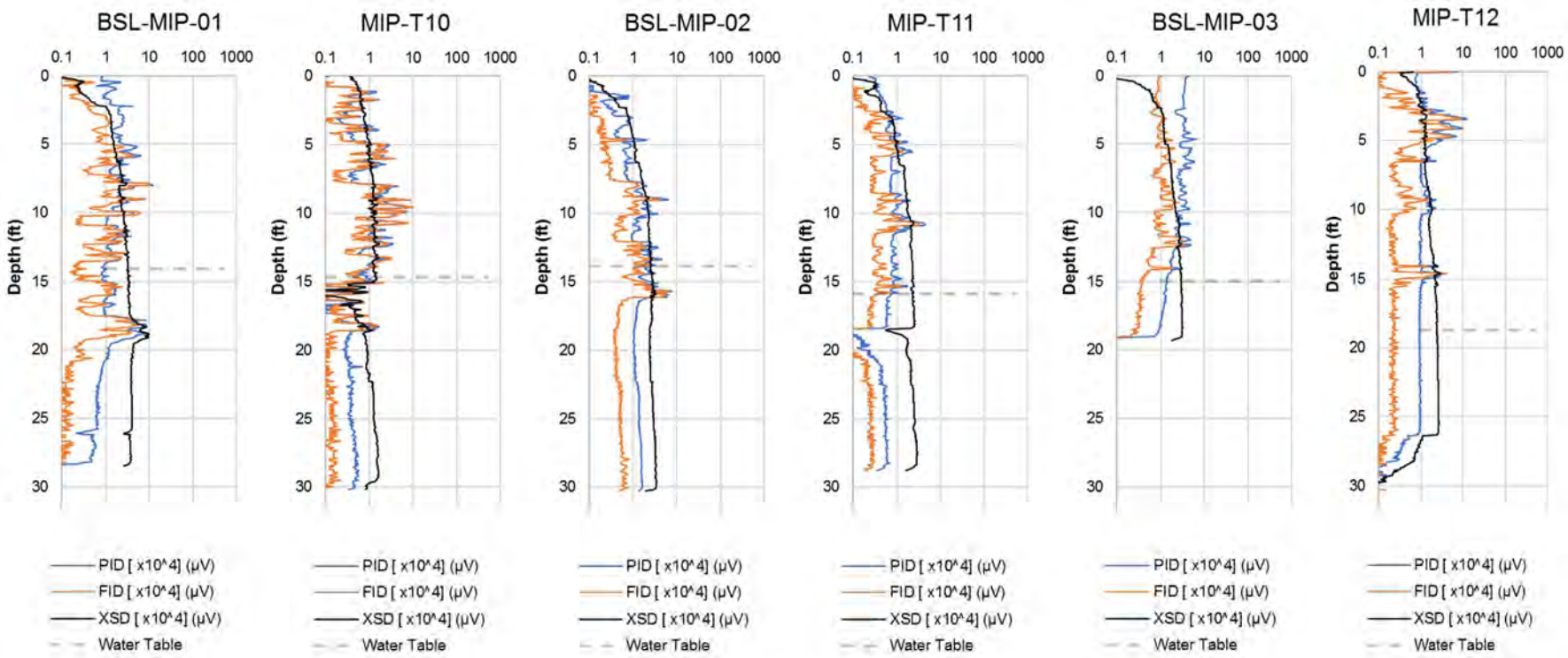
NA - location excluded: not evaluated during the MiHPT survey due to accessibility issues while the MiHPT equipment was on site.

For excluded locations near BSL soil cores were collected for sampling at a later time.

FIGURES

FIGURE D-1a. BIG SKY LINEN MiHPT DATA
REMEDIAL INVESTIGATION REPORT
BILLINGS PCE GROUNDWATER FACILITY, BILLINGS, MONTANA

MIP Data: BSL – South Central Ave Transect

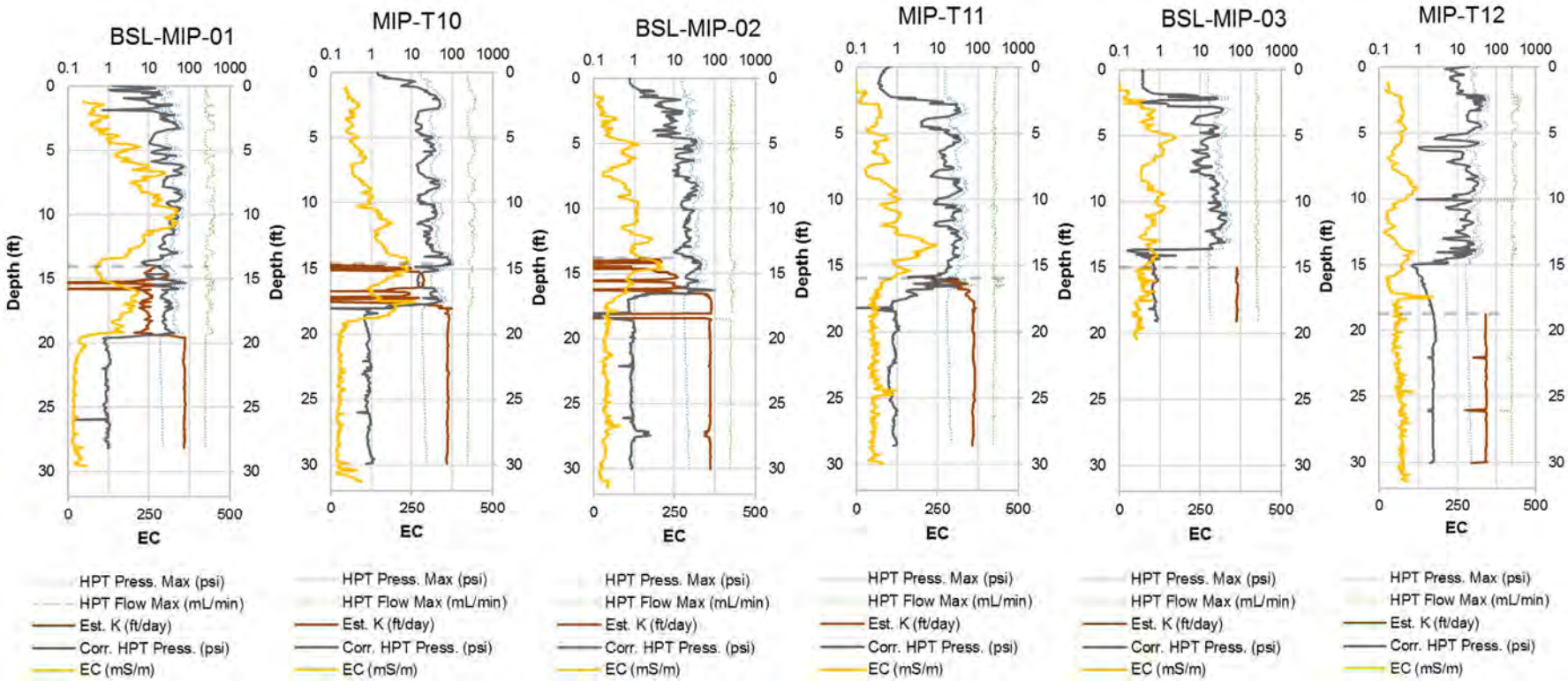


Notes:
BSL: Big Sky Linen
FID: flame ionization detector
ft: feet
MIP: membrane interface probe
PID: photo ionization detector
XSD: halogen specific detector
µV: micro volts

PID and FID data are corrected for high baseline by subtracting the minimal value from each data point

FIGURE D-1a. BIG SKY LINEN MiHPT DATA
REMEDIAL INVESTIGATION REPORT
BILLINGS PCE GROUNDWATER FACILITY, BILLINGS, MONTANA

HPT Data: BSL – South Central Ave Transect



Notes:
BSL: Big Sky Linen
ft: feet
HPT: hydraulic profiling tool
Est. K: estimated hydraulic conductivity
EC: electrical conductivity
Corr. HPT Press.: corrected HPT pressure
Psi: pounds per square inch
mS/m: millisiemens per meter
mL/min: milliliters per minute

FIGURE D-1a. BIG SKY LINEN MiHPT DATA
REMEDIAL INVESTIGATION REPORT
BILLINGS PCE GROUNDWATER FACILITY, BILLINGS, MONTANA

MIP Data: BSL – North Central Ave Transect

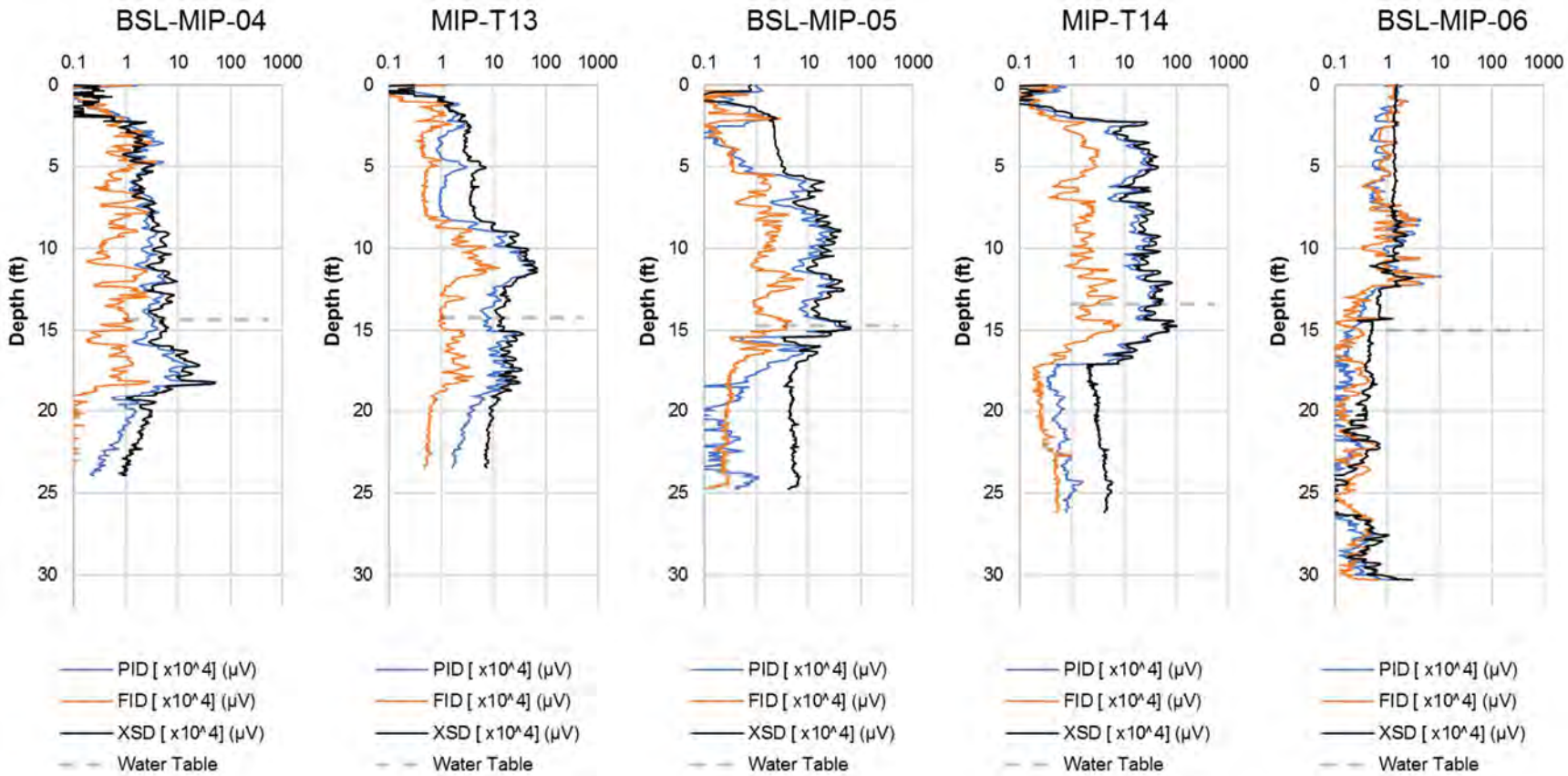


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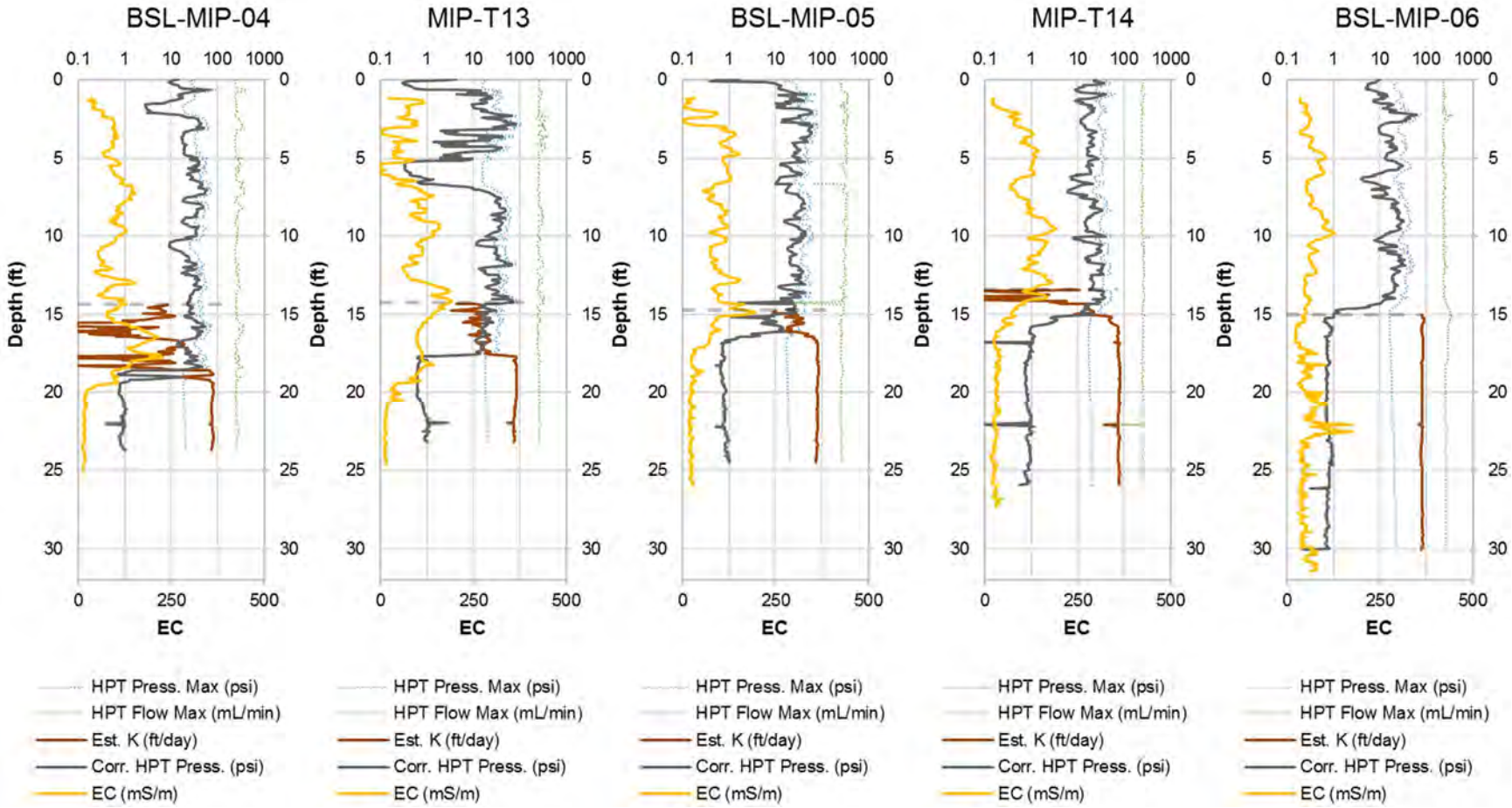
FIGURE D-1a. BIG SKY LINEN MiHPT DATA
REMEDIAL INVESTIGATION REPORT
BILLINGS PCE GROUNDWATER FACILITY, BILLINGS, MONTANA

HPT Data: BSL – North Central Ave Transect



Notes:
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ft: feet
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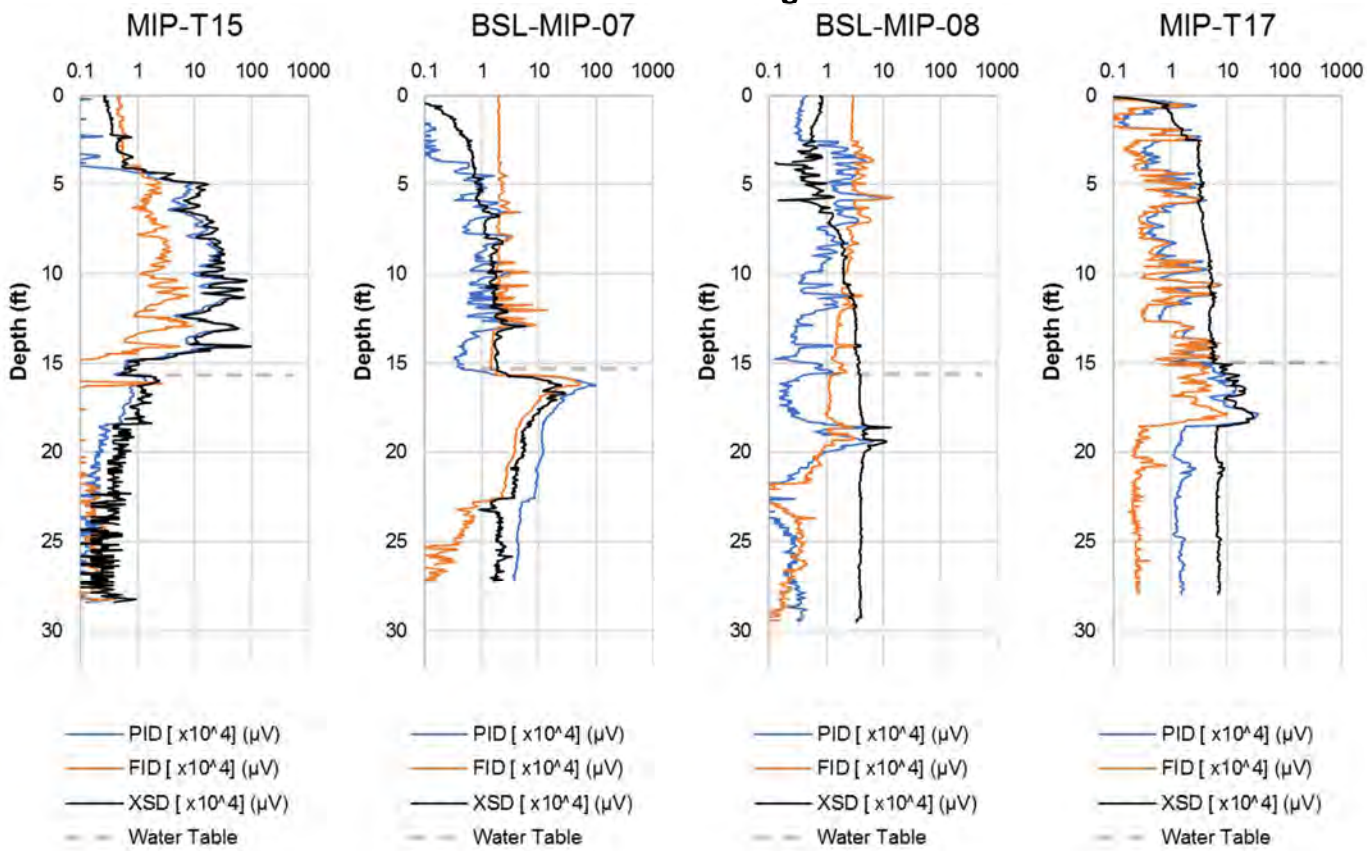
Est. K: estimated hydraulic conductivity
EC: electrical conductivity
Corr. HPT Press.: corrected HPT pressure
Psi: pounds per square inch
mS/m: millisiemens per meter
mL/min: milliliters per minute

FIGURE D-1a. BIG SKY LINEN MiHPT DATA
REMEDIAL INVESTIGATION REPORT
BILLINGS PCE GROUNDWATER FACILITY, BILLINGS, MONTANA

MIP Data: BSL – 711 Building Area Transect

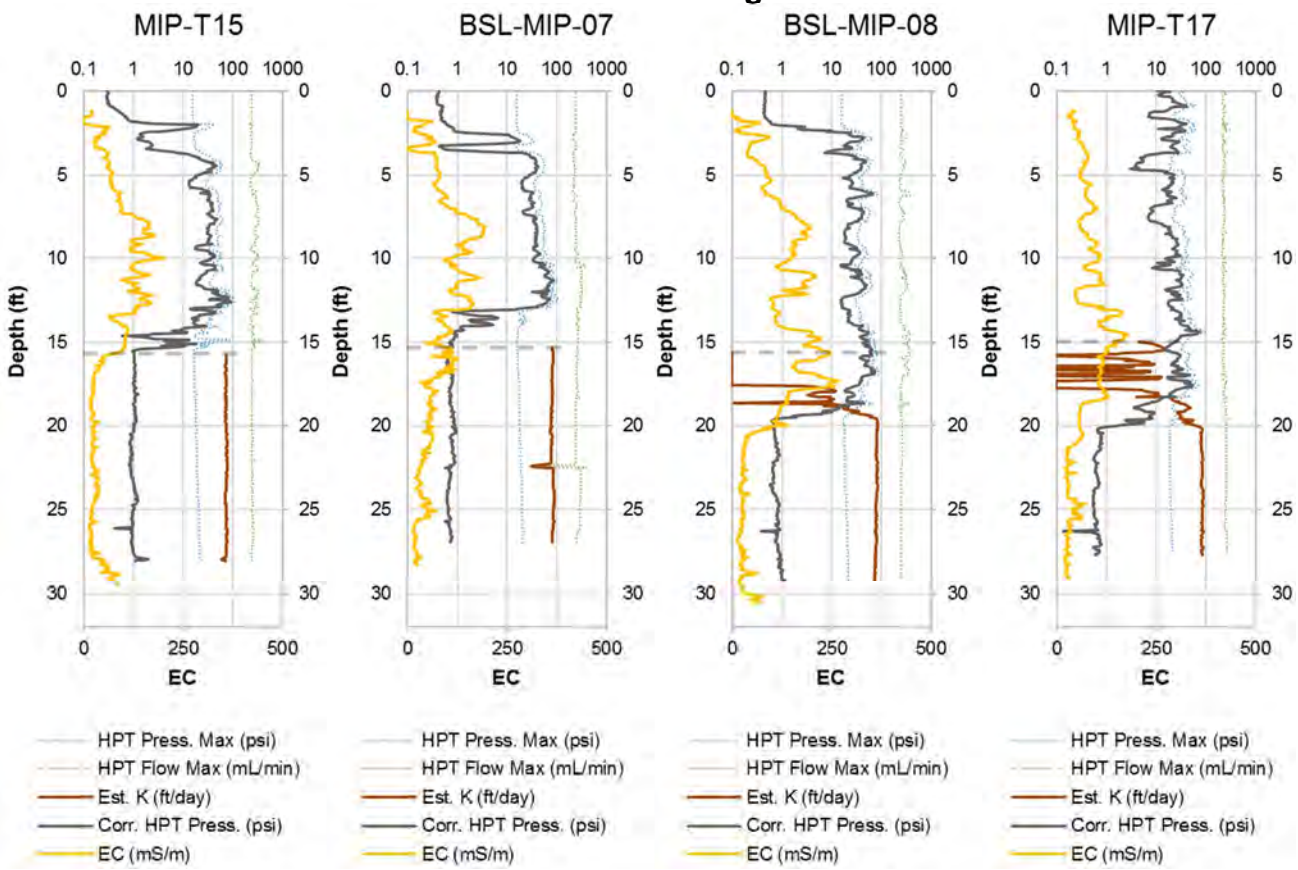


Notes:
BSL: Big Sky Linen
FID: flame ionization detector
ft: feet
MIP: membrane interface probe
PID: photo ionization detector
XSD: halogen specific detector
µV: micro volts

PID and FID data are corrected for high baseline by subtracting the minimal value from each data point

FIGURE D-1a. BIG SKY LINEN MiHPT DATA
REMEDIAL INVESTIGATION REPORT
BILLINGS PCE GROUNDWATER FACILITY, BILLINGS, MONTANA

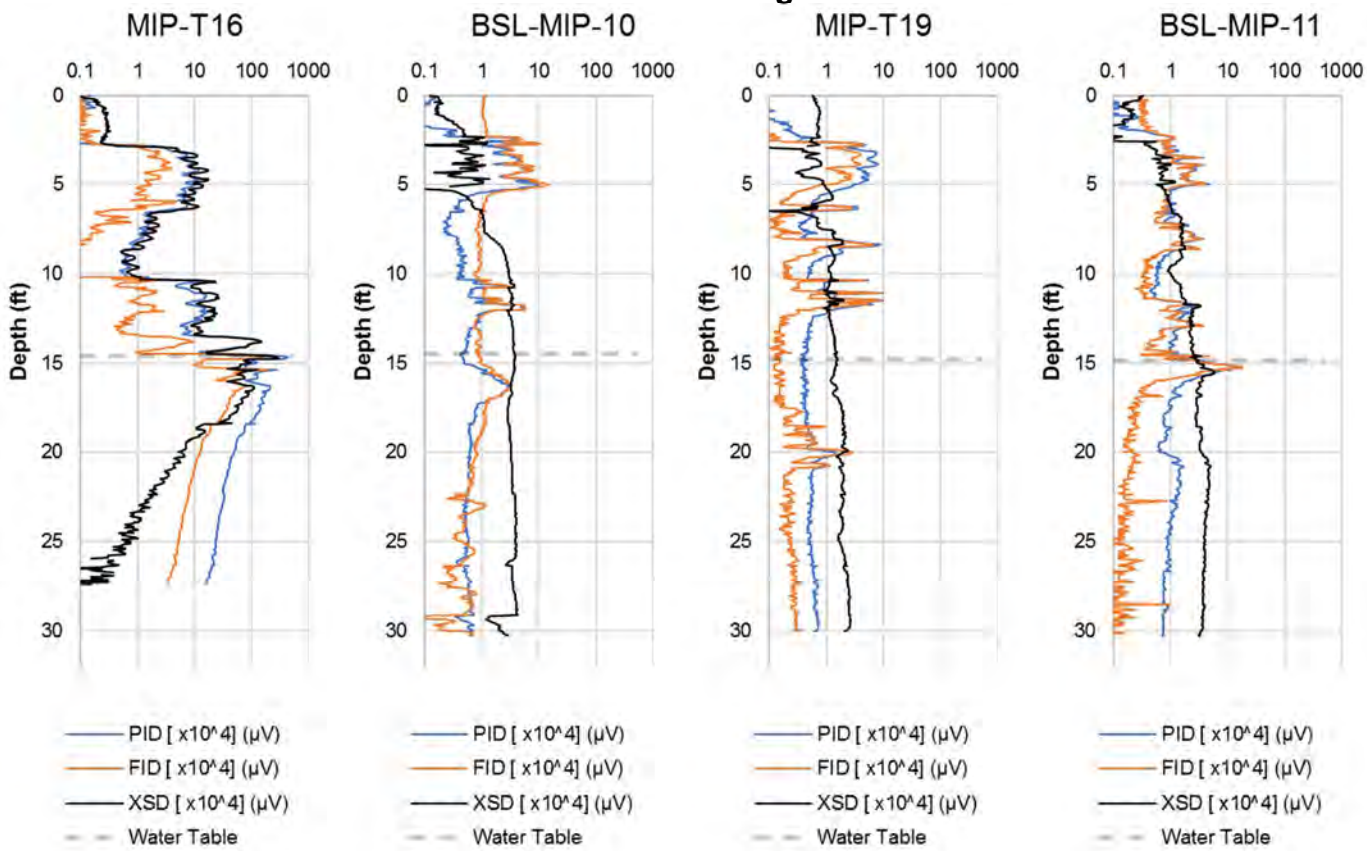
HPT Data: BSL – 711 Building Area Transect



Notes:
BSL: Big Sky Linen
ft: feet
HPT: hydraulic profiling tool
Est. K: estimated hydraulic conductivity
EC: electrical conductivity
Corr. HPT Press.: corrected HPT pressure
Psi: pounds per square inch
mS/m: millisiemens per meter
mL/min: milliliters per minute

FIGURE D-1a. BIG SKY LINEN MiHPT DATA
REMEDIAL INVESTIGATION REPORT
BILLINGS PCE GROUNDWATER FACILITY, BILLINGS, MONTANA

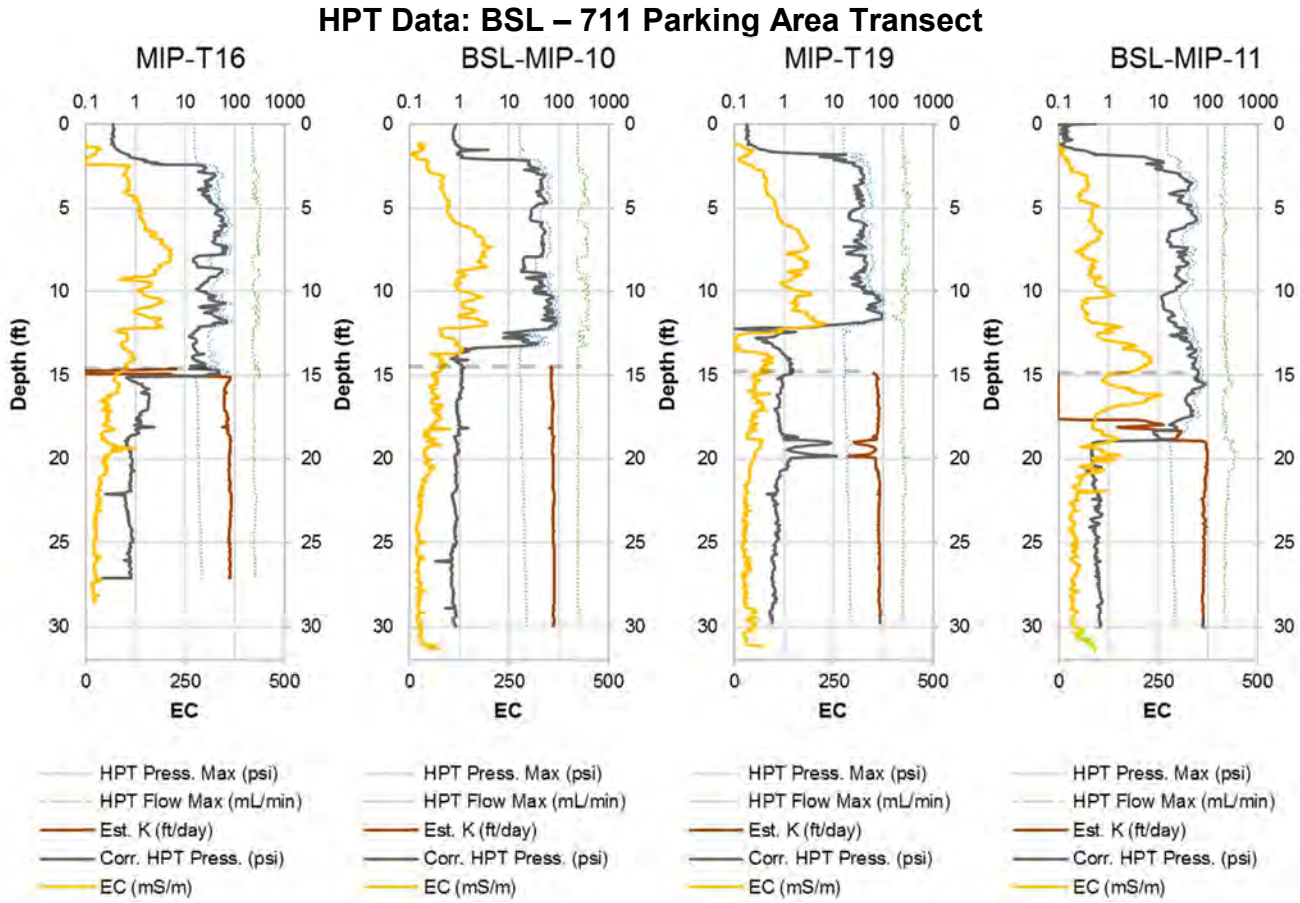
MIP Data: BSL – 711 Parking Area Transect



Notes:
BSL: Big Sky Linen
FID: flame ionization detector
ft: feet
MIP: membrane interface probe
PID: photo ionization detector
XSD: halogen specific detector
µV: micro volts

PID and FID data are corrected for high baseline by subtracting the minimal value from each data point

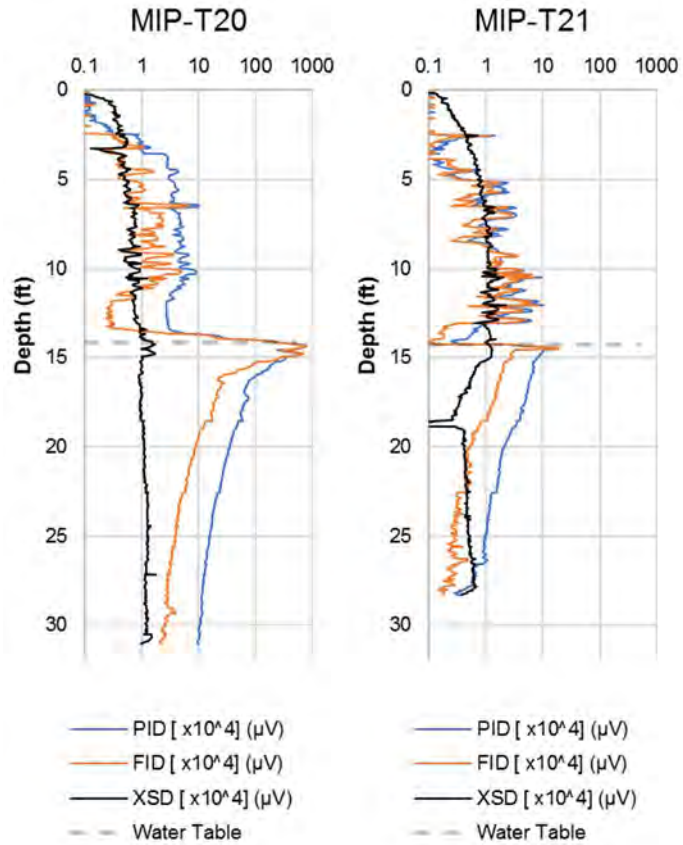
FIGURE D-1a. BIG SKY LINEN MiHPT DATA
REMEDIAL INVESTIGATION REPORT
BILLINGS PCE GROUNDWATER FACILITY, BILLINGS, MONTANA



Notes:
BSL: Big Sky Linen
ft: feet
HPT: hydraulic profiling tool
Est. K: estimated hydraulic conductivity
EC: electrical conductivity
Corr. HPT Press.: corrected HPT pressure
Psi: pounds per square inch
mS/m: millisiemens per meter
mL/min: milliliters per minute

FIGURE D-1a. BIG SKY LINEN MiHPT DATA
REMEDIAL INVESTIGATION REPORT
BILLINGS PCE GROUNDWATER FACILITY, BILLINGS, MONTANA

MIP Data: BSL – 711 North Alley Transect



Notes:
BSL: Big Sky Linen
FID: flame ionization detector
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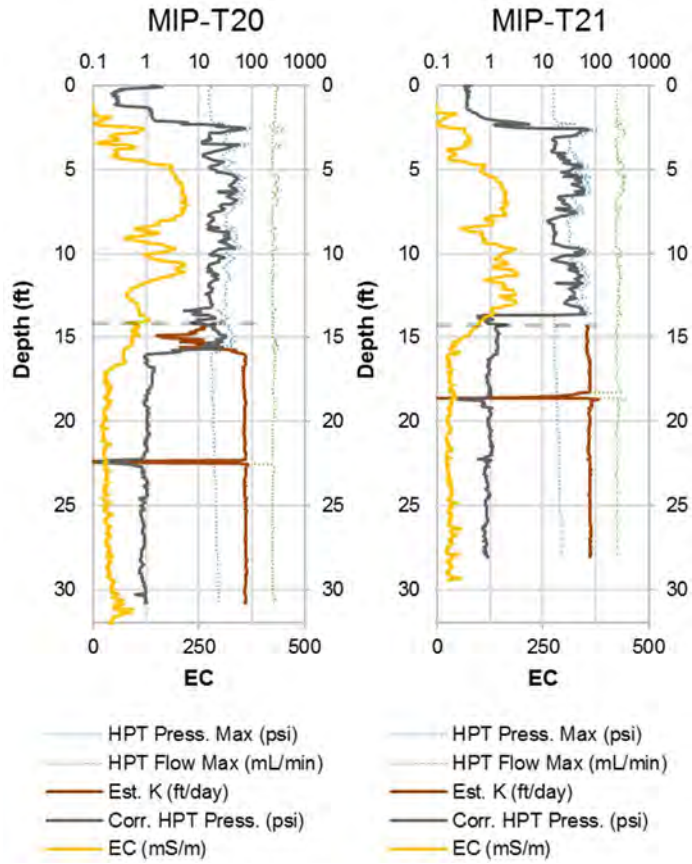
MIP: membrane interface probe
PID: photo ionization detector
XSD: halogen specific detector
µV: micro volts

PID and FID data are corrected for high baseline by subtracting the minimal value from each data point

FIGURE D-1a. BIG SKY LINEN MiHPT DATA
REMEDIAL INVESTIGATION REPORT
BILLINGS PCE GROUNDWATER FACILITY, BILLINGS, MONTANA

HPT Data: BSL – 711 North Alley Transect



Notes:
BSL: Big Sky Linen
ft: feet
HPT: hydraulic profiling tool
Est. K: estimated hydraulic conductivity
EC: electrical conductivity
Corr. HPT Press.: corrected HPT pressure
Psi: pounds per square inch
mS/m: millisiemens per meter
mL/min: milliliters per minute

EXPLANATION

- MiHPT LOCATION
- MAXIMUM XSD (NORM) BETWEEN 10 AND 50 ($x10^4$)
- MAXIMUM XSD (NORM) GREATER THAN 50 ($x10^4$)
- FACILITY GRID WITH X,Y NUMBER (SPACING = 500 FEET)

NOTES:

- MAXIMUM XSD VALUES (MEASURED / NORMALIZED) ARE SHOWN.
- NORMALIZED XSD VALUES ARE BASELINE CORRECTED BY SUBTRACTING THE MINIMUM VALUES FOR EACH LOCATION. CONTOURS ARE BASED ON NORMALIZED VALUES.
- MIP: MEMBRANE INTERFACE PROBE
- MiHPT: MEMBRANE INTERFACE PROBE/HYDRAULIC PROFILING TOOL
- BSL: BIG SKY LINEN
- XSD: HALOGEN SPECIFIC DETECTOR

N

0 70'

Trihydro CORPORATION
1252 Commerce Drive
Laramie, WY 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

FIGURE D-1b

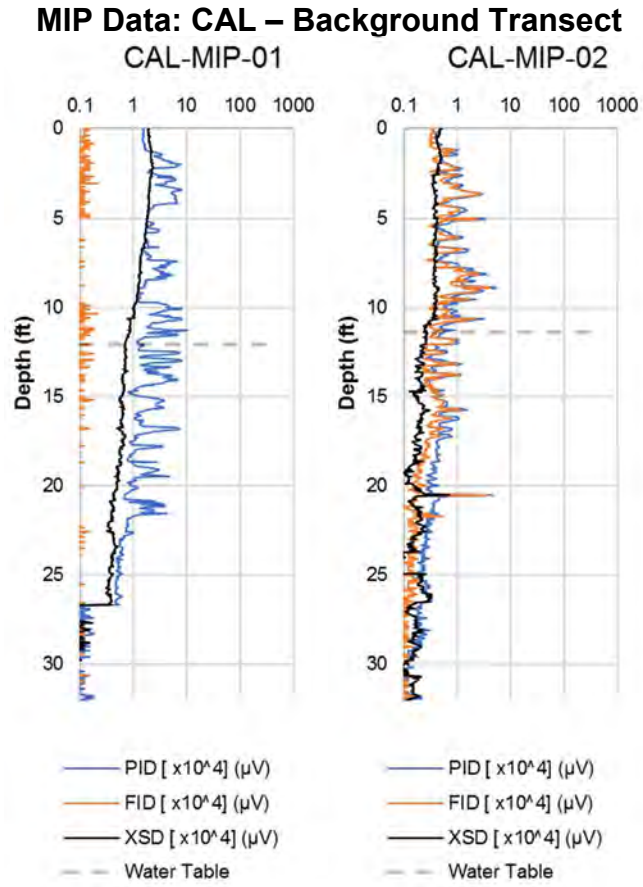
MIP DATA EVALUATION AT BIG SKY LINEN

REMEDIAL INVESTIGATION REPORT
BILLINGS PCE GROUNDWATER FACILITY
BILLINGS, MONTANA

Drawn By: PH	Checked By: MO	Scale: 1 " = 70 '	Date: 12/28/18	File: AppD-1b_Billings_MIPBigSky.mxd

\\TRIHYDRO.CO\MCLIENTS\GOVSTATEMDEQSRS\BILLINGSPCE\GIS\MAPPING\2018_RI_REPORT\APPD-1B_BILLINGS_MIPBIGSKY.MXD

FIGURE D-2. CENTRAL AVENUE LAUNDRY MiHPT DATA
REMEDIAL INVESTIGATION REPORT
BILLINGS PCE GROUNDWATER FACILITY, BILLINGS, MONTANA



Notes:
BSL: Big Sky Linen
FID: flame ionization detector
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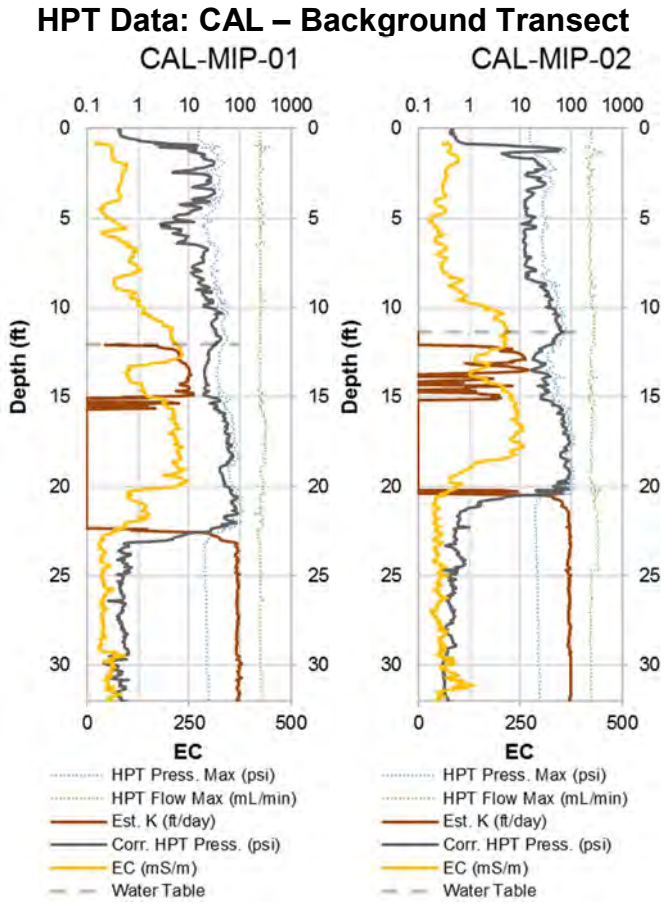
MIP: membrane interface probe
PID: photo ionization detector
XSD: halogen specific detector
µV: micro volts

PID and FID data are corrected for high baseline by subtracting the minimal value from each data point

FIGURE D-2. CENTRAL AVENUE LAUNDRY MiHPT DATA
REMEDIAL INVESTIGATION REPORT
BILLINGS PCE GROUNDWATER FACILITY, BILLINGS, MONTANA



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EC: electrical conductivity
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Psi: pounds per square inch
mS/m: millisiemens per meter
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REMEDIAL INVESTIGATION REPORT
BILLINGS PCE GROUNDWATER FACILITY, BILLINGS, MONTANA

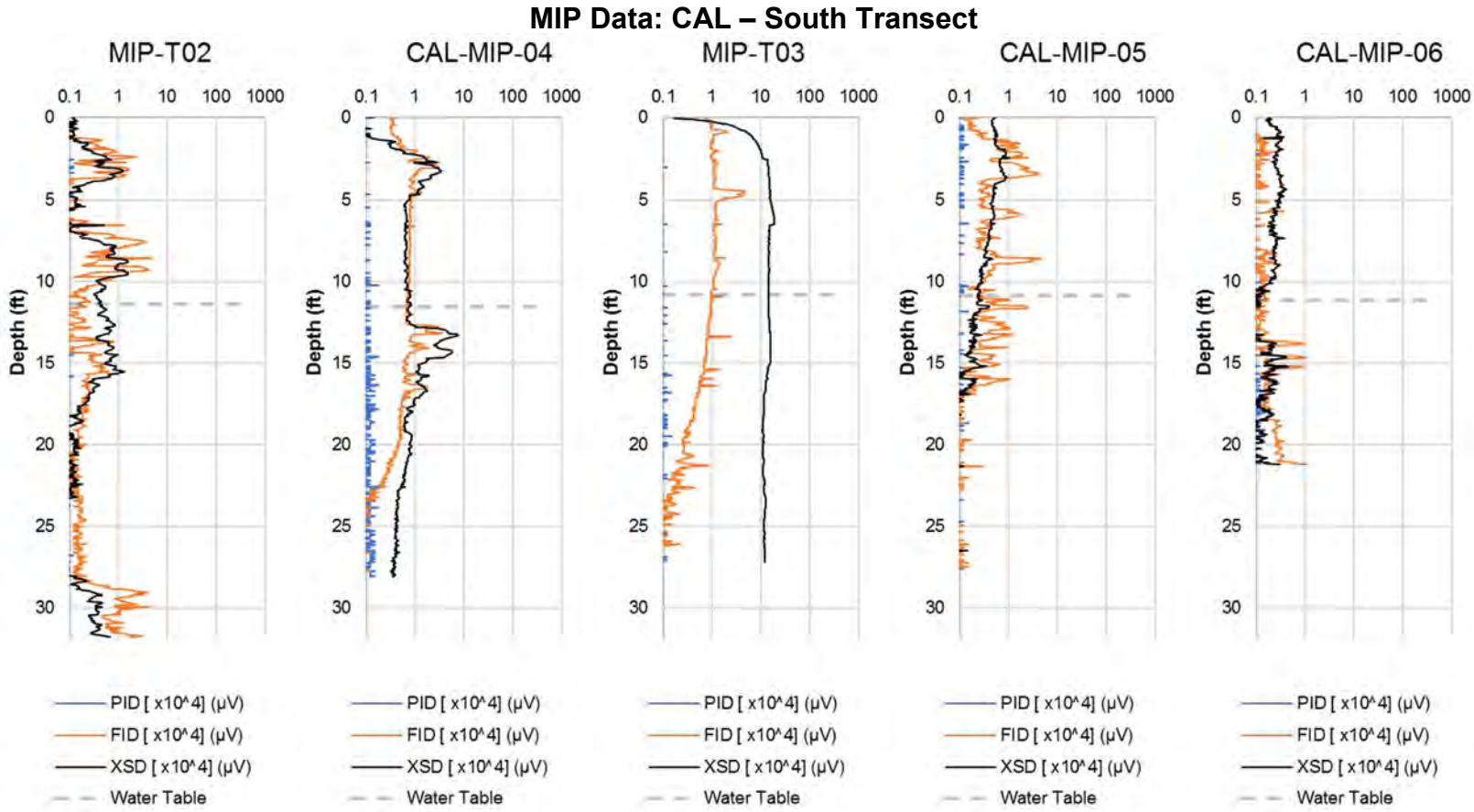

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FIGURE D-2. CENTRAL AVENUE LAUNDRY MiHPT DATA
REMEDIAL INVESTIGATION REPORT
BILLINGS PCE GROUNDWATER FACILITY, BILLINGS, MONTANA

HPT Data: CAL – South Transect

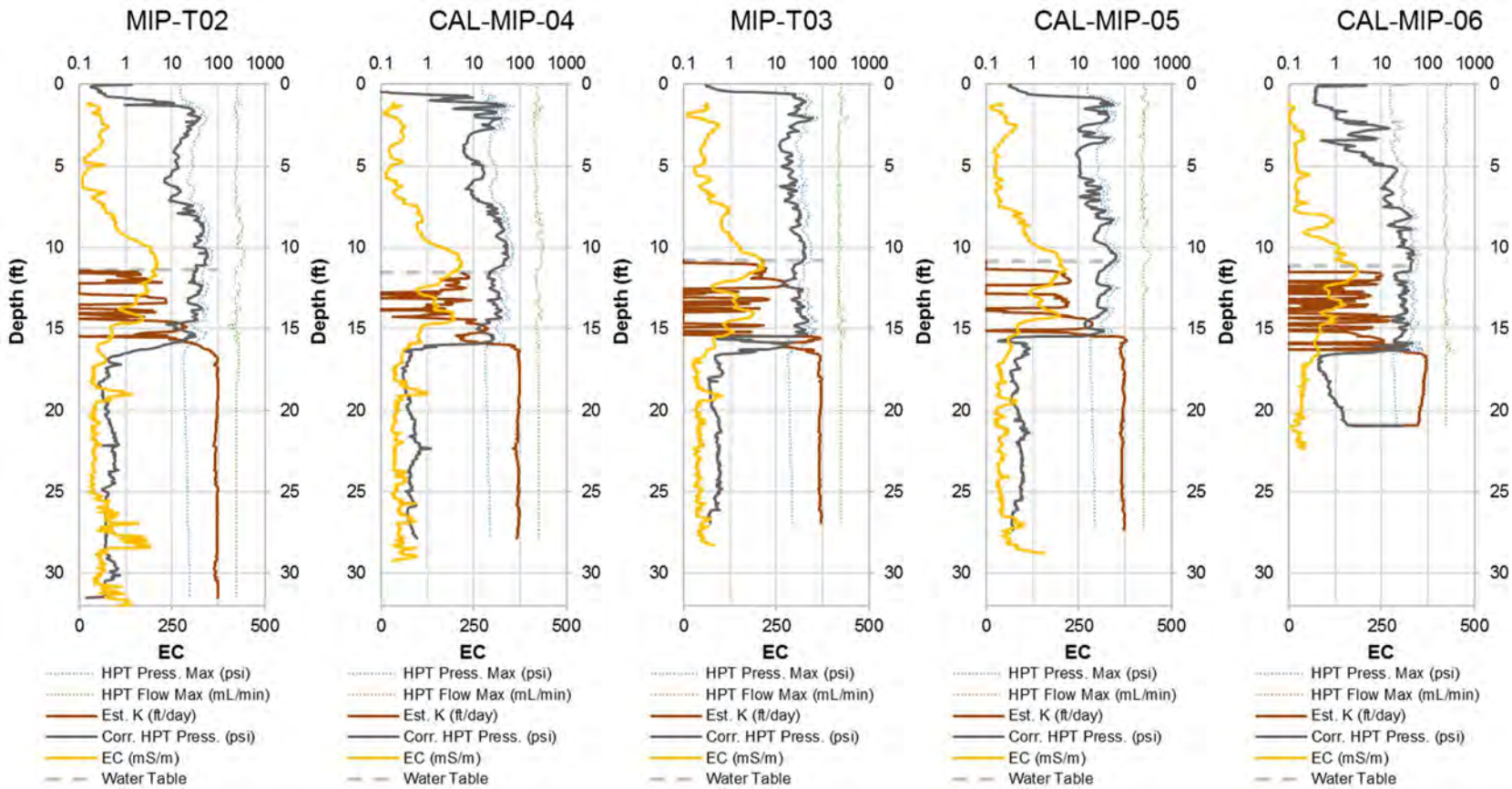

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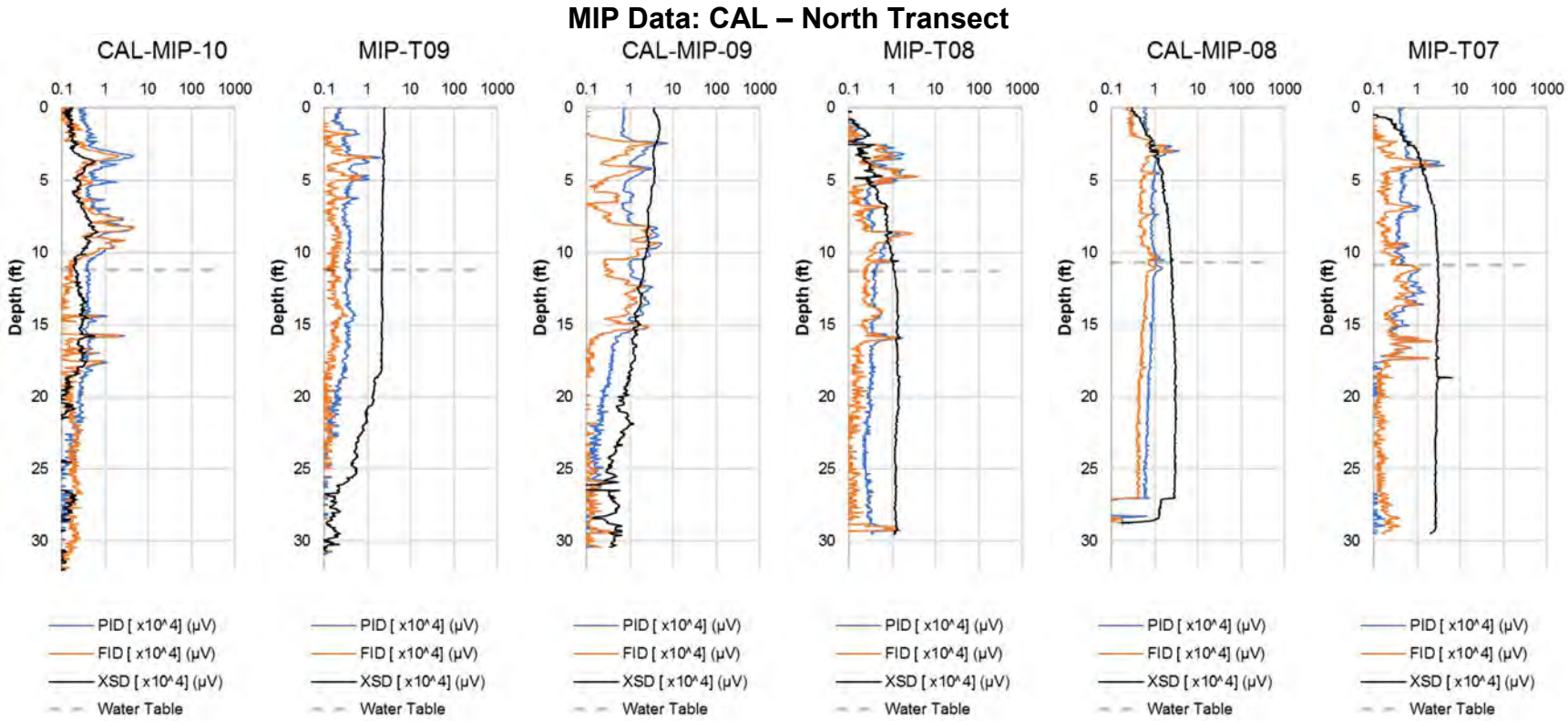
FIGURE D-2. CENTRAL AVENUE LAUNDRY MiHPT DATA
REMEDIAL INVESTIGATION REPORT
BILLINGS PCE GROUNDWATER FACILITY, BILLINGS, MONTANA



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MIP: membrane interface probe
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XSD: halogen specific detector
µV: micro volts

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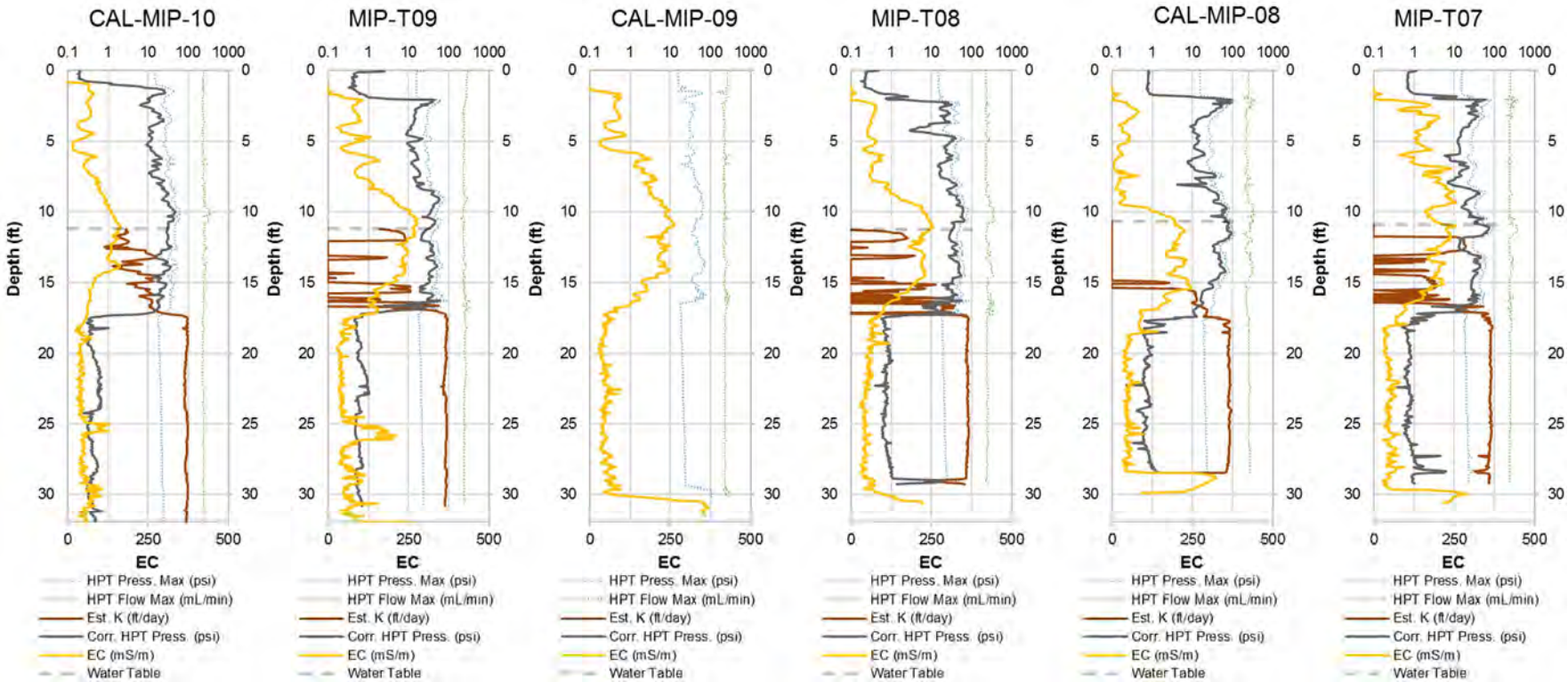
FIGURE D-2. CENTRAL AVENUE LAUNDRY MiHPT DATA
REMEDIAL INVESTIGATION REPORT
BILLINGS PCE GROUNDWATER FACILITY, BILLINGS, MONTANA

HPT Data: CAL – North Transect



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Psi: pounds per square inch
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FIGURE D-2. CENTRAL AVENUE LAUNDRY MiHPT DATA
REMEDIAL INVESTIGATION REPORT
BILLINGS PCE GROUNDWATER FACILITY, BILLINGS, MONTANA

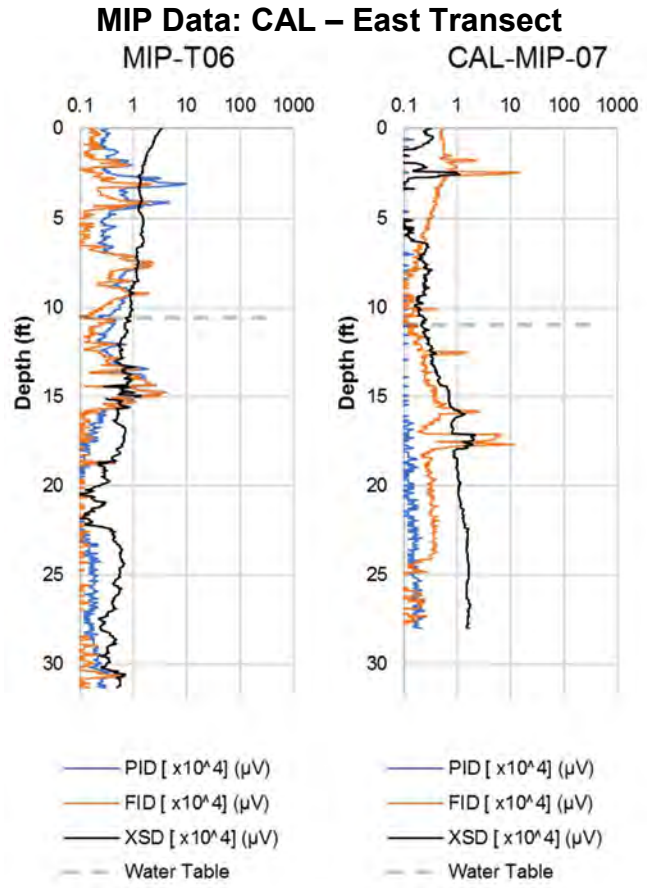

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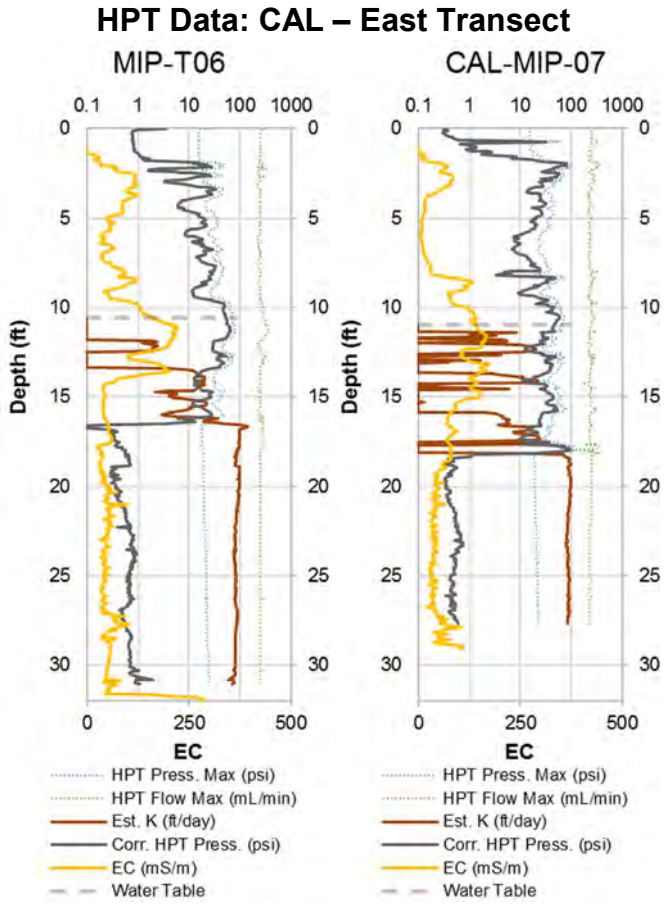
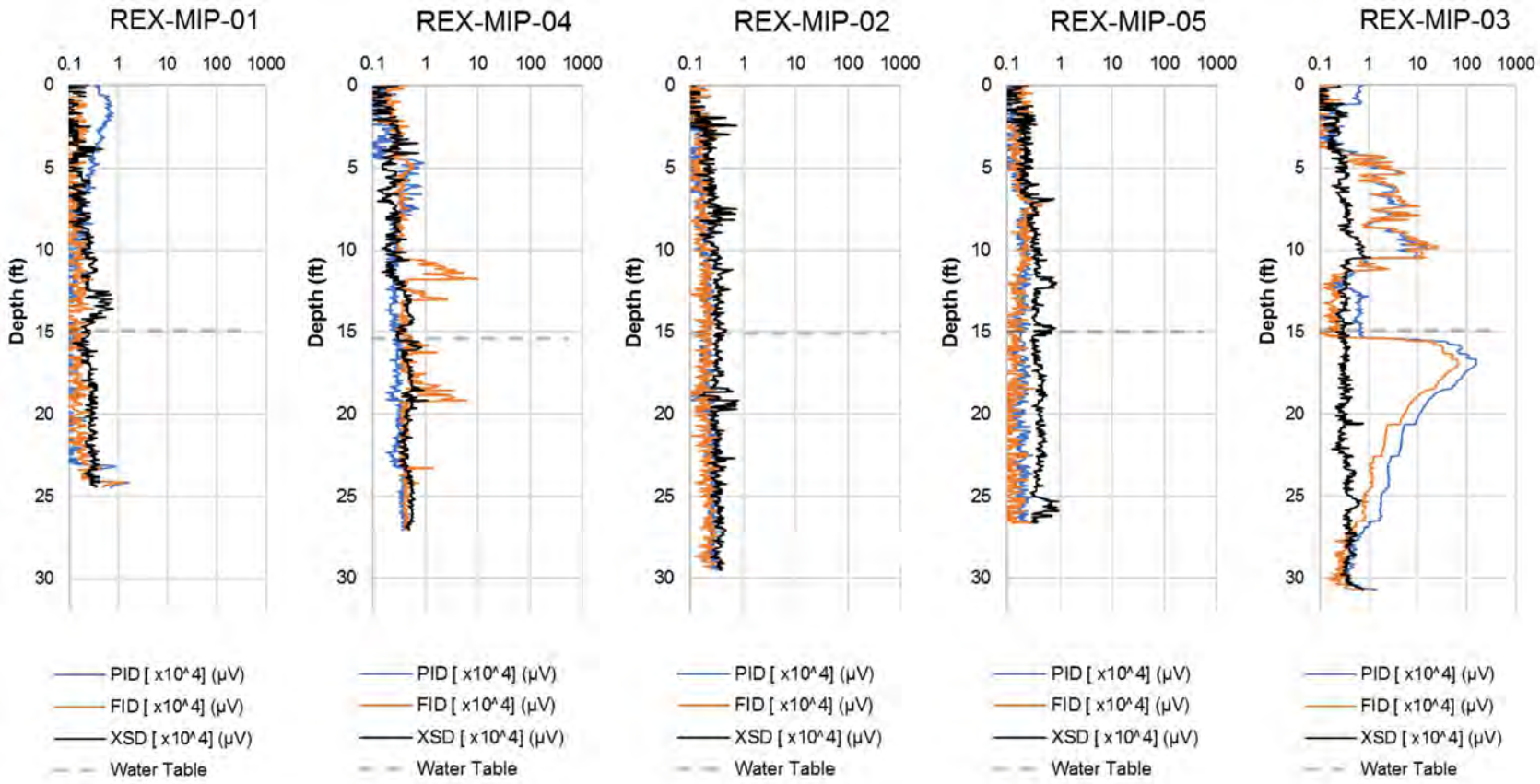
FIGURE D-2. CENTRAL AVENUE LAUNDRY MiHPT DATA
REMEDIAL INVESTIGATION REPORT
BILLINGS PCE GROUNDWATER FACILITY, BILLINGS, MONTANA



Notes:
BSL: Big Sky Linen
ft: feet
HPT: hydraulic profiling tool
Est. K: estimated hydraulic conductivity
EC: electrical conductivity
Corr. HPT Press.: corrected HPT pressure
Psi: pounds per square inch
mS/m: millisiemens per meter
mL/min: milliliters per minute

FIGURE D-3. REX CLEANERS MiHPT DATA
REMEDIAL INVESTIGATION REPORT
BILLINGS PCE GROUNDWATER FACILITY, BILLINGS, MONTANA

MIP Data: REX – South Transect

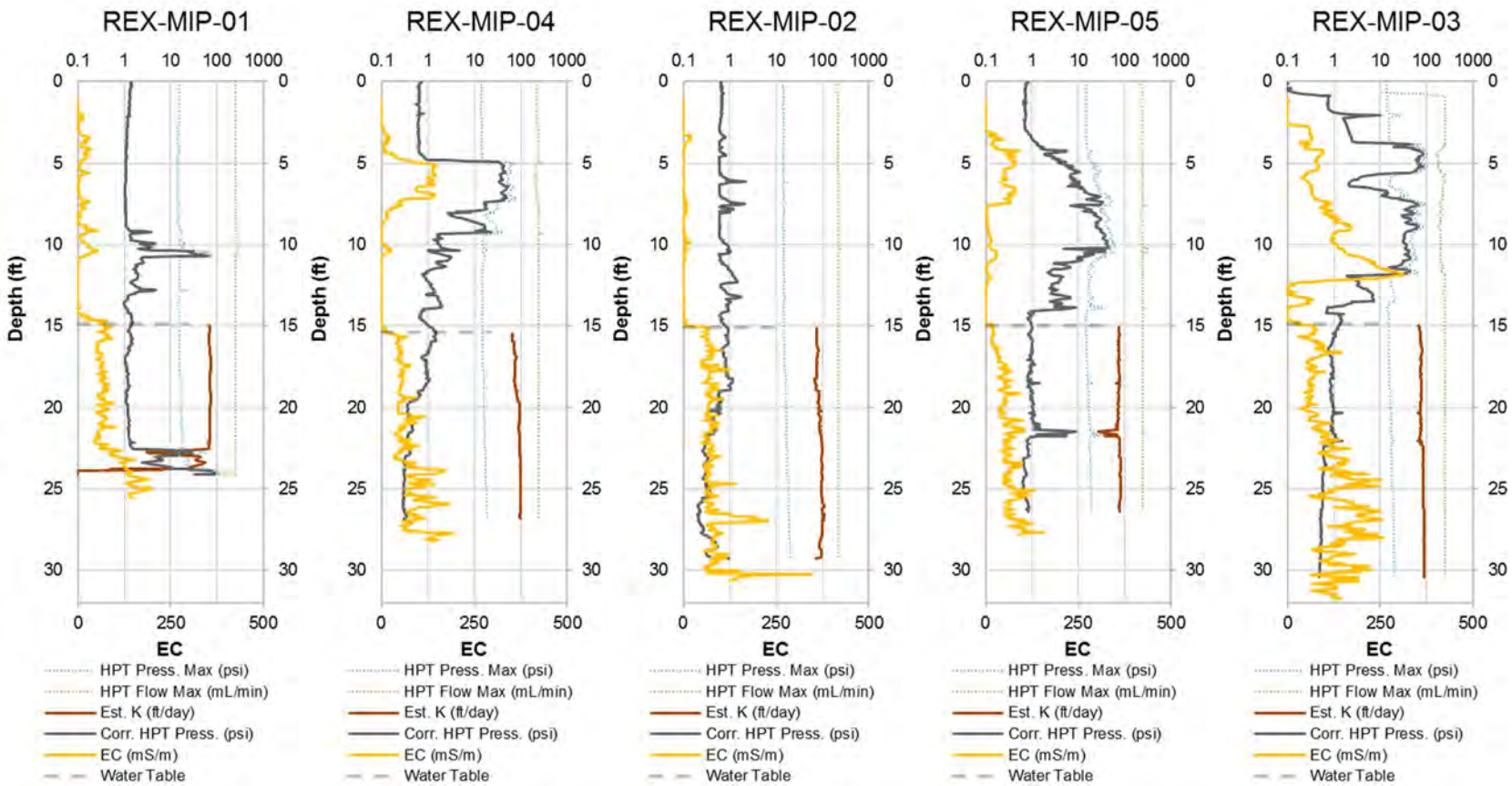


Notes:
BSL: Big Sky Linen
FID: flame ionization detector
ft: feet
MIP: membrane interface probe
PID: photo ionization detector
XSD: halogen specific detector
µV: micro volts

PID and FID data are corrected for high baseline by subtracting the minimal value from each data point

FIGURE D-3. REX CLEANERS MiHPT DATA
REMEDIAL INVESTIGATION REPORT
BILLINGS PCE GROUNDWATER FACILITY, BILLINGS, MONTANA

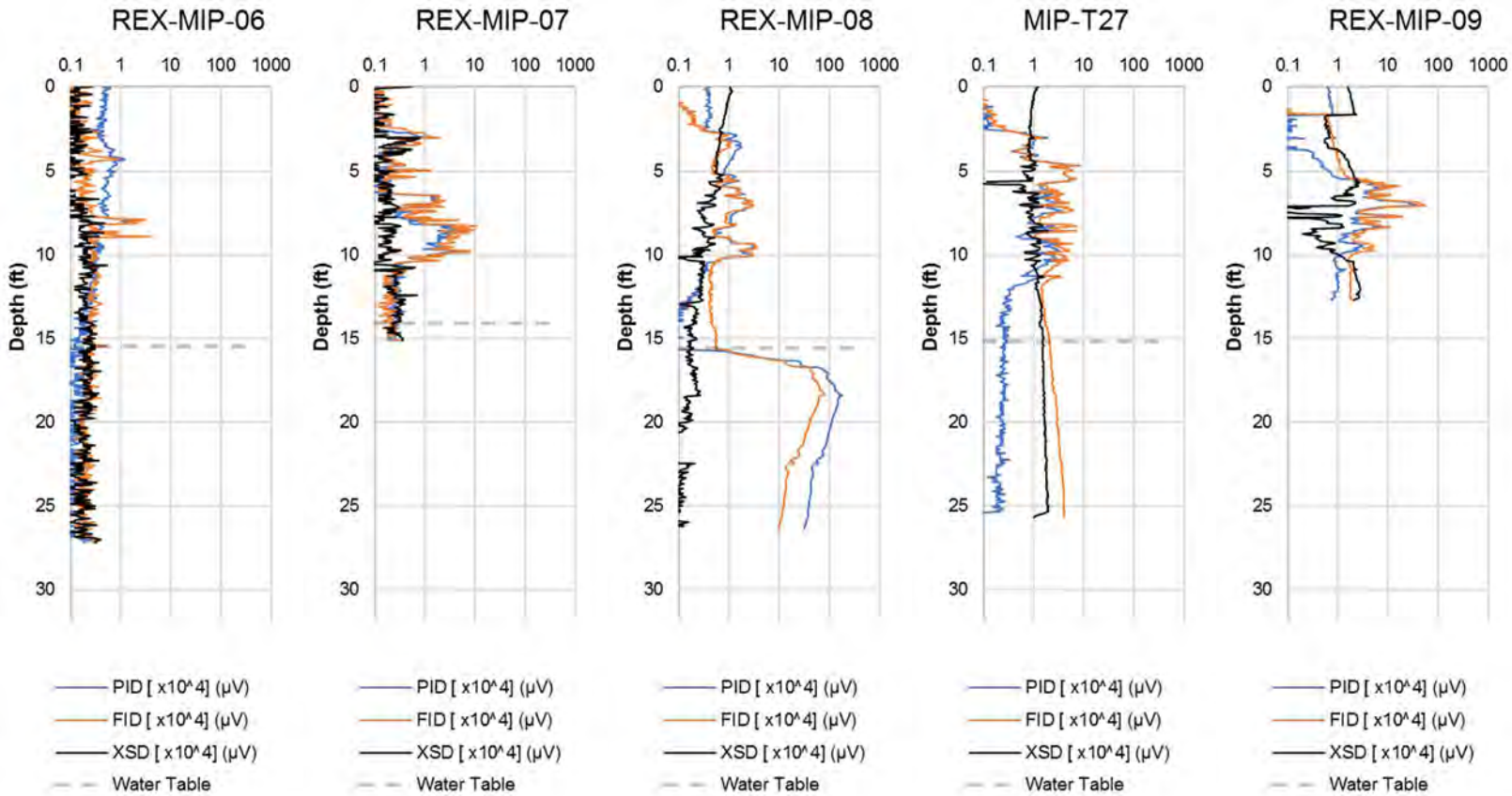
HPT Data: REX – South Transect



Notes:
BSL: Big Sky Linen
ft: feet
HPT: hydraulic profiling tool
Est. K: estimated hydraulic conductivity
EC: electrical conductivity
Corr. HPT Press.: corrected HPT pressure
Psi: pounds per square inch
mS/m: millisiemens per meter
mL/min: milliliters per minute

FIGURE D-3. REX CLEANERS MiHPT DATA
REMEDIAL INVESTIGATION REPORT
BILLINGS PCE GROUNDWATER FACILITY, BILLINGS, MONTANA

MIP Data: REX – North Transect

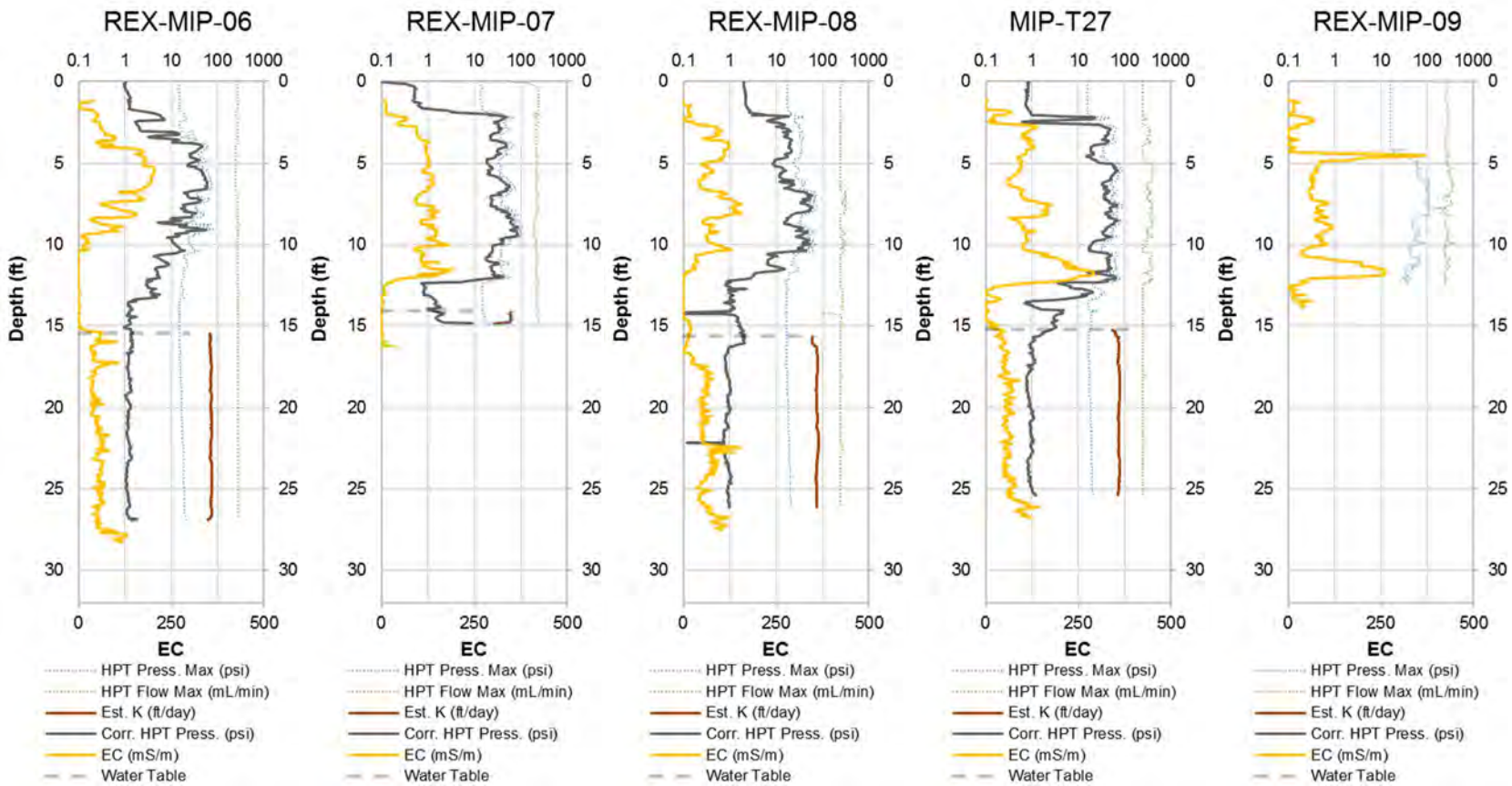


Notes:
BSL: Big Sky Linen
FID: flame ionization detector
ft: feet
MIP: membrane interface probe
PID: photo ionization detector
XSD: halogen specific detector
µV: micro volts

PID and FID data are corrected for high baseline by subtracting the minimal value from each data point

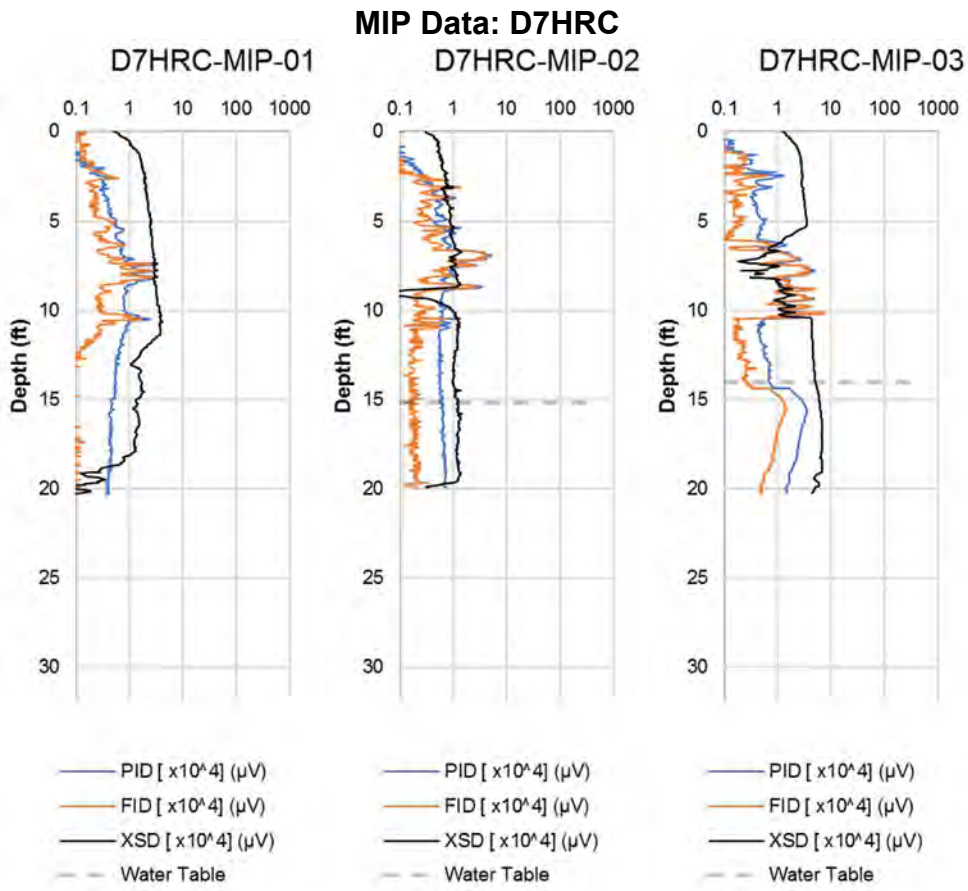
FIGURE D-3. REX CLEANERS MiHPT DATA
REMEDIAL INVESTIGATION REPORT
BILLINGS PCE GROUNDWATER FACILITY, BILLINGS, MONTANA

HPT Data: REX – North Transect



Notes:
BSL: Big Sky Linen
ft: feet
HPT: hydraulic profiling tool
Est. K: estimated hydraulic conductivity
EC: electrical conductivity
Corr. HPT Press.: corrected HPT pressure
Psi: pounds per square inch
mS/m: millisiemens per meter
mL/min: milliliters per minute

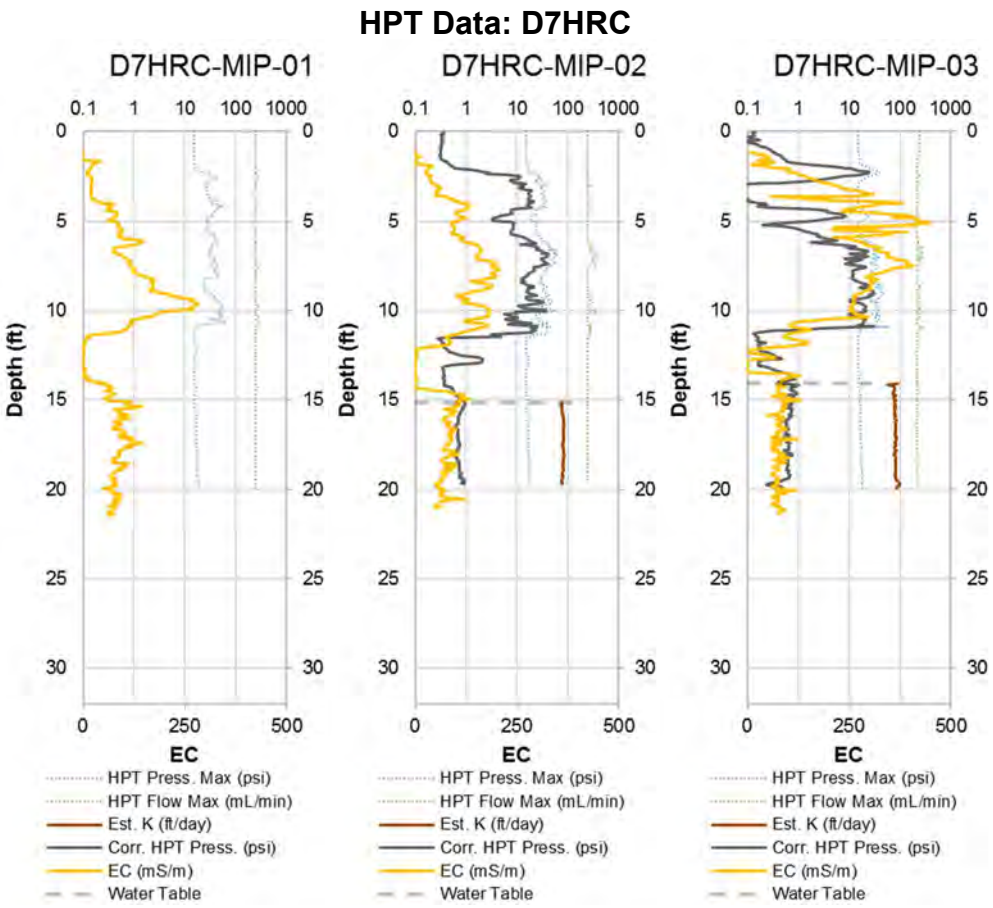
FIGURE D-4. DISTRICT 7 HUMAN RESOURCE COUNCIL MiHPT DATA
REMEDIAL INVESTIGATION REPORT
BILLINGS PCE GROUNDWATER FACILITY, BILLINGS, MONTANA



Notes:
BSL: Big Sky Linen
FID: flame ionization detector
ft: feet
MIP: membrane interface probe
PID: photo ionization detector
XSD: halogen specific detector
µV: micro volts

PID and FID data are corrected for high baseline by subtracting the minimal value from each data point

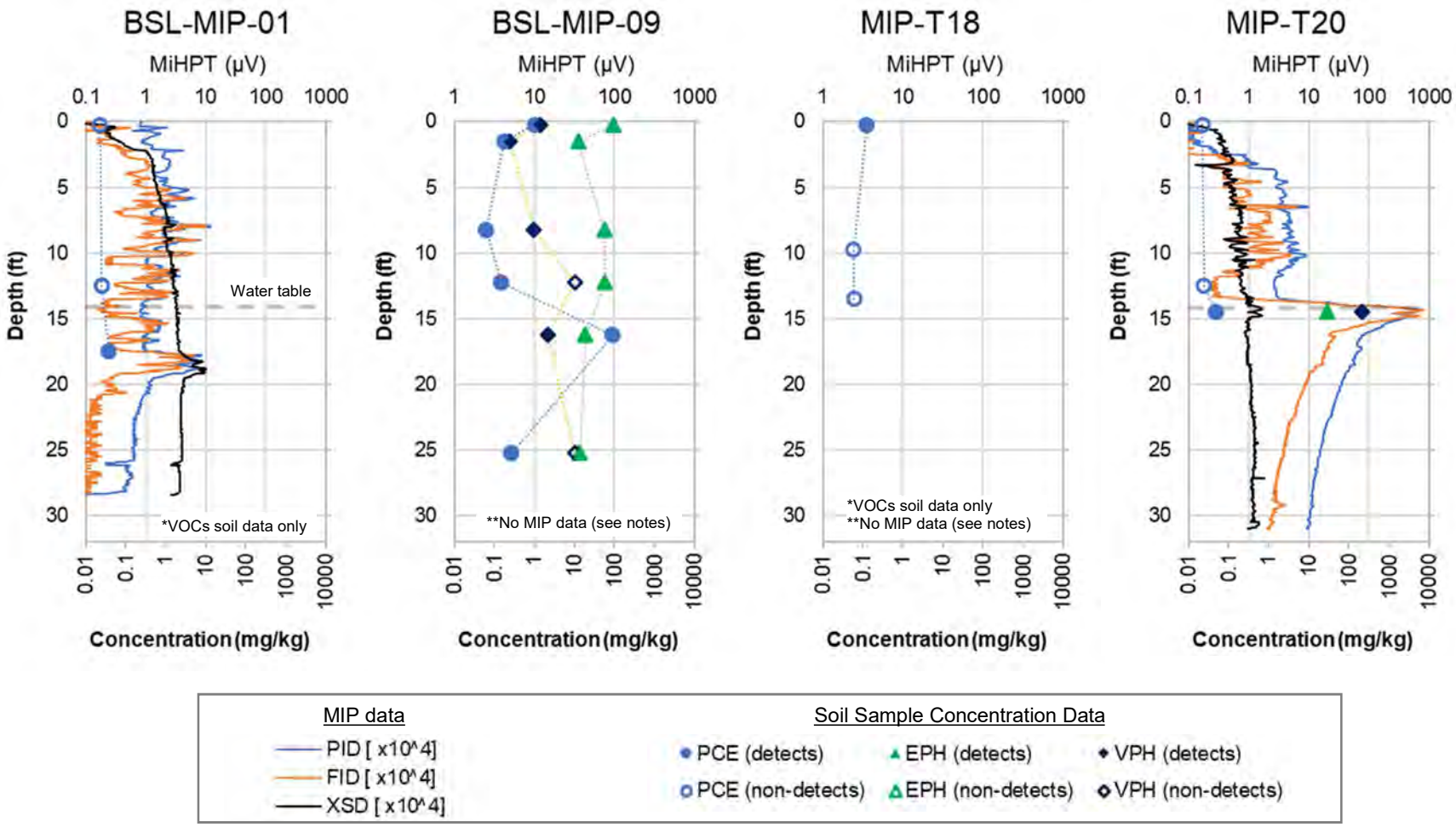
FIGURE D-4. DISTRICT 7 HUMAN RESOURCE COUNCIL MiHPT DATA
REMEDIAL INVESTIGATION REPORT
BILLINGS PCE GROUNDWATER FACILITY, BILLINGS, MONTANA



Notes:
BSL: Big Sky Linen
ft: feet
HPT: hydraulic profiling tool
Est. K: estimated hydraulic conductivity
EC: electrical conductivity
Corr. HPT Press.: corrected HPT pressure
Psi: pounds per square inch
mS/m: millisiemens per meter
mL/min: milliliters per minute

FIGURE D-5. SOIL CONCENTRATION AND MIP DATA OVERLAY PLOTS
BILLINGS PCE GROUNDWATER FACILITY
BILLINGS, MONTANA

BSL LOCATIONS

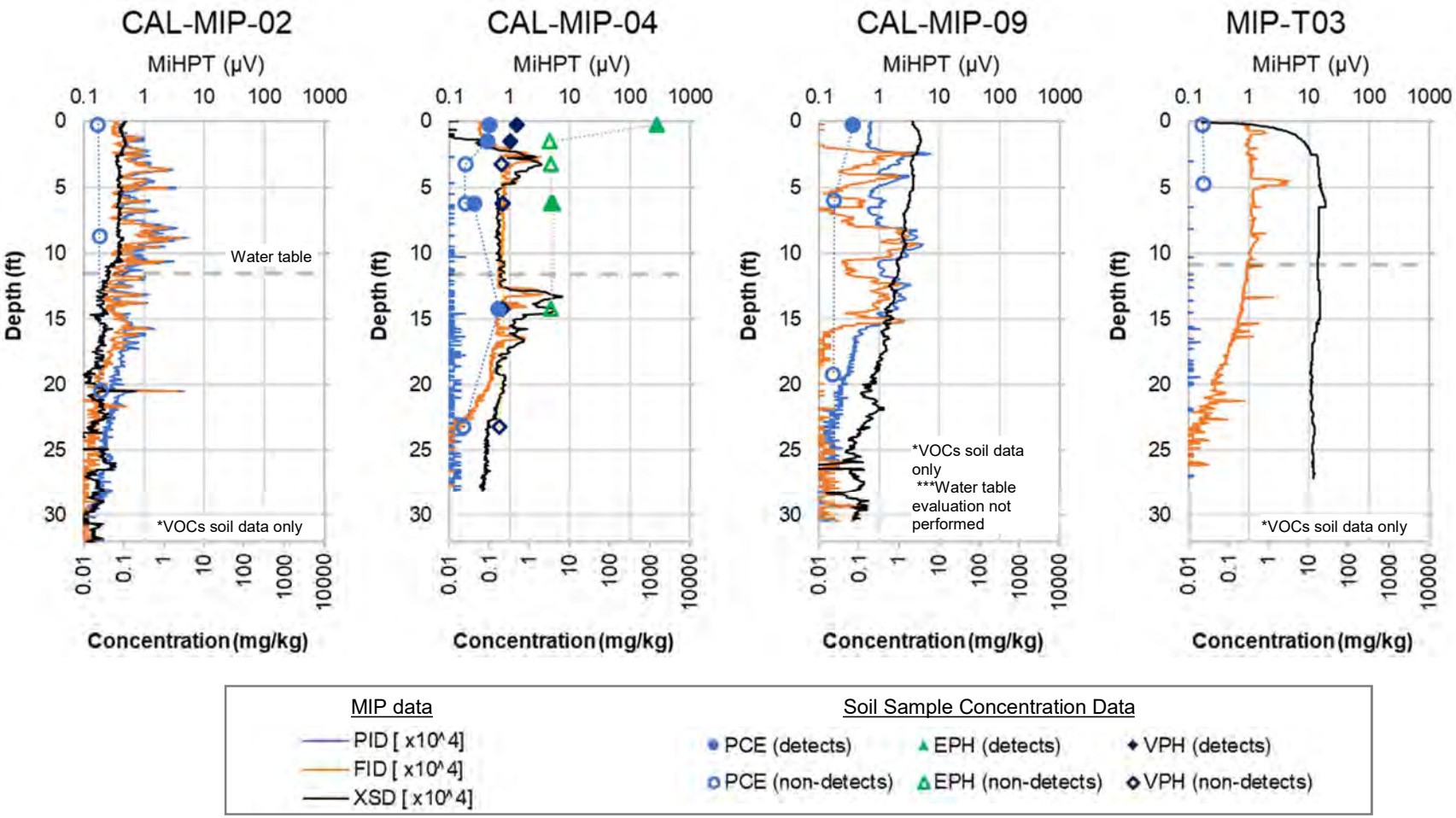


Notes:
*VPH and EPH analysis was conducted at "high resolution" confirmatory sample locations, in accordance with the work plan
**Locations BSL-MIP-09 and MIP-T18 were not included in the MiHPT survey due to access limitations.

EPH – extractable petroleum hydrocarbons; FID - flame ionization detector; ft - feet; mg/kg - milligrams per kilogram; MiHPT - membrane interface / hydraulic profiling tool; µV - microvolts; PCE – tetrachloroethene; PID - photoionization detector; VPH – volatile petroleum hydrocarbons; XSD - halogen specific detector

FIGURE D-5. SOIL CONCENTRATION AND MIP DATA OVERLAY PLOTS
BILLINGS PCE GROUNDWATER FACILITY
BILLINGS, MONTANA

CAL LOCATIONS

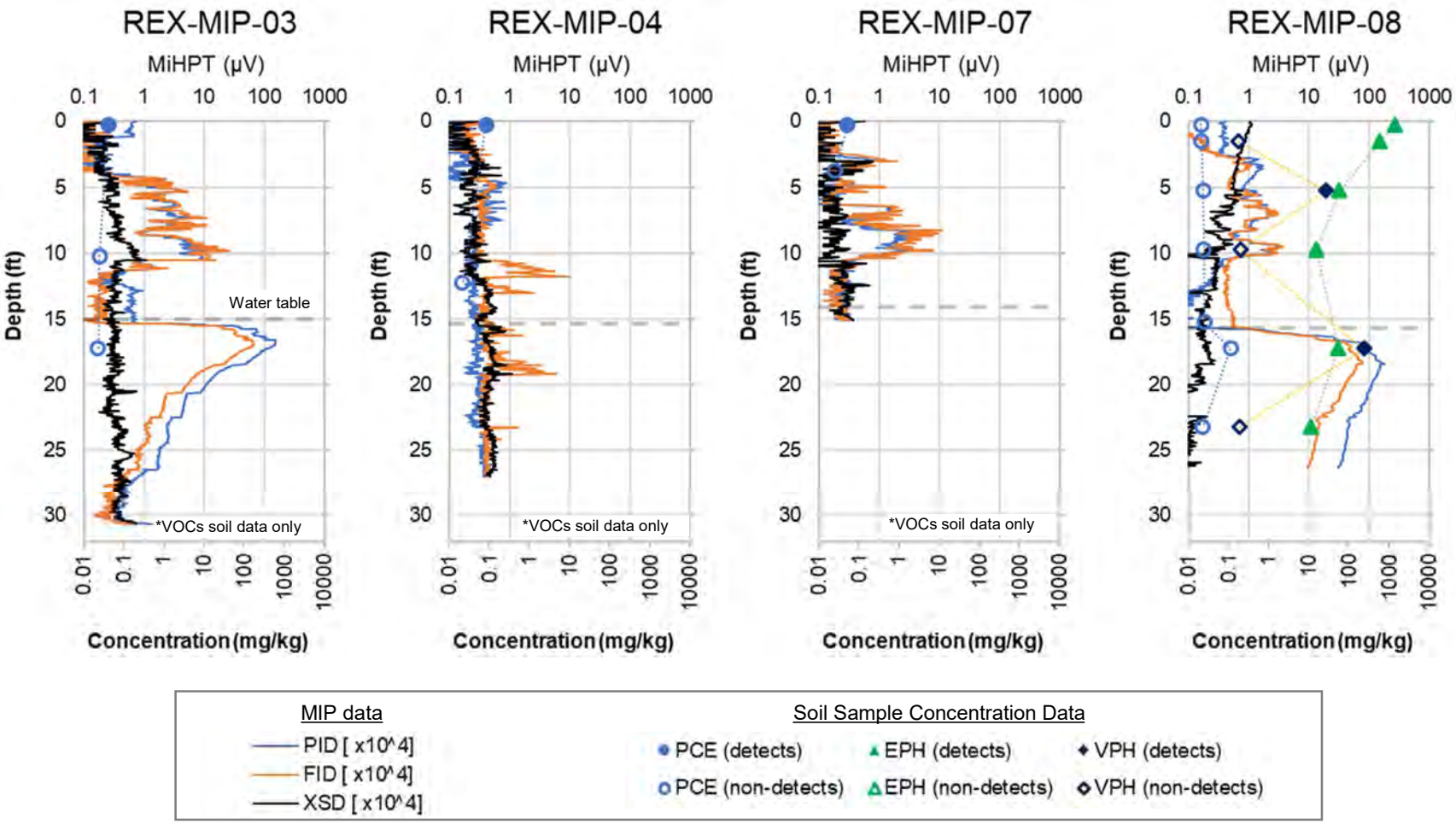


Notes:
*VPH and EPH analysis was conducted only at "high resolution" confirmatory sample locations, in accordance with the work plan.
***Water table estimation requires an MiHPT dissipation test; the dissipation test was not performed at some locations due to equipment issues or non-conducive geology.

EPH – extractable petroleum hydrocarbons; FID - flame ionization detector; ft - feet; mg/kg - milligrams per kilogram; MiHPT - membrane interface / hydraulic profiling tool; µV - microvolts; PCE – tetrachloroethene; PID - photoionization detector; VPH – volatile petroleum hydrocarbons; XSD - halogen specific detector

FIGURE D-5. SOIL CONCENTRATION AND MIP DATA OVERLAY PLOTS
BILLINGS PCE GROUNDWATER FACILITY
BILLINGS, MONTANA

REX LOCATIONS

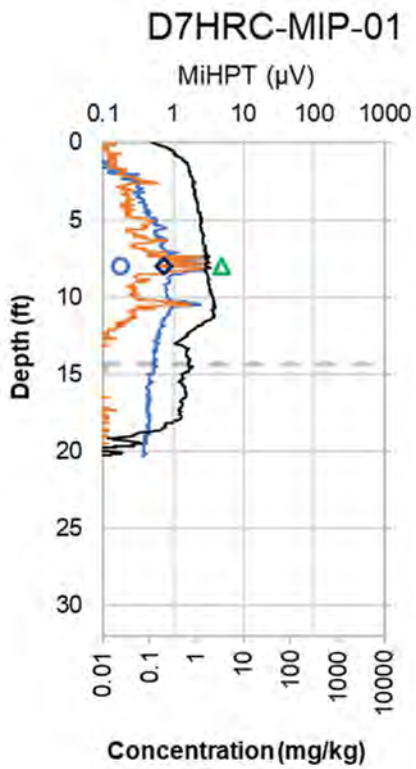


Notes:
*VPH and EPH analysis was conducted only at "high resolution" confirmatory sample locations, in accordance with the work plan

EPH – extractable petroleum hydrocarbons; FID - flame ionization detector; ft - feet; mg/kg - milligrams per kilogram; MiHPT - membrane interface / hydraulic profiling tool; µV - microvolts; PCE – tetrachloroethene; PID - photoionization detector; VPH – volatile petroleum hydrocarbons; XSD - halogen specific detector

FIGURE D-5. SOIL CONCENTRATION AND MIP DATA OVERLAY PLOTS
BILLINGS PCE GROUNDWATER FACILITY
BILLINGS, MONTANA

OTHER LOCATIONS



MIP data	Soil Sample Concentration Data		
PID [x10^4]	PCE (detects)	EPH (detects)	VPH (detects)
FID [x10^4]	PCE (non-detects)	EPH (non-detects)	VPH (non-detects)
XSD [x10^4]			

Notes:
EPH – extractable petroleum hydrocarbons; FID - flame ionization detector; ft - feet; mg/kg - milligrams per kilogram; MiHPT - membrane interface / hydraulic profiling tool; µV - microvolts; PCE – tetrachloroethene; PID - photoionization detector; VPH – volatile petroleum hydrocarbons; XSD - halogen specific detector

ATTACHMENT A

High Resolution Site Characterization Report – MiHpt Investigation

Client: Trihydro Corporation

Project Name: Billings PCE Groundwater Facility

Location: Billings, MT

Prepared by:

Dakota Technologies Company, LLC

5001 Boone Avenue N.

New Hope, Minnesota 55428

763.424.4803

December 27, 2017

Project Number: 0302.17

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Appendix C MiHpt Logs with 100 mVolt Detectors
Appendix D Select MiHpt Logs with 1,000 mVolt Detectors
Appendix E Select MiHpt Logs with 10,000 mVolt Detectors
Appendix F MiHpt Reference Log

1.0 MiHpt (COMBINED MIP/HPT PROBE) SYSTEM DESCRIPTION

The MiHpt direct push logging tool consists of a probe/trunkline system that combines MIP (membrane interface probe), HPT (hydraulic profiling tool) and EC (electrical conductivity) into one push. When viewed in relation to analytical detector responses, the EC and HPT pressure plots provide further insight into contaminant distribution and migration pathways. The water injection port for the HPT function is located near the top of the probe. The MiHpt probe's MIP membrane is located centrally and the EC dipole is located near the tip of the probe. These three measurement segments of the MiHpt system are described below.

A. MIP SYSTEM DESCRIPTION AND CALIBRATION

Volatile organic compounds (VOCs) are semi-quantitatively analyzed in-situ using a membrane interface probe (MIP). The probe is pushed into the ground at a rate of 1 foot per minute, including a 45 second residence time. The membrane block heats to a temperature of approximately 90 to 120°C. VOCs diffuse across the membrane into the trunkline carrier gas tubing and are brought to the surface and into the gas chromatograph (GC) analytical system. The carrier gas containing samples from the subsurface then passes through a nafion dryer (optional) and a heated GC oven to remove moisture prior to detector analysis. Compounds appropriate for the detectors and at sufficient concentrations (approximately 1 ppm or higher for most compounds) will produce an electrical signal, which is analyzed. The MIP system can detect VOCs in the soil, water and soil gas.

The GC system is comprised of an SRI (or HP) brand GC equipped with the following three-detector system: laboratory grade Photoionization Detector (PID), Flame ionization Detector (FID) and a Halogen-Specific Detector (XSD). The MIP trunkline return gas is Y-split in the GC to accommodate the desired detector configuration. The PID utilizes a 10.0-10.6 eV lamp and will ionize aromatic, olefinic, and unsaturated halogenated hydrocarbons with an ionization potential of 10.6 (or 10.0) eV or less. The FID will respond to all types of hydrocarbons including methane, halogenated hydrocarbons and other saturated hydrocarbons, generally giving a good indication of total hydrocarbons present. The XSD responds selectively to only halogenated compounds (e.g., hydrocarbons containing chlorine or bromine).

The following quality assurance/control measures are routinely conducted to ensure the validity of the analytical results:

Chemical Response Test: MiHpt data must be validated with acceptable Quality Control (QC) at the beginning and end of every log. The probe is immersed into a 500 mL cylinder of water containing the compound(s) of interest. This test will be performed at multiple concentration levels at the beginning of each day to verify detector response and generate detection limits of the system (for example: three levels of TCE at 0, 1, 5 and 25 ppm). QC tests of at least one level (and 0 ppb – water only) are checked between each boring to determine system integrity and monitor membrane and detector fluctuations. The results of these tests are listed in the QA/QC report.

Butane response: May be run between each boring by dispensing butane over the membrane. Measurement of the lag time of the carrier gas from the probe to the detectors is used to determine trip time and to verify FID detector response.

Continuity check: Performed before and after each boring to verify system continuity and validate the EC data. The EC dipole on the probe tip is tested at 55 mS/m and 290 mS/m.

B. HPT SYSTEM DESCRIPTION

The MiHpt (HPT section) is a logging tool (hydraulic profiling tool) that measures the pressure required to inject water into the soil as the probe is advanced into the subsurface. The injection pressure log is an excellent indicator of formation permeability. In addition to measurement of injection pressure, the system can also be used to measure hydrostatic pressure under the zero flow conditions. This allows the development of a hydrostatic pressure graph for the log and prediction of the position of the water table.

The probe is advanced into the ground at a rate of approximately 1 foot/minute. The pump in the flow module draws water from the supply tank and pumps water down the trunk line at a constant flow rate set between 250-300 mL/min. An inline flow meter measures the flow rate. The downhole pressure sensor monitors the pressure generated by injecting water into the formation matrix. At a minimum, the MiHPT log provides graphs of the electrical conductivity, pressure and flow rate (and MIP detector data – see MIP section description below) versus depth.

Prior to running the MiHpt log, quality assurance (QA) tests are performed on the EC dipole and pressure sensor (and MIP membrane – see below). The results of the QA tests are saved in an information file for later review and reporting. The electrical conductivity is tested with the EC dipole tester to verify continuity and isolation of the EC system. Next, a reference test is performed on the pressure sensor. This is accomplished by submerging the MiHpt probe to a specified depth below the water level in a reference tube. A two-step test (top and bottom) enables the operator to verify that the pressure sensor is providing the correct measurement for a defined length of water column. If the result is more than 10% out of range the transducer fails the QA test. At completion of the field boring, another QA test is performed to verify probe performance during the log.

The MiHpt pressure log reveals observed pressure depending on the characteristics of the soil or sediment penetrated. It is apparent that higher pressure resulting from the injection of water into a sediment at a given flow rate indicates lower permeability and conversely, that lower pressure from injection of water at a given flow rate indicates higher permeability. This simple relationship allows for evaluating changes in relative permeability of soils and sediments in the MiHpt log by reviewing the pressure versus depth log. High EC readings in general correlate with high pressure readings and conversely low EC readings usually correlate with low pressure readings. It should be noted, however, that pressure plots frequently reveal hydraulic behavior of the soil not observed by the EC and that the EC may display responses associated with minerology and chemical conductance not observed by the pressure plot.

Another important feature of the MiHpt pressure log is the increase in hydrostatic pressure as the probe is advanced below the water table. The increase in hydrostatic pressure results in a “rising baseline” on the pressure log. To obtain a quantitative determination of the local static water level a pressure dissipation test must be performed during the logging operation. To perform the dissipation test the advancement of the probe is halted and the operator starts a time log. Water flow is turned off to observe and record the dissipation of the pressure versus time, until pressure stabilizes. The stabilized pressure is the absolute hydrostatic pressure at the depth of the test. Knowing the depth of the test, the absolute hydrostatic pressure and the atmospheric pressure the static water level may be calculated. Multiple dissipation tests may be performed at different depths during a single log to evaluate variations in piezometric head with depth and local vertical gradients in the aquifer.

Dissipation test data can be used in conjunction with the pressure and flow logs to estimate hydraulic conductivity (K) for the entire log after logging is completed. From Darcy’s Law we know that K is proportional to the flow rate (Q) divided by the pressure (P) required to induce that flow rate in the given sediment or soil. The raw pressure provided by the MiHpt log is the total pressure observed at the depth where the water is injected. This total pressure includes the ambient atmospheric pressure at the time of the log, the local hydrostatic pressure and the pressure required to inject the fluid into the formation. So we have:

$$P\ (total) = P\ (atm) + P\ (hydro) + P\ (inj)$$

As discussed above the atmospheric pressure is determined from the pre and post log response tests and the hydrostatic pressure is defined by one or more dissipation tests obtained as the log is run. Now the actual injection pressure [$P_{inj} = P_{total} - (P_{hydro} + P_{atm})$] that was required to inject the water into the formation is calculated for each depth increment of the log. The actual injection pressure (P_{inj}) and the measured flow rate (Q) is then used to model an estimated K value for each depth increment of the MiHPT log.

C. ELECTRICAL CONDUCTIVITY DESCRIPTION

Electrical Conductivity (EC) is a measure of the soil's ability to conduct an electrical current using the dipole array of the MiHpt probe. Conductivity is the reciprocal of electrical resistivity and has the units (in our application) of millisiemens per meter (mS/m). Since soil is in the pathway of the charge flow, the grain size can be determined by comparing the EC log to a soil boring. Conductivity readings in the 100s indicate smaller grain (such as clay). Larger grain size (sand and gravels) are typically in the 10s of mS/m range. Prior to every log, the EC of the MiHpt probe is checked for proper operation by performing a conductivity test with an EC dipole tester. The system is tested at 55 mS/m and 290 mS/m for proper system performance. The EC provides insight into soil lithology. Additionally, the EC data can be incorporated into a 4DIM visualization protocol.

2.0 DISCUSSION AND COMMENTS

The purpose of this portion of the investigation performed by Dakota Technologies was to partially determine the extent of select CVOC (MIP appropriate) impacts. Dakota pushed the MiHpt tool in several suspected areas of PCE contamination in various areas of the city of Billings, MT and around the former REX Laundry Site by utilizing the MiHpt system. The generated data partially aided in understanding the vertical and horizontal extent of the contaminants by viewing the detector responses, electrical conductivity responses and hydraulic related data relative to soil, water, and analytical laboratory testing in the areas around and adjacent to MiHpt locations. The MiHpt data will be utilized as supporting, field screening data for understanding and characterizing the PCE (and break-down products) contaminant distribution.

Dakota pushed 46 MiHpt borings (in 5-6 general locations) in the city of Billings, MT.

The target depth for all MiHpt locations was 35-40 feet - several inches into the bedrock (weathered shale). The drilling was generally moderate in the permeable, sandy/silt zones. For most locations, the dissipation test equilibrated quickly and was performed in a high permeable zone with correspond low HPT pressure readings. The water table was calculated to be at or near 12-16 feet for most locations.

EC data and HP (hydraulic profiling) data was collected simultaneously at each MiHpt location. The EC was tested before and after each log for continuity and performance. Additionally, the transducer was tested for HP performance before each log. All tests passed manufacturer QC specifications

The MiHpt system experience a few technical issues throughout the project that were all subsequently addressed and resolved. The first of these issues was that the PID lamp controller broke and was replacement the next day with a controller was shipped overnight. This resulted in no PID data for logs: MIP-T02 and 3, CAL-MIP-04, 5, 6 and 7. Also, the FID was not lit for CAL-MIP-01 (no FID Data for this log). Lastly, the XSD experienced some baseline drift and slight suppression for several logs as noted in the *MiHpt (MIP section) Field Log Summary.* This XSD plot baseline issue did introduce some level of uncertainty to the XSD data plots and is addressed in the Summary appropriately. The logs that are described as unstable XSD baseline show CVOC responses that are somewhat suppressed, but still indicative of halogenated responses.

Dakota Technologies Company, LLC (Dakota) performed chemical response tests at 0, 0.25, 1, 5 and 25 ppm TCE at various times throughout the project. At a minimum, a one-level response test was performed before or after each log on the MiHpt system (PID/FID/XSD) to assure data quality. The response tests appeared normal and were indicative of a properly functioning MiHPT system.

For each log, the MiHpt probe was advanced at a steady rate of approximately 1 foot per minute. The trip time was approximately 70-80 seconds for the 150-foot MiHpt trunkline. CVOCs were observed at several locations. Non-chlorinated, petroleum-like VOC responses were observed at several locations as well, but not commented on in analytical interpretation section.

The first portion of the project was done by an HRSC operator from Dakota's Denver (GH) office and then the week of 12/25 from the New Hope (MJ), MN crew. The two data sets were acquired from MiHpt labs of the same model (HP brand), but with slightly differing detector baseline levels. The net electrical (mVolts) responses were relatively comparable throughout this equipment transition.

3.0 LIMITATIONS (MiHpt)

The analysis and opinions expressed in this report are based upon data obtained from the samples collected at the indicated locations and from other information discussed in this report. Exceptions, if any, are discussed in the accompanying comments section of this report. This report is prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted practices. Reported results shall not be reproduced, except in full, without written approval of Dakota. The sample results relate only to the analytes of interest tested. No warranties, expressed or implied are intended or made.

Since the MiHpt system is a screening tool, laboratory analysis of soil or groundwater and/or some historical analytical data is needed to obtain optimum MiHpt log correlation. It should also be understood that the compounds detected by the MiHpt system are likely a sub-set only of the compounds that exist at the investigation site. Off-site or mobile laboratory analytical results of soil, soil gas and water testing are expected to differ substantially. The MiHpt membrane, trunlkline and/or detectors may require detector baseline stabilization after pushing through heavily contaminated zones before proceeding to next location. It should also be noted that dissipation test locations are chosen carefully. At times, however, detector responses may be exaggerated due to the probe residing for extended periods of time (while performing dissipation) in highly contaminated zones when optimal dissipation test zones correlate with highly contaminated zones.

The HPT portion of the MiHpt tool is limited to a max working depth of 120 feet below ground water and the pressure transducer output range is 0-100 psi. Coarse (sandy), saturated soils are required for dissipation tests to be performed. Successful (fully stabilized) dissipations are required for water table and hydraulic conductivity (Est. K) calculations. The lower K boundary for Geoprobe's empirical calculation model is about 0.1 ft./day and the upper boundary is near 75 ft./day.

The EC and hydraulic data acquired from the MiHpt tool should be reviewed in conjunction with representative soil samples to best understand the soil behavior.

Appendix A

Field Log Summaries

MiHpt (HPT section) Field Summary Log

Billings PCE Groundwater Facility

Billings, MT - 302.17

				QA/QC (pass/fail)				Static Water			
				EC Results		Transducer Results		Level	Dissipation Test		
File Log ID	Date	Total Depth *(ft)*	Preprobed Depth (ft)	Pre-Log pass / fail	Post-Log pass / fail	Pre-Log pass / fail	Post-Log pass / fail	*based on dissipation* *(ft)*	Depth *(ft)*	Stable? *yes / no*	Comments
BSL-MIP-01	11/29/17	28.5	4	pass	pass	pass	pass	14.1	28.3	yes	no comments
BSL-MIP-02	12/01/17	30.3	4	pass	pass	pass	pass	13.9	22.2, 30.1	yes, yes	no comments
BSL-MIP-03	11/29/17	19.3	4	pass	pass	pass	pass	15.0	19.1	yes	no comments
BSL-MIP-04	11/30/17	24.0	4	pass	pass	pass	pass	14.4	23.7	yes	no comments
BSL-MIP-05	11/30/17	24.8	4	pass	pass	pass	pass	14.8	22.2, 24.5	yes, yes	no comments
BSL-MIP-06	11/28/17	30.3	4	pass	pass	pass	pass	15.1	22.1, 26.2, 30	yes, yes, yes	no comments
BSL-MIP-07	11/28/17	27.2	4	pass	pass	pass	pass	15.4	27.0	yes	no comments
BSL-MIP-08	11/28/17	29.5	4	pass	pass	pass	pass	15.7	26.3, 29.3	yes, yes	no comments
BSL-MIP-10	11/28/17	30.3	4	pass	pass	pass	pass	14.5	26.2, 30.1	yes, yes	no comments
BSL-MIP-11	11/16/17	30.3	4	pass	pass	pass	pass	14.9	23.4, 30.1	yes, yes	no comments
BSL-MIP-T10	12/01/17	30.2	4	pass	pass	pass	pass	14.7	30.0	yes	no comments
BSL-MIP-T11	11/30/17	28.8	4	pass	pass	pass	pass	15.9	28.6	yes	no comments
BSL-MIP-T12	11/29/17	33.0	4	pass	pass	pass	pass	18.7	20.2	yes	no comments
BSL-MIP-T13	11/30/17	23.4	4	pass	pass	pass	pass	14.3	23.2	yes	no comments
BSL-MIP-T14	11/30/17	26.2	4	pass	pass	pass	pass	13.4	26.0	yes	no comments
BSL-MIP-T15	11/28/17	28.4	4	pass	pass	pass	pass	15.8	26.1, 28.2	yes, yes	no comments
BSL-MIP-T16	11/29/17	27.4	4	pass	pass	pass	pass	14.7	22.1	yes	no comments
BSL-MIP-T17	11/29/17	28.0	4	pass	pass	pass	pass	15.2	26.3	yes	no comments
BSL-MIP-T19	11/29/17	30.1	4	pass	pass	pass	pass	14.9	22.1	yes	no comments
BSL-MIP-T20	12/01/17	31.1	4	pass	pass	pass	pass	14.2	30.8	yes	no comments
BSL-MIP-21	12/01/17	28.3	4	pass	pass	pass	pass	14.2	26.4, 28.1	yes	no comments
CAL-MIP-01	11/13/17	34.5	4	pass	pass	pass	pass	12.2	26.5	yes	no comments
CAL-MIP-02	11/30/17	38.4	4	pass	pass	pass	pass	11.5	24.8	yes	no comments
CAL-MIP-04	11/14/17	28.1	4	pass	pass	pass	pass	11.6	27.9	yes	no comments
CAL-MIP-05	11/29/17	27.6	4	pass	pass	pass	pass	10.9	27.4	yes	no comments
	Total Depth	718.00									

(1) Reported static water level data below typical level of certainty where footnoted

MiHpt (HPT section) Field Summary Log

Billings PCE Groundwater Facility

Billings, MT - 302.17

				QA/QC (pass/fail)				Static Water			
				EC Results		Transducer Results		Level	Dissipation Test		
File Log ID	Date	Total Depth *(ft)*	Preprobed Depth (ft)	Pre-Log pass / fail	Post-Log pass / fail	Pre-Log pass / fail	Post-Log pass / fail	*based on dissipation* *(ft)*	Depth *(ft)*	Stable? *yes / no*	Comments
CAL-MIP-06	11/14/17	21.2	4	pass	pass	pass	pass	11.2	21.0	yes	no comments
CAL-MIP-07	11/14/17	28.0	4	pass	pass	pass	pass	11.1	26.1, 27.7	yes, yes	no comments
CAL-MIP-08	11/15/17	28.8	4	pass	pass	pass	pass	10.8	22.3, 26.4, 26.8	yes, yes, yes	no comments
CAL-MIP-09	11/15/17	30.4	4	pass	pass	pass	pass	NA	NA	NA	no dissipation test performed
CAL-MIP-10	11/13/17	34.2	4	pass	pass	pass	pass	11.3	24.3	yes	no comments
D7HRSC-MIP-01	11/17/17	20.4	4	pass	pass	pass	pass	14.4	18.4	yes	no comments
D7HRSC-MIP-02	11/17/17	20.0	4	pass	pass	pass	pass	15.1	19.7	yes	no comments
D7HRSC-MIP-03	11/17/17	20.2	4	pass	pass	pass	pass	14.1	18.2, 20	yes, yes	no comments
MIP-T02	11/14/17	31.8	4	pass	pass	pass	pass	11.4	22.3	yes	no comments
MIP-T03	11/14/17	27.2	4	pass	pass	pass	pass	10.9	27.0	yes	no comments
MIP-T06	11/16/17	31.3	4	pass	pass	pass	pass	10.7	18.4, 22.3, 31.1	yes, yes, tes	no comments
MIP-T07	11/16/17	29.5	4	pass	pass	pass	pass	11.0	22.5	yes	no comments
MIP-T08	11/16/17	29.5	4	pass	pass	pass	pass	11.3	22.4, 29.3	yes, yes	no comments
MIP-T09	11/16/17	31.0	4	pass	pass	pass	pass	11.2	22.4	yes	no comments
REX-MIP-1	12/20/17	24.4	4	pass	pass	pass	pass	15.0	21.3	yes	no comments
REX-MIP-2	12/19/17	29.5	4	pass	pass	pass	pass	15.2	18.3	yes	no comments
REX-MIP-3	12/20/17	30.7	4	pass	pass	pass	pass	15.0	20.4	yes	no comments
REX-MIP-4	12/19/17	27.1	4	pass	pass	pass	pass	15.4	18.3	yes	no comments
REX-MIP-5	12/19/17	26.7	4	pass	pass	pass	pass	15.1	17.4	yes	no comments
REX-MIP-6	12/20/17	27.2	4	pass	pass	pass	pass	15.4	16.7	yes	no comments
REX-MIP-7	12/19/17	15.1	4	pass	pass	pass	pass	14.1	14.9	yes	no comments
REX-MIP-08	12/02/17	26.4	4	pass	pass	pass	pass	15.7	26.1	yes	no comments
REX-MIP-09	12/02/17	12.1	4	pass	pass	pass	pass	NA	NA	NA	no dissipation test performed. Too shallow
REX-MIP-T27	12/02/17	25.7	4	pass	pass	pass	pass	15.3	25.4	yes	no comments
	Total Depth	628.40									

(1) Reported static water level data below typical level of certainty where footnoted

MiHpt (MIP section) Field Summary Log

Billings PCE Groundwater Facility

Billings, MT - 302.17

File Log ID	Date	QA/QC (pass/fail) EC Test Pre/Post Log	Chemical Response Test Pre-Log	Chemical Response Test Post-Log	Final Depth (ft)	Preprobed Depth (ft)	Comments
BSL-MIP-01	11/29/17	pass	pass	pass	28.5	4	XSD baseline unstable
BSL-MIP-02	12/01/17	pass	pass	pass	30.3	4	XSD baseline unstable
BSL-MIP-03	11/29/17	pass	pass	pass	19.3	4	XSD baseline unstable
BSL-MIP-04	11/30/17	pass	pass	pass	24.0	4	no comments
BSL-MIP-05	11/30/17	pass	pass	pass	24.8	4	no comments
BSL-MIP-06	11/28/17	pass	pass	pass	30.3	4	no comments
BSL-MIP-07	11/28/17	pass	pass	pass	27.2	4	no comments
BSL-MIP-08	11/28/17	pass	pass	pass	29.5	4	XSD baseline unstable
BSL-MIP-10	11/28/17	pass	pass	pass	30.3	4	XSD baseline unstable
BSL-MIP-11	11/16/17	pass	pass	pass	30.3	4	XSD baseline unstable
BSL-MIP-T10	12/01/17	pass	pass	pass	30.2	4	XSD baseline unstable
BSL-MIP-T11	11/30/17	pass	pass	pass	28.8	4	XSD baseline unstable
BSL-MIP-T12	11/29/17	pass	pass	pass	33.0	4	XSD baseline unstable
BSL-MIP-T13	11/30/17	pass	pass	pass	23.4	4	no comments
BSL-MIP-T14	11/30/17	pass	pass	pass	26.2	4	XSD baseline unstable
BSL-MIP-T15	11/28/17	pass	pass	pass	28.4	4	no comments
BSL-MIP-T16	11/29/17	pass	pass	pass	27.4	4	no comments
BSL-MIP-T17	11/29/17	pass	pass	pass	28.0	4	XSD baseline unstable
BSL-MIP-T19	11/29/17	pass	pass	pass	30.1	4	no comments
BSL-MIP-T20	12/01/17	pass	pass	pass	31.1	4	no comments
BSL-MIP-21	12/01/17	pass	pass	pass	28.3	4	XSD baseline unstable
CAL-MIP-01	11/13/17	pass	pass	pass	34.5	4	XSD baseline unstable, FID not lit (no FID data)
CAL-MIP-02	11/30/17	pass	pass	pass	38.4	4	no comments
CAL-MIP-04	11/14/17	pass	pass	pass	28.1	4	no PID detector data (broken controller)
CAL-MIP-05	11/29/17	pass	pass	pass	27.6	4	no PID detector data (broken controller)
				Total Footage (this sheet)	**718.00**		

R = Refusal

MiHpt (MIP section) Field Summary Log

Billings PCE Groundwater Facility

Billings, MT - 302.17

File Log ID	Date	QA/QC (pass/fail) EC Test Pre/Post Log	Chemical Response Test Pre-Log	Chemical Response Test Post-Log	Final Depth (ft)	Preprobed Depth (ft)	Comments
CAL-MIP-06	11/14/17	pass	pass	pass	21.2	4	no PID data (controller broken)
CAL-MIP-07	11/14/17	pass	pass	pass	28.0	4	no PID data (controller broken)
CAL-MIP-08	11/15/17	pass	pass	pass	28.8	4	XSD baseline unstable
CAL-MIP-09	11/15/17	pass	pass	pass	30.4	4	XSD baseline unstable
CAL-MIP-10	11/13/17	pass	pass	pass	34.2	4	no comments
D7HRSC-MIP-01	11/17/17	pass	pass	pass	20.4	4	XSD baseline unstable
D7HRSC-MIP-02	11/17/17	pass	pass	pass	20.0	4	XSD baseline unstable
D7HRSC-MIP-03	11/17/17	pass	pass	pass	20.2	4	XSD baseline unstable
MIP-T02	11/14/17	pass	pass	pass	31.8	4	no PID data (controller broken)
MIP-T03	11/14/17	pass	pass	pass	27.2	4	XSD baseline unstable, no PID data (broken controller)
MIP-T06	11/16/17	pass	pass	pass	31.3	4	XSD baseline unstable
MIP-T07	11/16/17	pass	pass	pass	29.5	4	XSD baseline unstable
MIP-T08	11/16/17	pass	pass	pass	29.5	4	XSD baseline unstable
MIP-T09	11/16/17	pass	pass	pass	31.0	4	XSD baseline unstable
REX-MIP-1	12/20/17	pass	pass	pass	24.4	4	no comments
REX-MIP-2	12/19/17	pass	pass	pass	29.5	4	no comments
REX-MIP-3	12/20/17	pass	pass	pass	30.7	4	no comments
REX-MIP-4	12/19/17	pass	pass	pass	27.1	4	no comments
REX-MIP-5	12/19/17	pass	pass	pass	26.7	4	no comments
REX-MIP-6	12/20/17	pass	pass	pass	27.2	4	no comments
REX-MIP-7	12/19/17	pass	pass	pass	15.1	4	no comments
REX-MIP-08	12/02/17	pass	pass	pass	26.4	4	XSD baseline unstable
REX-MIP-09	12/02/17	pass	pass	pass	12.1	4	XSD baseline unstable
REX-MIP-T27	12/02/17	pass	pass	pass	25.7	4	XSD baseline unstable
		pass	pass	pass		4	no comments
				Total Footage (this sheet)	**628.40**		

R = Refusal

Appendix B

MiHpt Analytical Interpretation

MiHpt Analytical Interpretation

Billings PCE Groundwater Facility

Billings, MT - 302.17

page 1

File Log ID	Date	Max mV, Detector (net) Response at Indicated Depths						Analytical Comments
		PID *(mVolts)*	Depth *(ft)*	FID *(mVolts)*	Depth *(ft)*	XSD *(mVolts)*	Depth *(ft)*	
BSL-MIP-01	11/29/17	110	8.0	100	8.0	60	18.9	CVOCs at 6.3, 7.9, 8.9, 10, 11.3, 18-19.4
BSL-MIP-02	12/01/17	80	15.7	70	15.7	12	15.9	CVOCs at 5.4, 7.8, 8.9-10.4, 12.2-16.3
BSL-MIP-03	11/29/17	35	4.6	34	12.4	**6**	12.3	CVOCs at 10.4-12.4, 14
BSL-MIP-04	11/30/17	366	18.2	37	4.8	515	18.2	CVOCs at 2.3-18.6, 19.5
BSL-MIP-05	11/30/17	527	14.9	75	11.9	605	14.9	CVOCs at 5.5-15.5, 16-16.7
BSL-MIP-06	11/28/17	100	11.7	90	11.7	32	30.3	CVOCs at 1, 2.3, 3.5, 4.5, 5.2, 5.9, 7.3-10.8, 11.3-12.5, 14.3, 22-22.3, 26.4-28.8, 29.4-bottom
BSL-MIP-07	11/28/17	1,000	16.2	515	16.2	420	16.6	CVOCs at 6.8, 8.2, 11.8-13, 15.7-17.3 - XSD value with attenuation adjustment
BSL-MIP-08	11/28/17	113	5.7	116	5.7	100	18.6	CVOCs at 2.6-7.2, 10.6-11.9, 14, 18.4-19.8
BSL-MIP-10	11/28/17	100	5.0	138	5.0	12	4.7	CVOCs at 2.4-4.9, 6.4, 10.4-11.9, 15.4-16.8, unknown below 16.8 feet.
BSL-MIP-11	11/16/17	180	15.2	180	15.2	57	15.5	CVOCs at 2.4-5, 6.7-9, 11.6-12.9, 14.6-17.8, (likely 20.1-23.5?)
BSL-MIP-T10	12/01/17	90	9.6	102	9.6	**6**	12.3	CVOCs at 1-18.5
BSL-MIP-T11	11/30/17	42	10.9	30	10.8	**9**	10.8	CVOCs at 2.6-17
BSL-MIP-T12	11/29/17	105	3.4	85	3.4	13	14.6	CVOCs at 1.6-5, 6.2-6.5, 8.5-10.2, 14.1-15.5
BSL-MIP-T13	11/30/17	678	11.2	123	11.2	682	11.5	CVOCs at 0.7, 1.2, 1.8, 2.3-2.9, 4.4-5.1, 6.3, 8.5-11.9, 12.9-13.5, 14.245, 14.9-18.7
BSL-MIP-T14	11/30/17	995	14.8	80	14.7	1,002	14.8	CVOCs at 2.3-17
BSL-MIP-T15	11/28/17	880	14.1	90	13.0	965	14.1	CVOCs at 4.4-14.3 attenuation change at 10 feet
BSL-MIP-T16	11/29/17	4,250	14.7	1,904	15.4	2,920	14.7	CVOCs at 2.9-6.3, 10.4-18.4
BSL-MIP-T17	11/29/17	346	17.9	97	17.9	236	18.0	CVOCs at (likely from 0.6-11.7), 13.4-18.3, 20.7-21.3, (possibly at 24.9)
BSL-MIP-T19	11/29/17	100	11.1	91	11.5	10	11.5	CVOCs at 2.8-4.8, 8.3, 10.4-11.7, 19.9
BSL-MIP-T20	12/01/17	7,360	14.4	8,070	14.4	**9**	14.8	CVOCs at 6.5?, 14.1-14.8
BSL-MIP-21	12/01/17	186	14.5	187	14.5	12	12.1	CVOCs at 2.6, 6.7-12.9, 14.6?
CAL-MIP-01	11/13/17	90	11.3	NA	NA	NA	NA	indeterminate CVOC responses (XSD detector unstable, FID detector not lit)
CAL-MIP-02	11/30/17	50	8.9	40	8.9	**6**	20.5	CVOCs at 20.5 (indeterminate for the remainder of the log)
CAL-MIP-04	11/14/17	NA	NA	39	13.2	70	13.3	CVOCs at 2.2-4.7, 13-14.8, 15.8, 16.7 PID controller out (no PID data)
CAL-MIP-05	11/29/17	NA	NA	44	8.7	**5**	2.3	CVOCs at 2-3.7, 8.7, 11.5, 15.2, 16 PID controller out (no PID data)

Values displayed in **bold type** indicate concentrations at or near method detection limit

(XVOC) Halogenated Response typically refers more specifically to Chlorinated Volatile Organics (CVOCs)

VOC Response may refer to BTEX, GRO, methane or other lighter constituents of fuels and other hydrocarbons.

XSD Detector refers to Halogen Specific Detector (detects VOCs containing chlorine, bromine, fluorine, etc.)

na = not applicable

MiHpt Analytical Interpretation

Billings PCE Groundwater Facility

Billings, MT - 302.17

page 2

File Log ID	Date	Max mV, Detector (net) Response at Indicated Depths						Analytical Comments
		PID (mVolts)	Depth (ft)	FID (mVolts)	Depth (ft)	XSD (mVolts)	Depth (ft)	
CAL-MIP-06	11/14/17	NA	NA	9	21.2	**4**	15.3	CVOCs at 7.4?, 13.8-15.3, bottom (21.2) PID controller out (no PID data)
CAL-MIP-07	11/14/17	NA	NA	115	17.7	14	17.2	CVOCs at 2.6, 16, 17.2-17.8 PID controller out (no PID data)
CAL-MIP-08	11/15/17	30	3.0	15	3.0	**1**	3.0	CVOCs likely from 2.2-3.2, 10.6 (somewhat indeterminate CVOC responses - XSD detector unstable)
CAL-MIP-09	11/15/17	67	2.5	44	9.4	**1**	9.4	CVOCs likely from 2.4, 8.2-9.6, 21.9, 29.3 (somewhat indeterminate CVOC responses - XSD detector unstable)
CAL-MIP-10	11/13/17	43	3.3	48	8.3	**4**	8.6	CVOCs at 3.7, 8.6, 9.3, 15.8
D7HRSC-MIP-01	11/17/17	32	7.8	28	7.8	**6**	8.1	CVOCs at 2.6?, 7.4, 7.8, 8.1, 10.7
D7HRSC-MIP-02	11/17/17	50	7.0	45	7.0	**6**	6.8	CVOCs at 3.2, 6.8, 8.6
D7HRSC-MIP-03	11/17/17	67	10.2	78	10.2	**2**	9.8	CVOCs at 6.3-10.4
MIP-T02	11/14/17	NA	NA	48	8.6	15	9.6	CVOCs at 1.6-3.6, 6.7, 7.4-16.3, 28.3-31.8 (bottom) PID controller out (no PID data)
MIP-T03	11/14/17	NA	NA	42	4.6	NA	NA	indeterminate CVOC responses, but possible response at 4.5 (XSD detector unstable), PID controller out (no PID data)
MIP-T06	11/16/17	92	3.1	40	14.8	**10**	15.0	CVOCs at 13.4-15.6
MIP-T07	11/16/17	37	4.0	26	4.0	**37**	18.7	indeterminate CVOC responses, but possible response at 4.2, 16.1, 17.3, 18.7 (XSD detector unstable)
MIP-T08	11/16/17	38	4.8	40	5.8	**3**	4.8	indeterminate CVOC responses, but likely response at 2.6-4.75, 8.7, 10.6, 15.9, and 29.2? (XSD detector unstable)
MIP-T09	11/16/17	17	3.4	13	3.4	NA	NA	indeterminate CVOC responses, (XSD detector unstable)
REX-MIP-1	12/20/17	16	24.0	11	24.1	5	13.0	CVOCs at 3.8-4.3, 12.6-14.1
REX-MIP-2	12/19/17	**1**	11.1	**1**	23.0	5	2.5	CVOCs at 2, 2.5, 3, 7.4-8.2, 11.2, 18.5-18.7, 19.2-19.7, (22.7?)
REX-MIP-3	12/20/17	1,554	16.7	671	16.9	7	10.5	CVOCs at 9-10.5, 20.6, 23.5?, 25.3?, 30.7 (bottom)
REX-MIP-4	12/19/17	8	4.7	97	11.8	8	19.2	CVOCs at 3.5, 4.1, 10.6, 15.6-16, 18.6, 19.2
REX-MIP-5	12/19/17	**2**	7.3	**2**	7.3	7	25.9	CVOCs at 6.9-7, 11.8-12.3, 14.6-15.2, 25.2-26.2
REX-MIP-6	12/20/17	23	8.0	40	8.9	**3**	10.7	likely CVOCs at 6.7, 8.1, 8.7, 10.7
REX-MIP-7	12/19/17	65	8.3	110	8.3	9	3.0	CVOCs at 3-4, 10.8, 12.5
REX-MIP-08	12/02/17	1,830	18.4	800	18.4	**2**	5.3	CVOCs at 5.3-10
REX-MIP-09	12/02/17	400	7.1	549	7.1	**14**	6.8	Likely CVOCs at 5.6-9.8 (XSD unstable)
REX-MIP-T27	12/02/17	82	4.7	72	4.7	**10**	8.6	Likely CVOCs at 3-11.4 (XSD unstable)

Values displayed in **bold type** indicate concentrations at or near method detection limit

(XVOC) Halogenated Response typically refers more specifically to Chlorinated Volatile Organics (CVOCs)

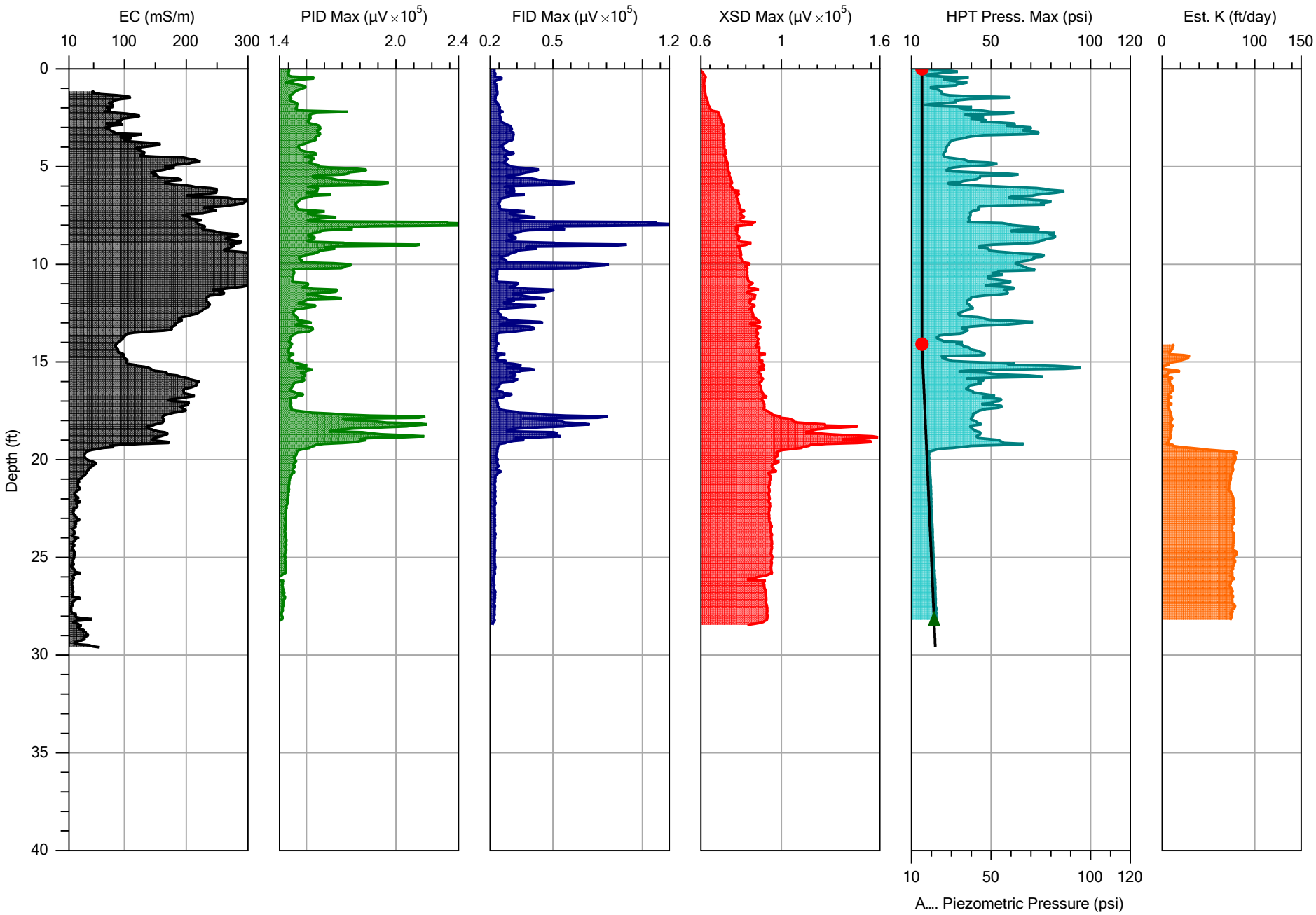
VOC Response may refer to BTEX, GRO, methane or other lighter constituents of fuels and other hydrocarbons.

XSD Detector refers to Halogen Specific Detector (detects VOCs containing chlorine, bromine, fluorine, etc.)

na = not applicable

Appendix C

MiHpt Logs with Detectors @ 100 mVolts



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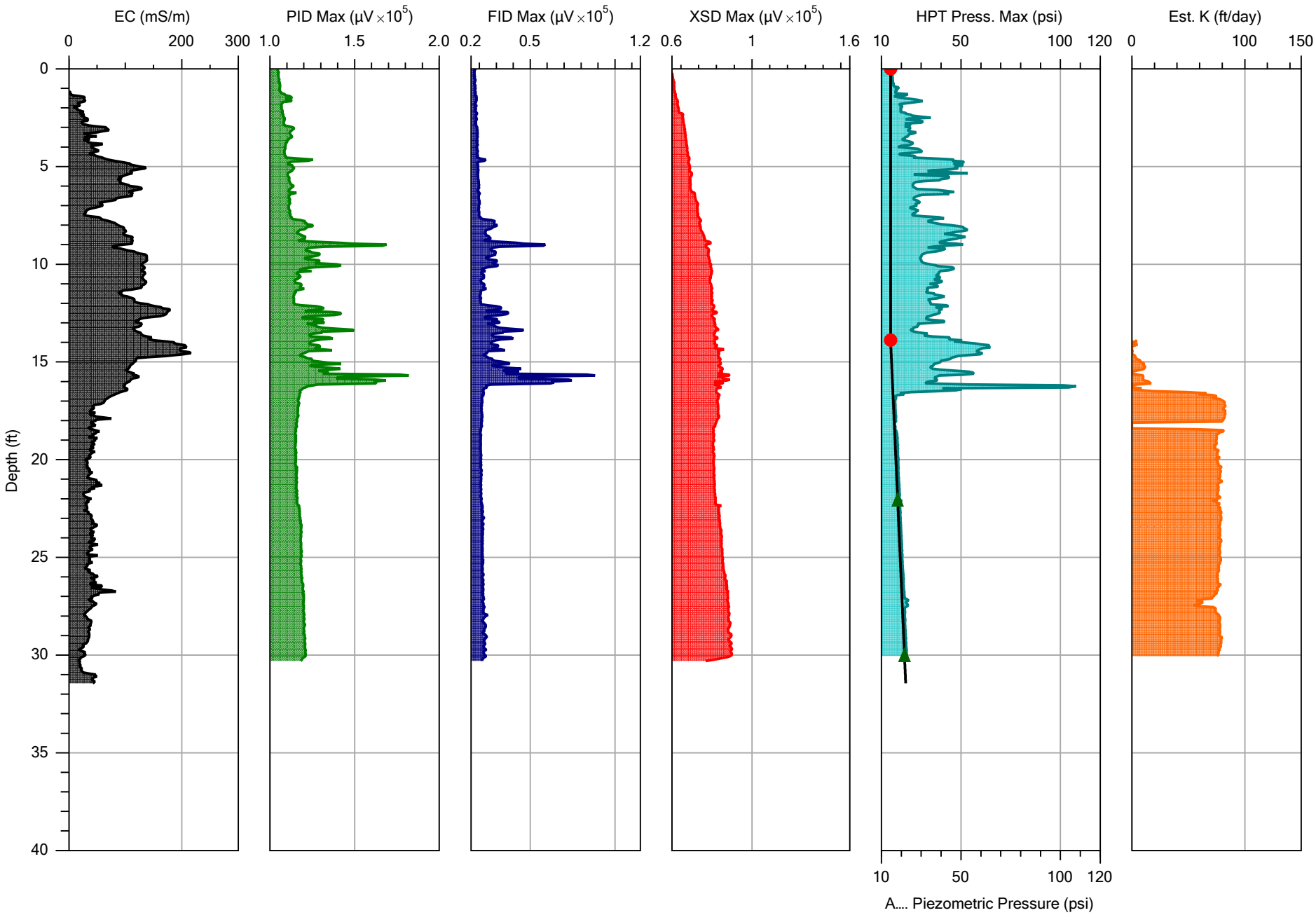
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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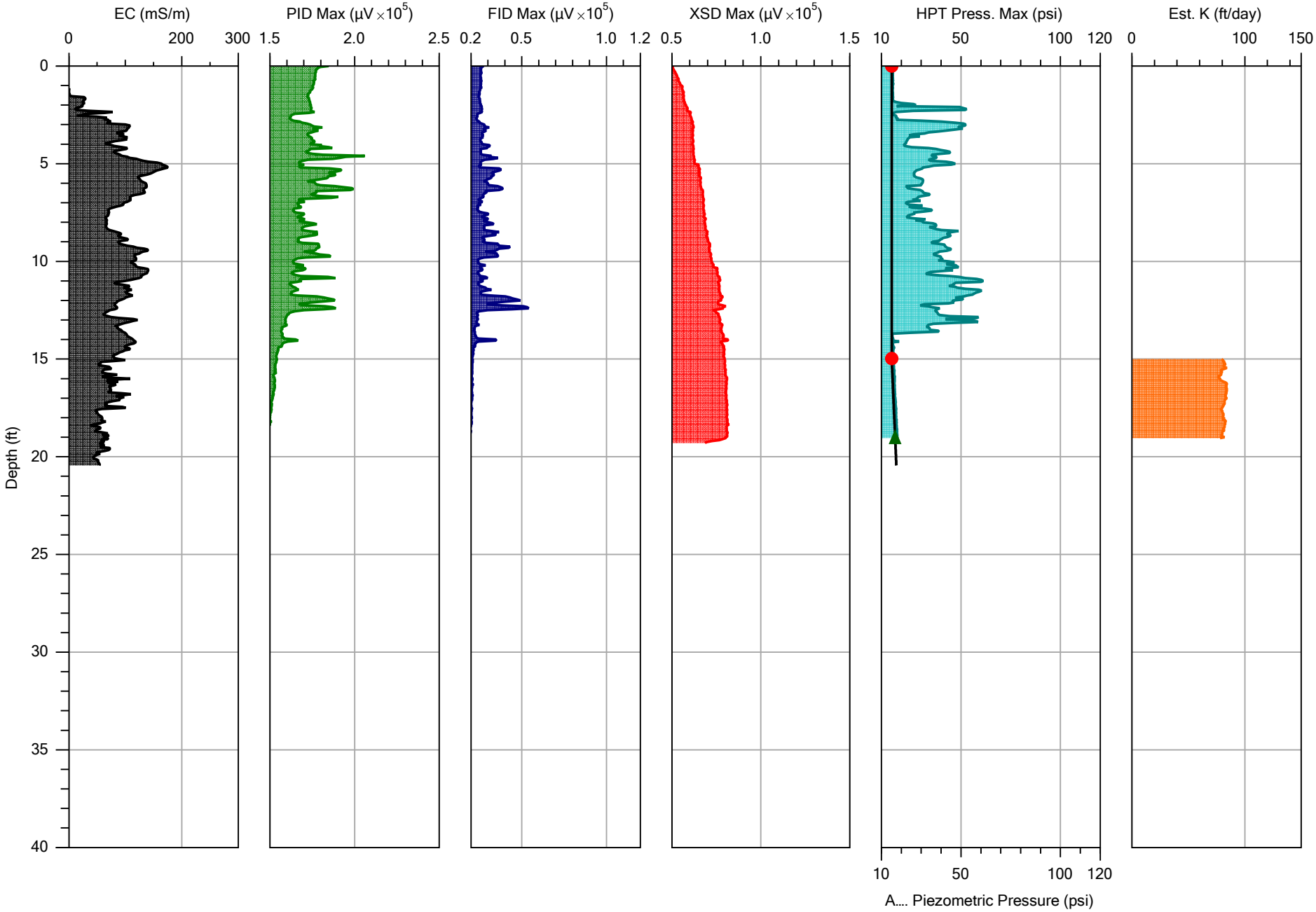

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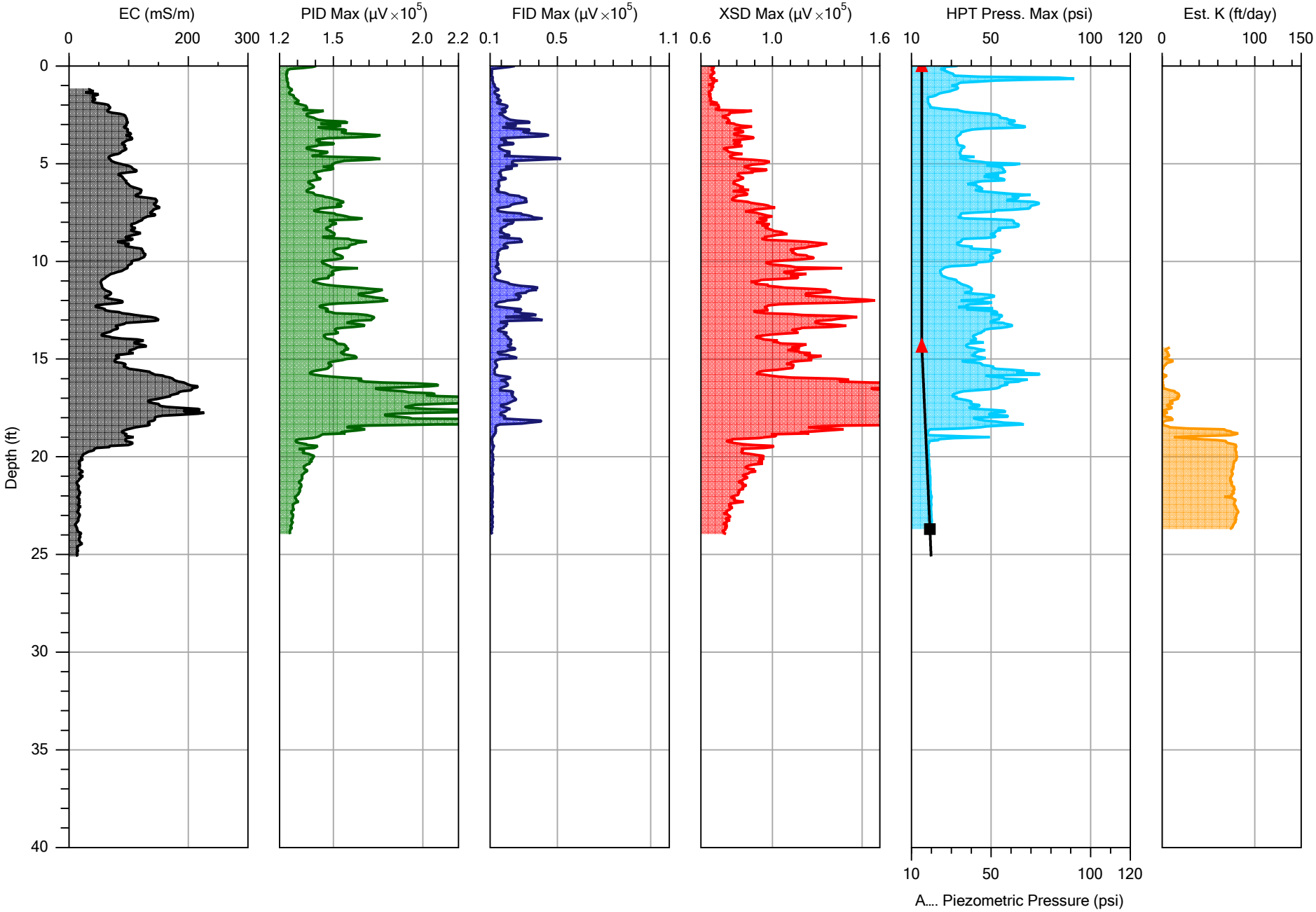
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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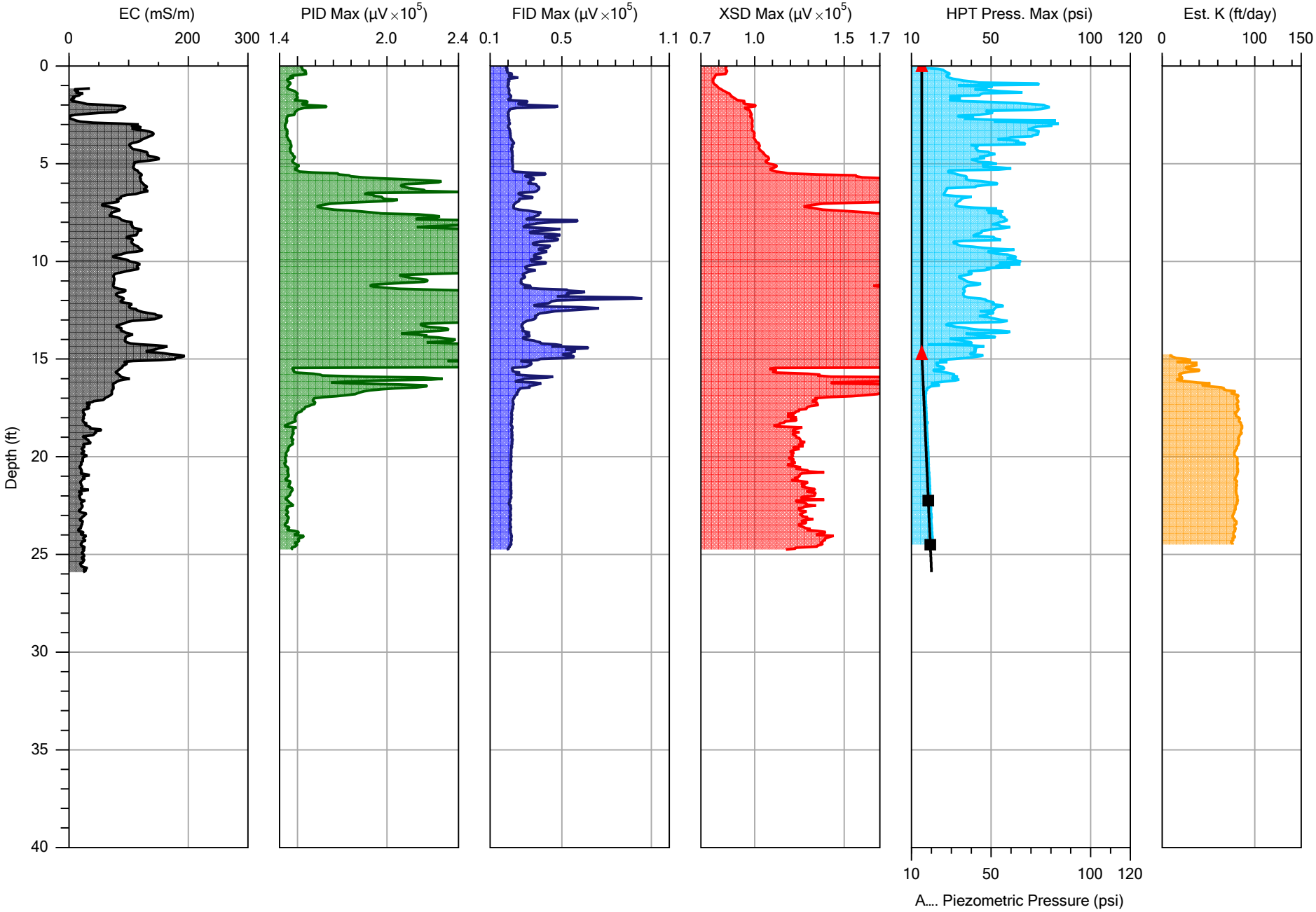

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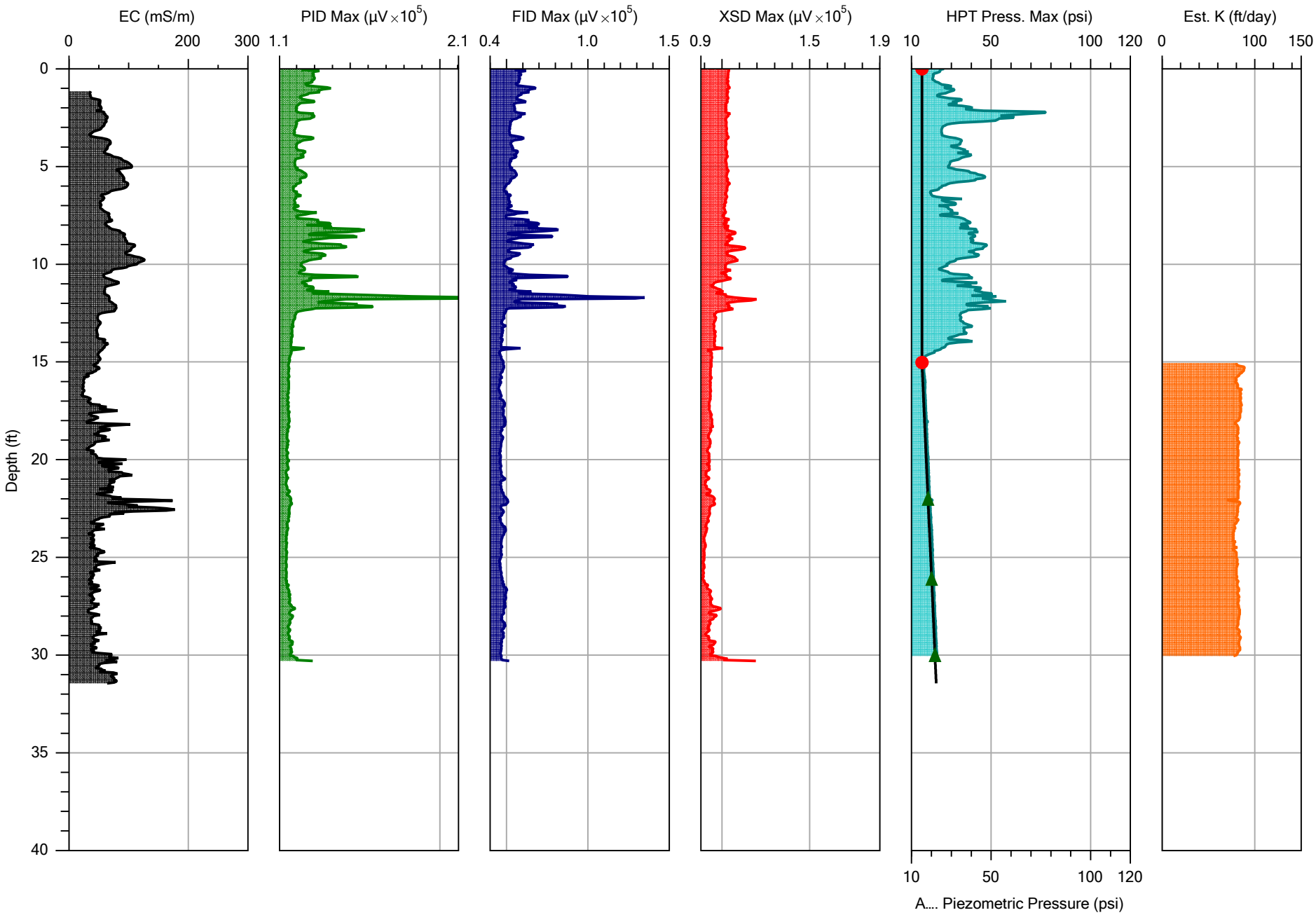

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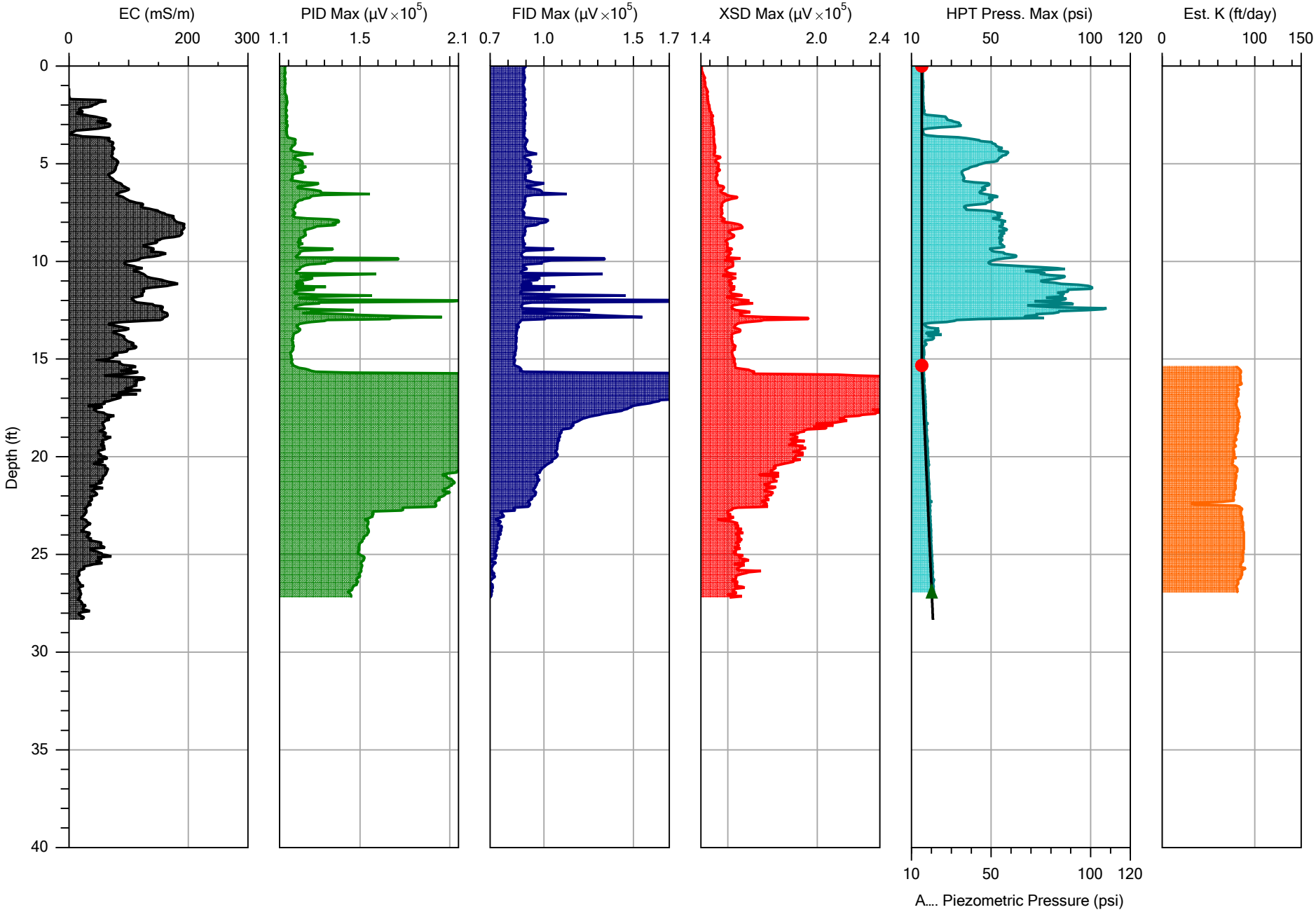
Company: Dakota Technologies	Operator: GHH	Date: 11/28/2017
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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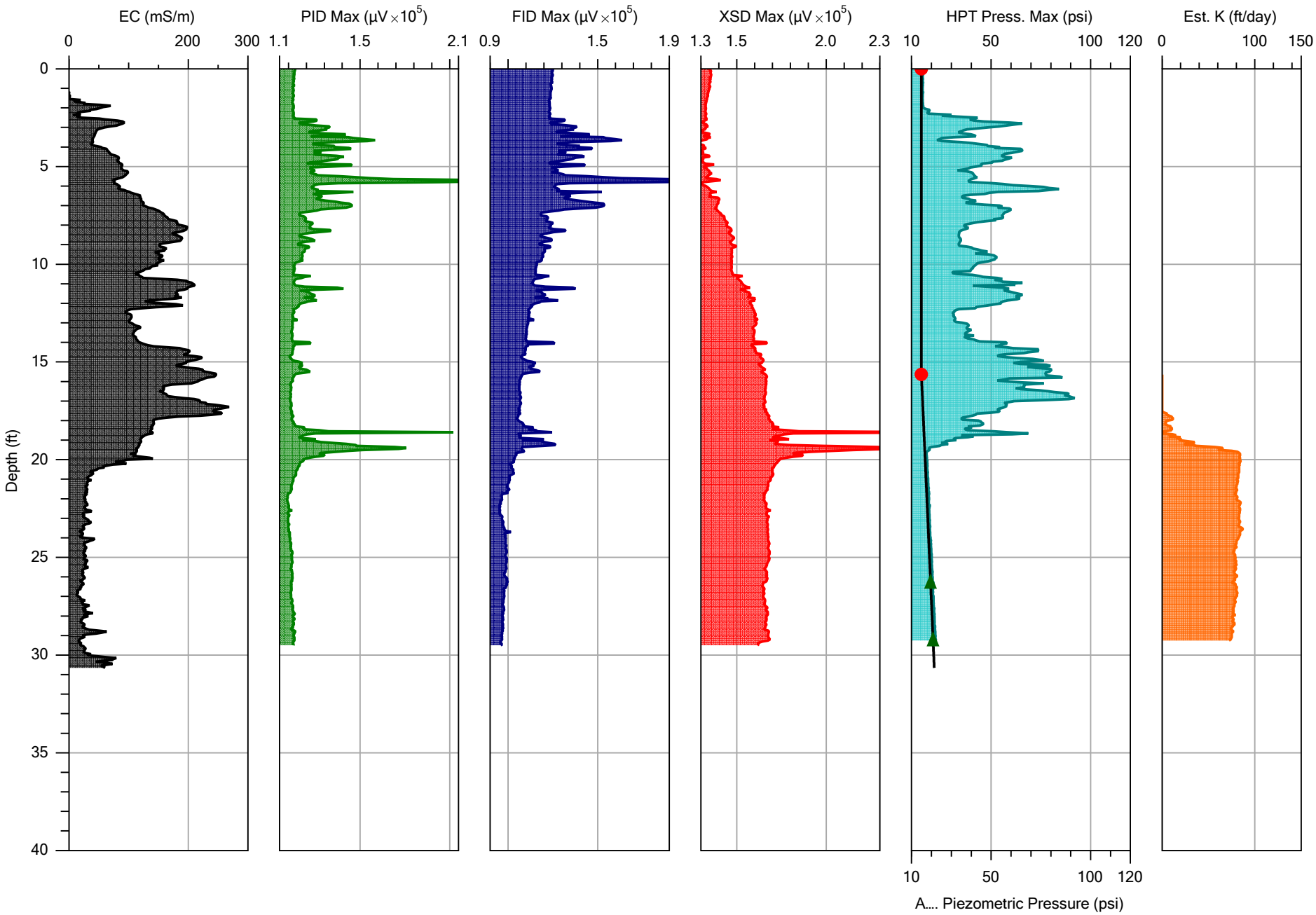
Company: Dakota Technologies	Operator: GHH	Date: 11/28/2017
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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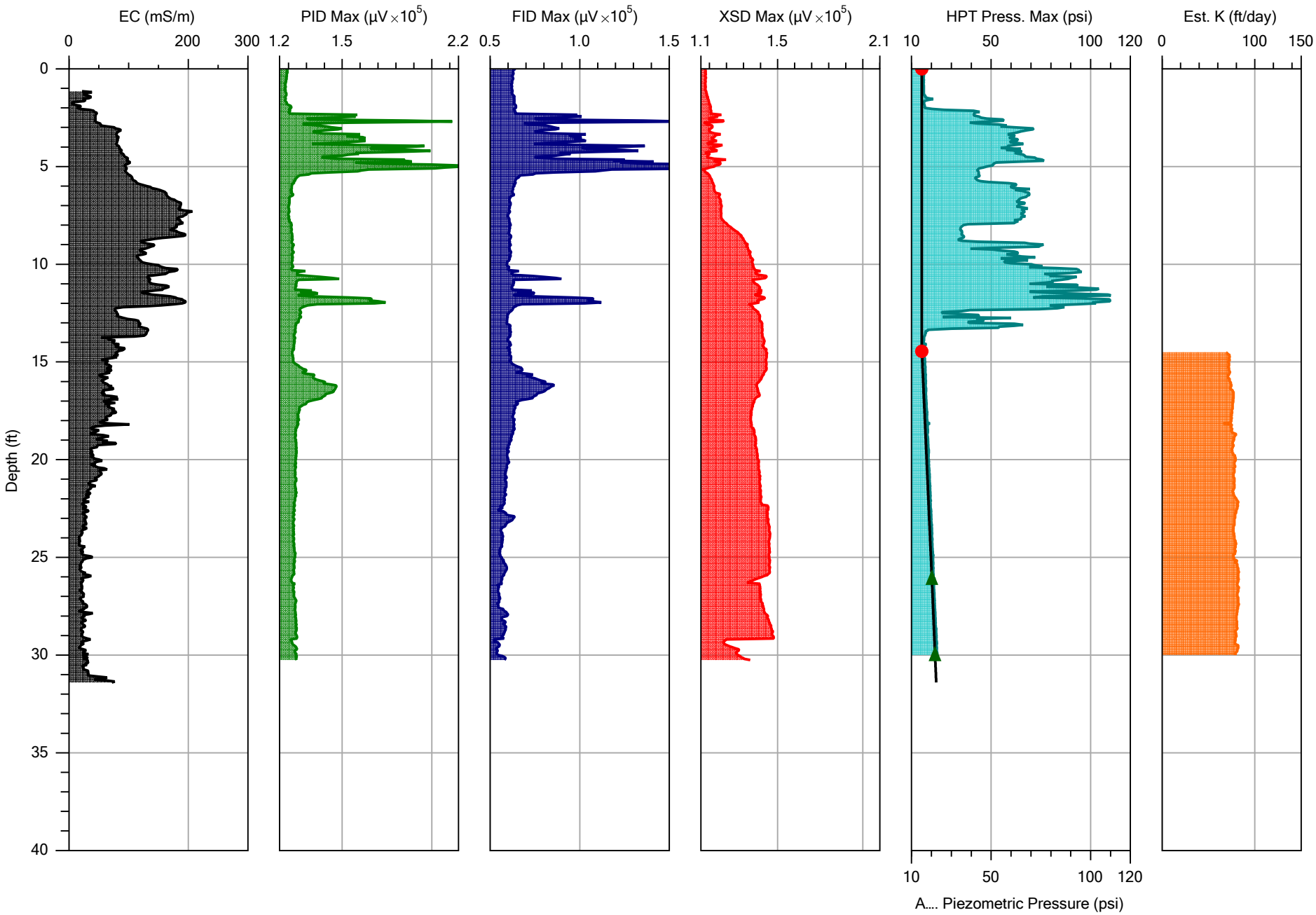
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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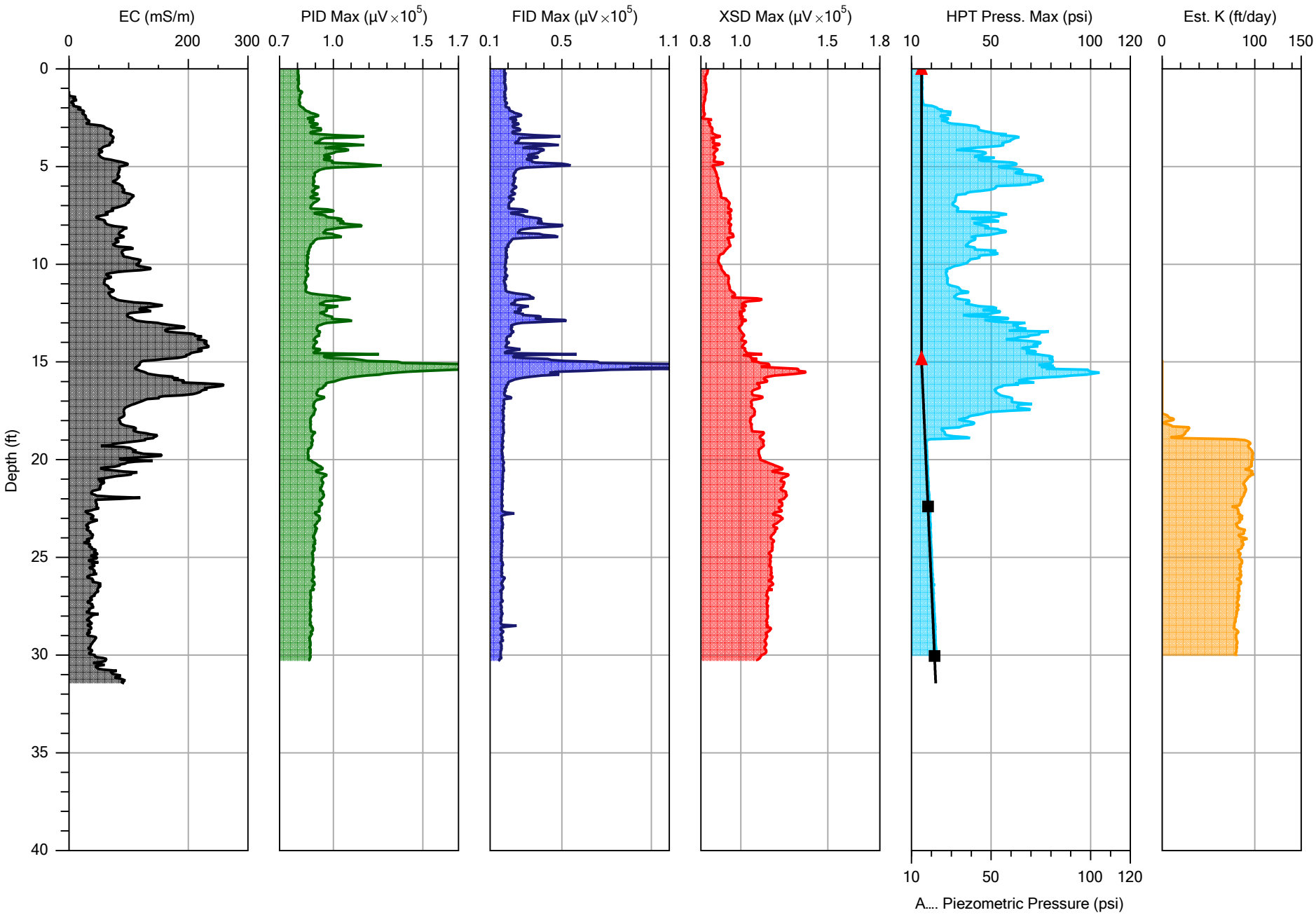

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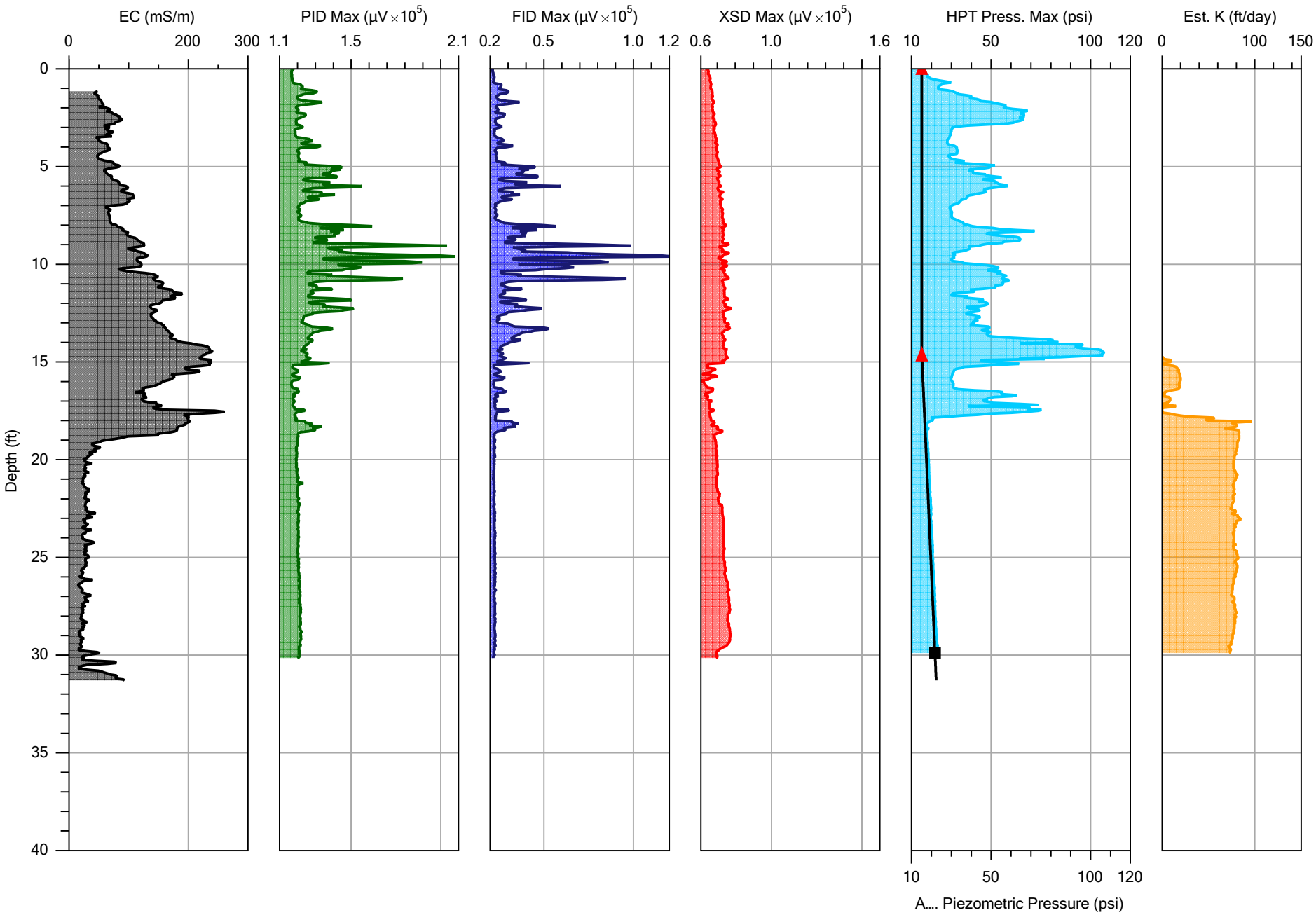
Company: Dakota Technologies	Operator: GHH	Date: 11/16/2017
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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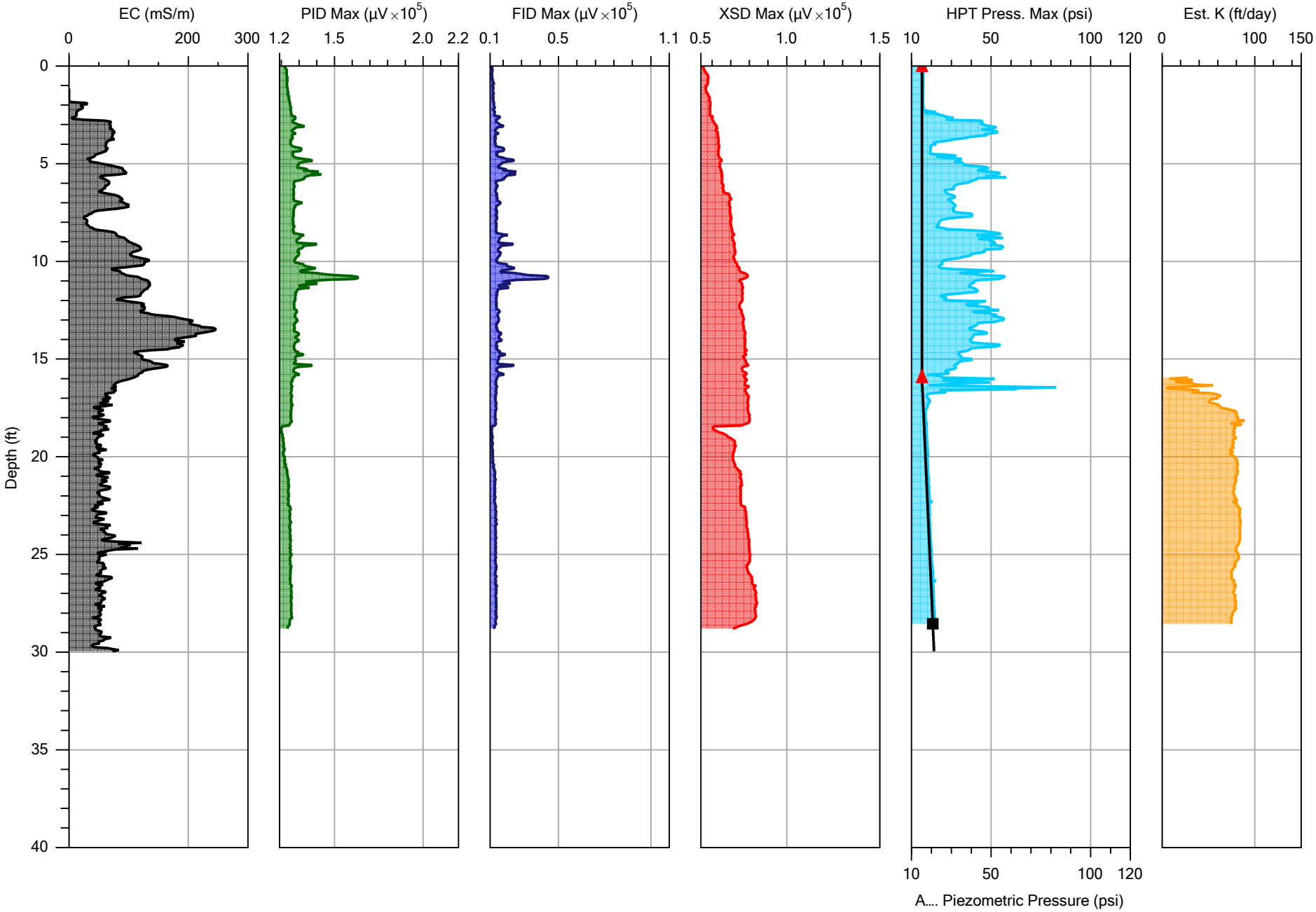
Company: Dakota Technologies	Operator: GHH	Date: 12/1/2017
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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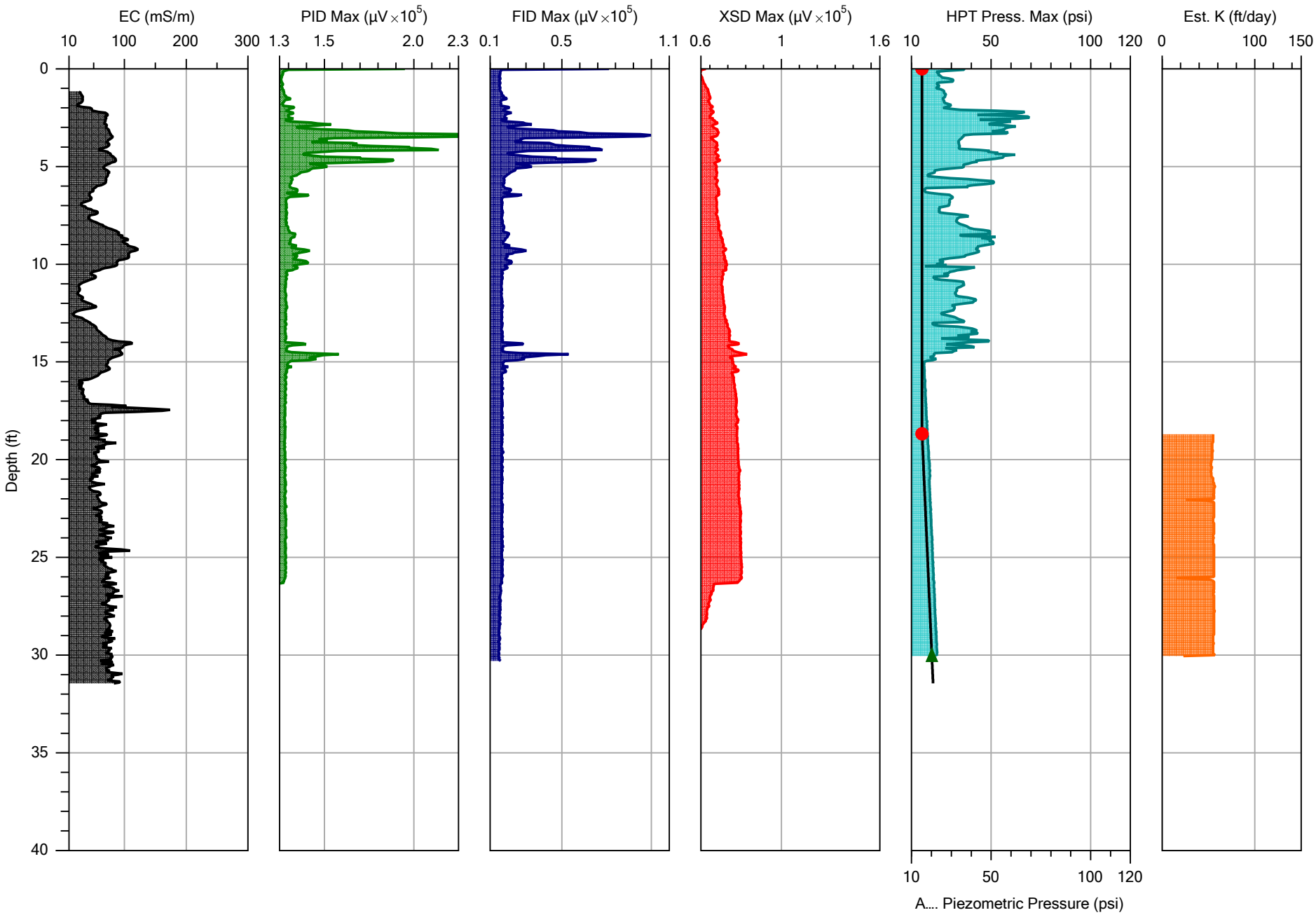
Company: Dakota Technologies	Operator: GHH		Date: 11/30/2017
Project ID: Billings PCE	Client: Trihydro		Location: Billings, MT



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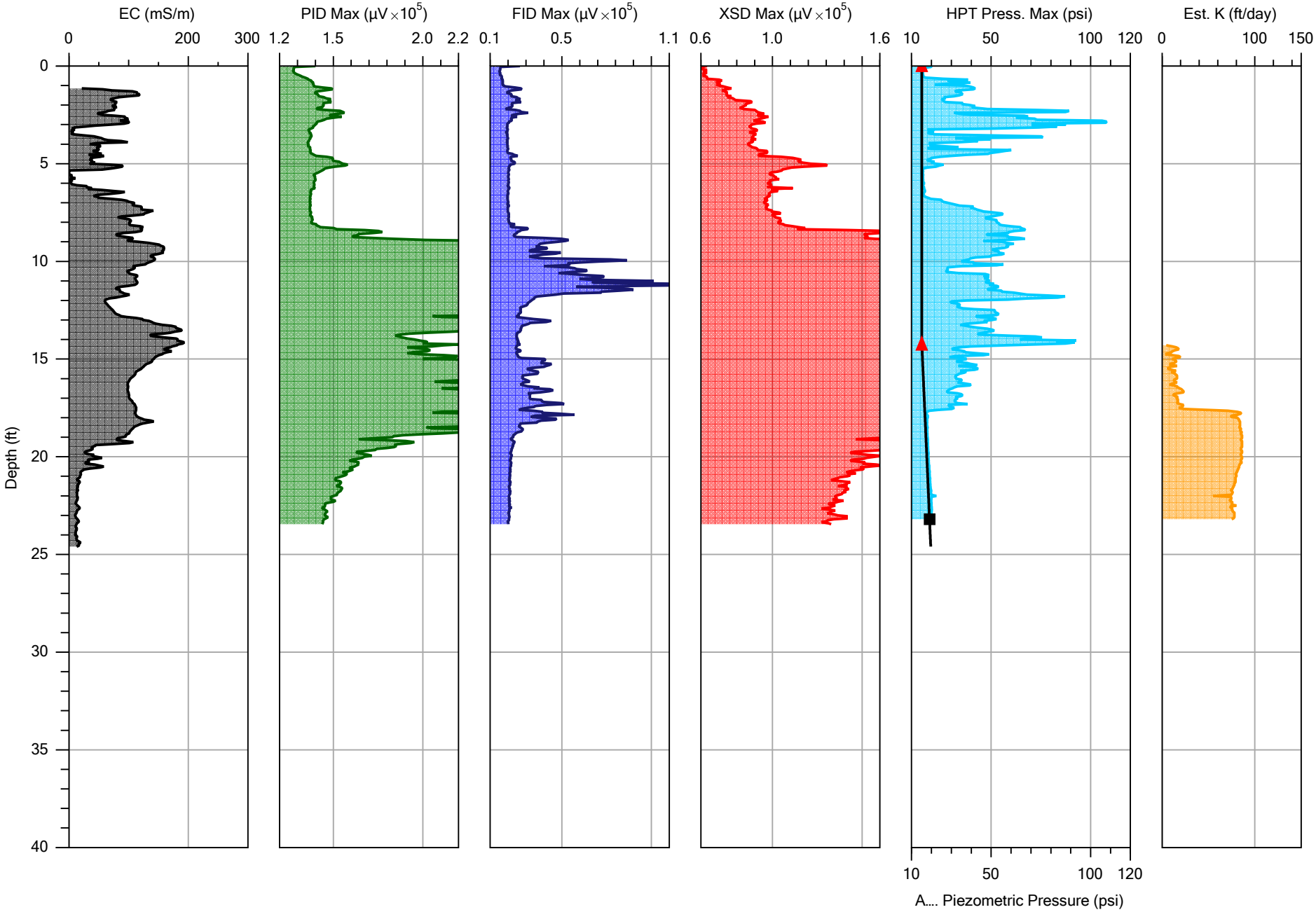
Company: Dakota Technologies	Operator: GHH	Date: 11/29/2017
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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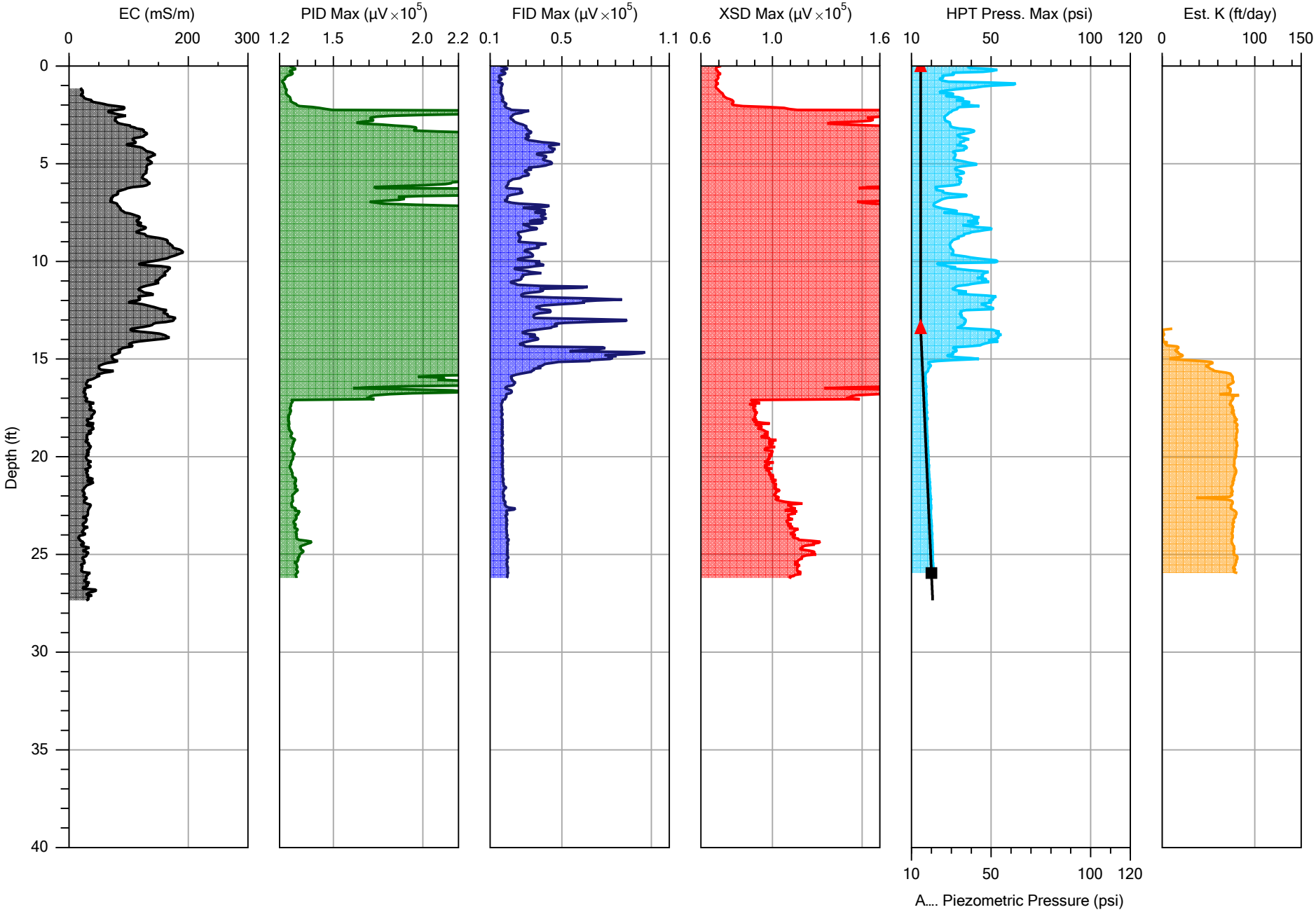
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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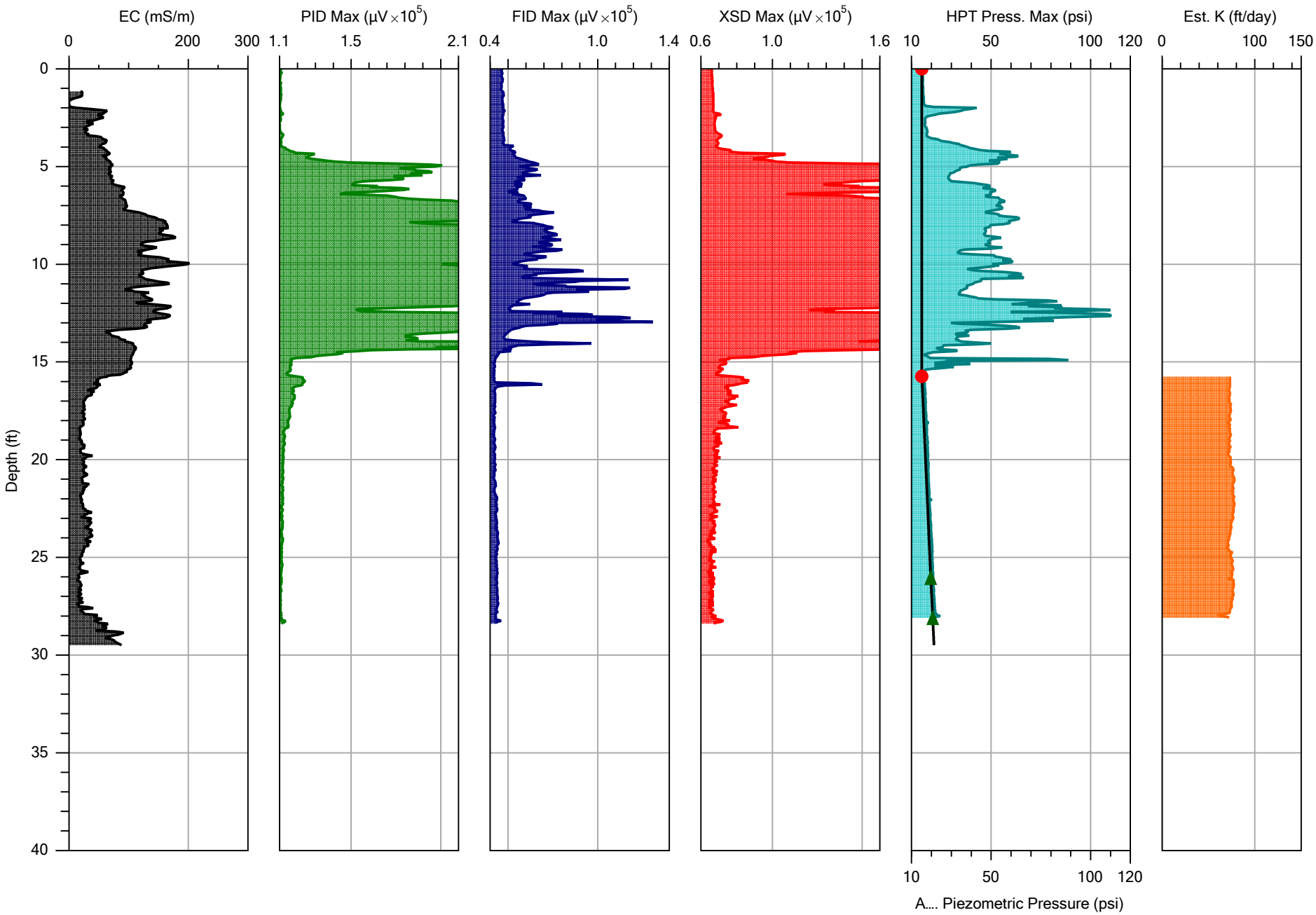
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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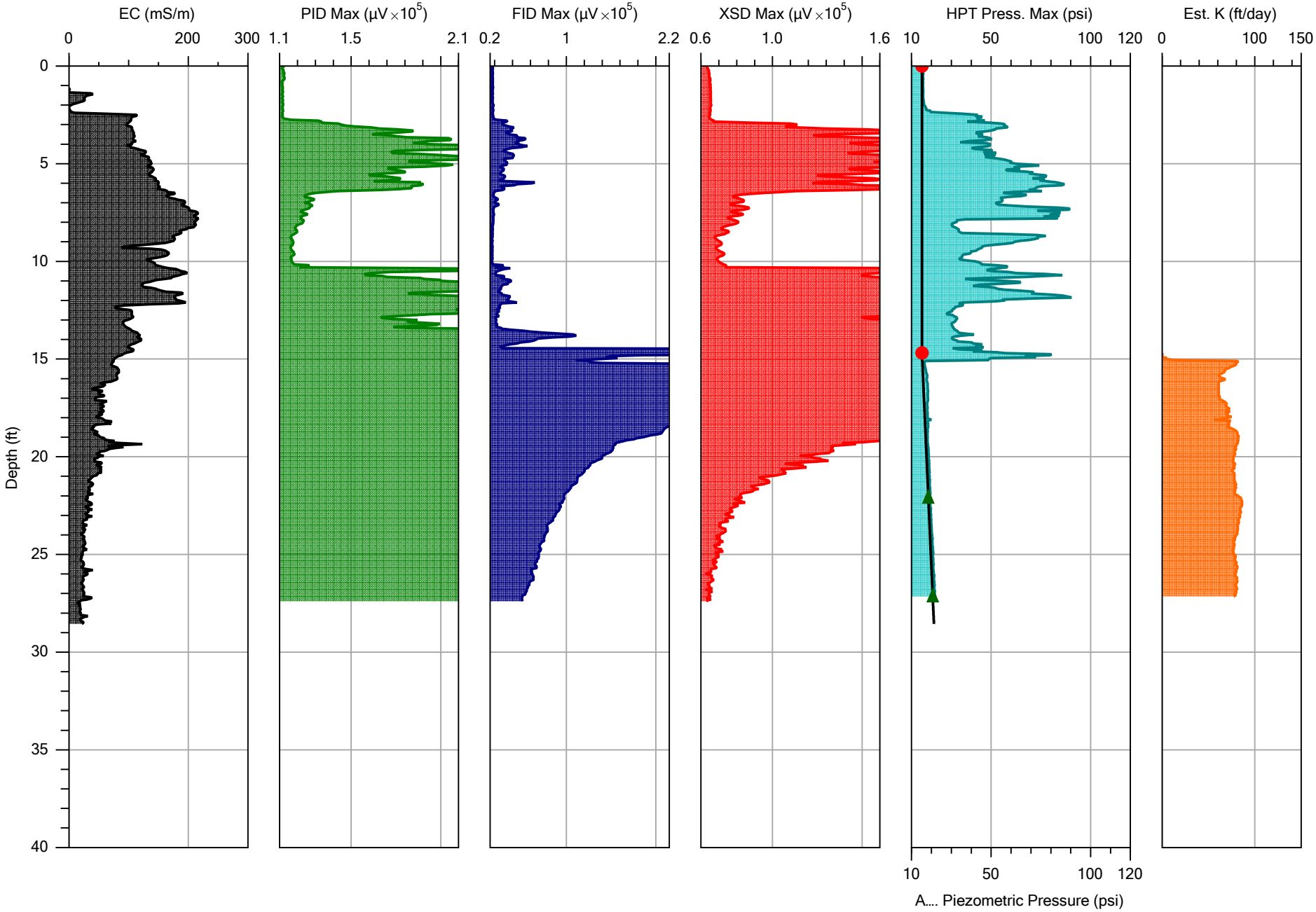
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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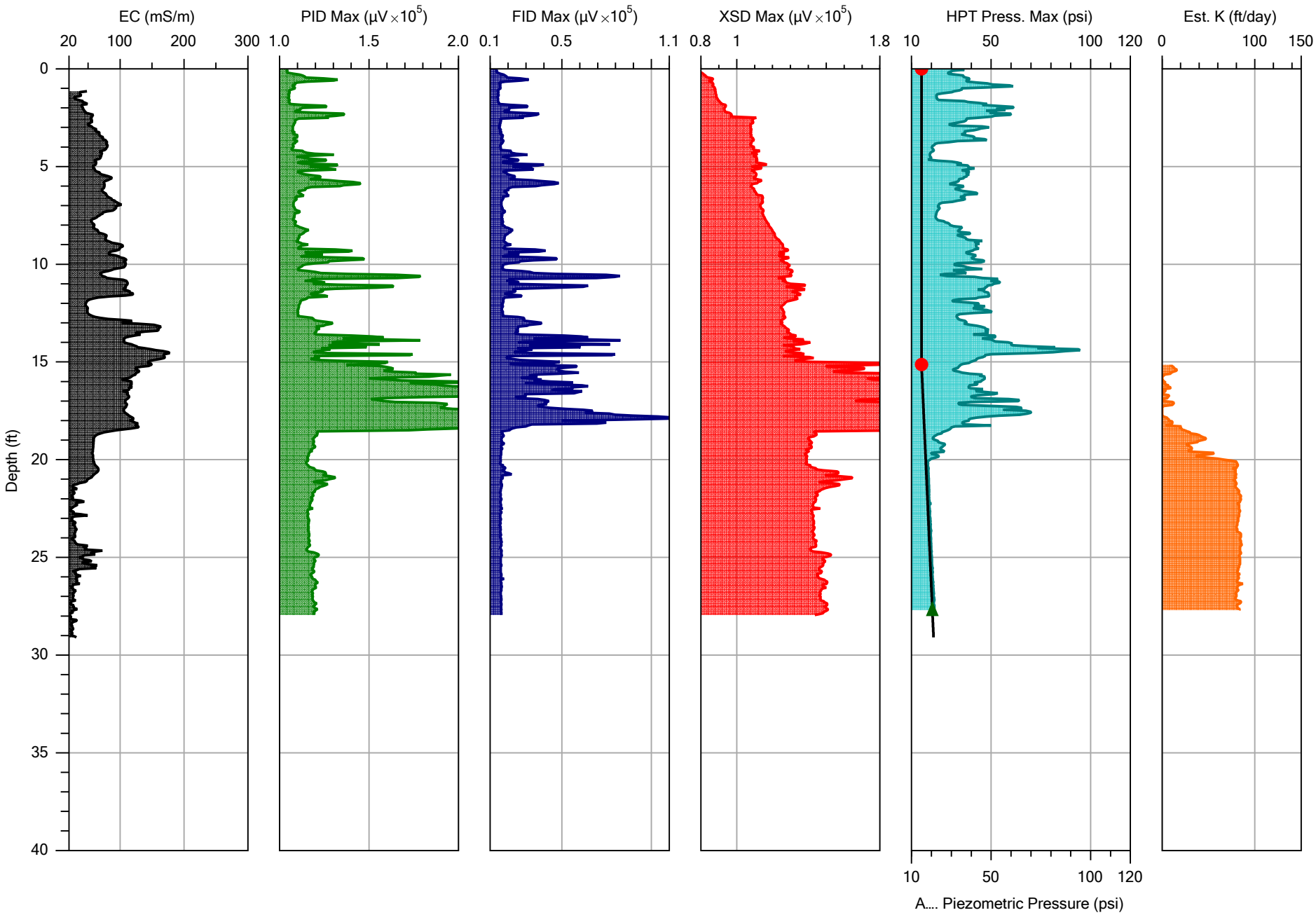
Project ID: Billings PCE	Client: Trihydro		Location: Billings, MT



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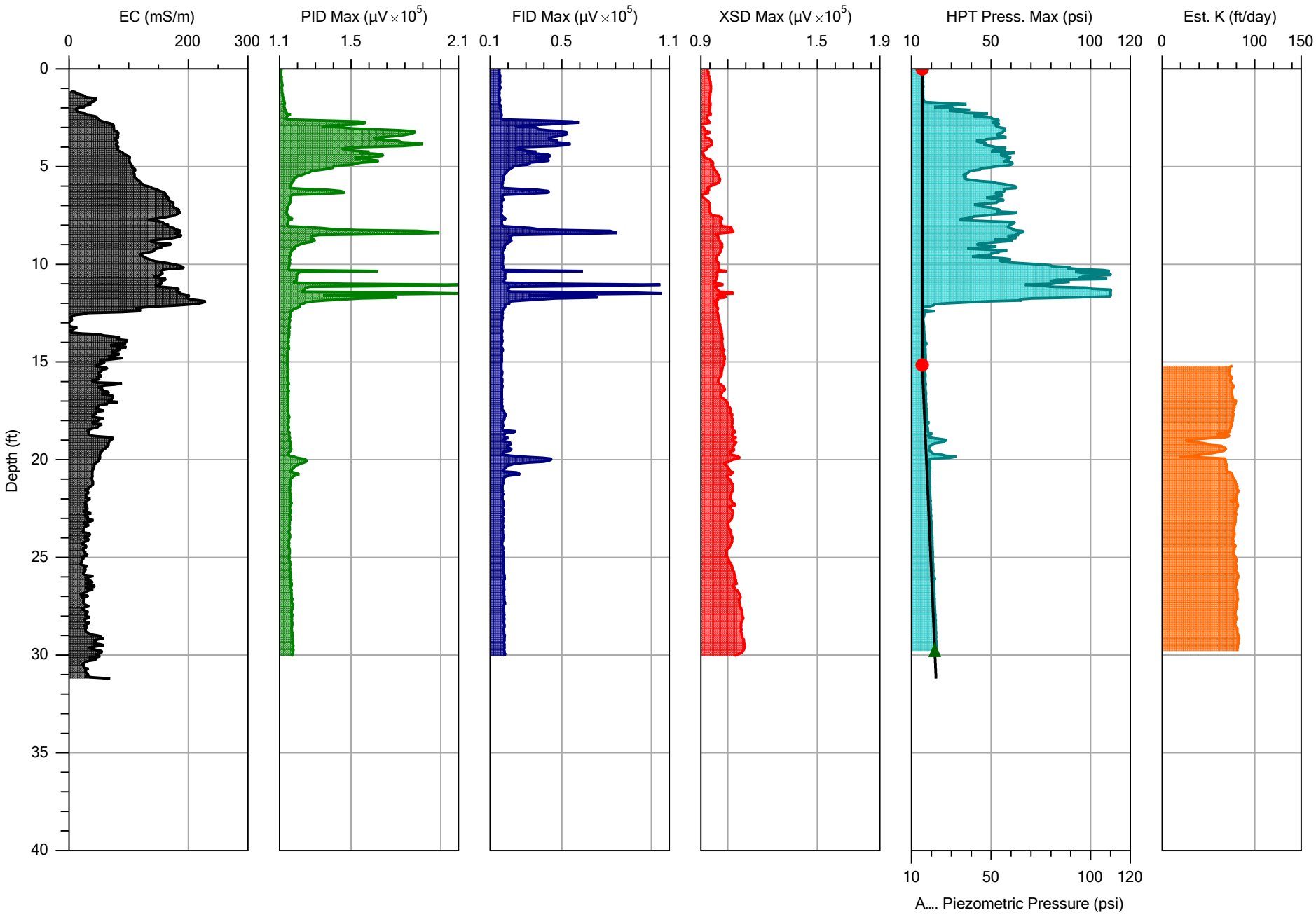
Company: Dakota Technologies	Operator: GHH	Date: 11/29/2017
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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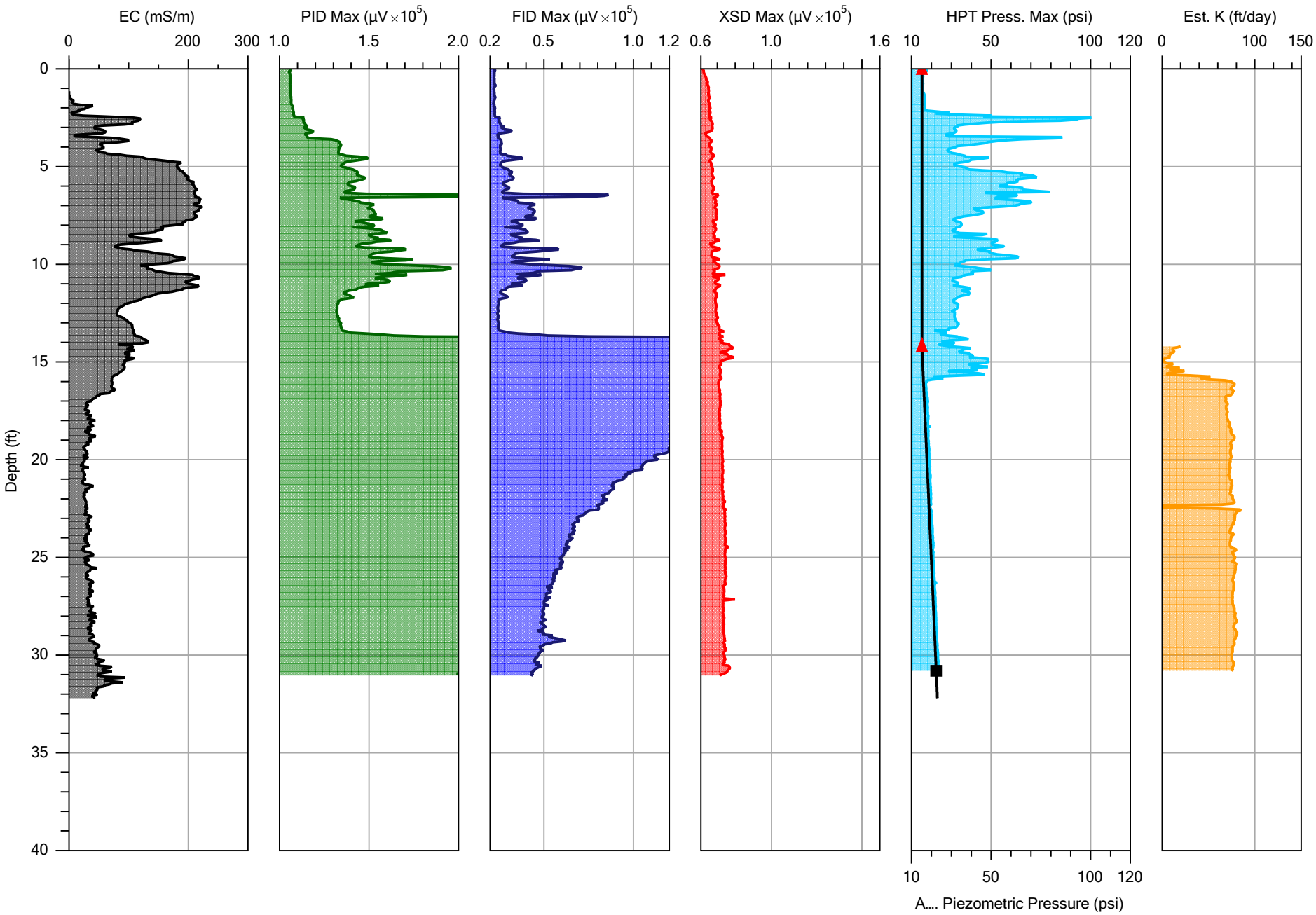
Company: Dakota Technologies	Operator: GHH	Date: 11/29/2017
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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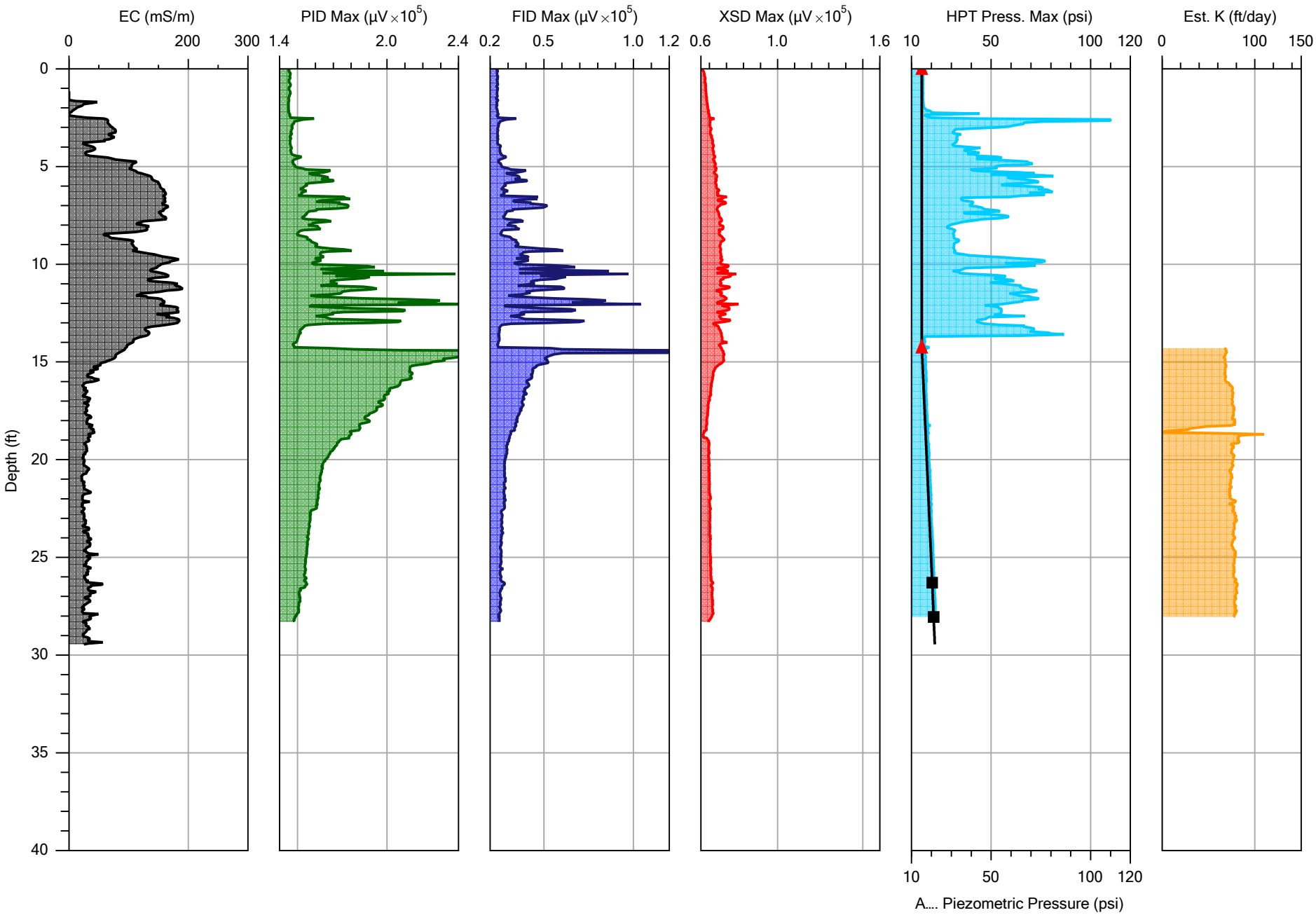
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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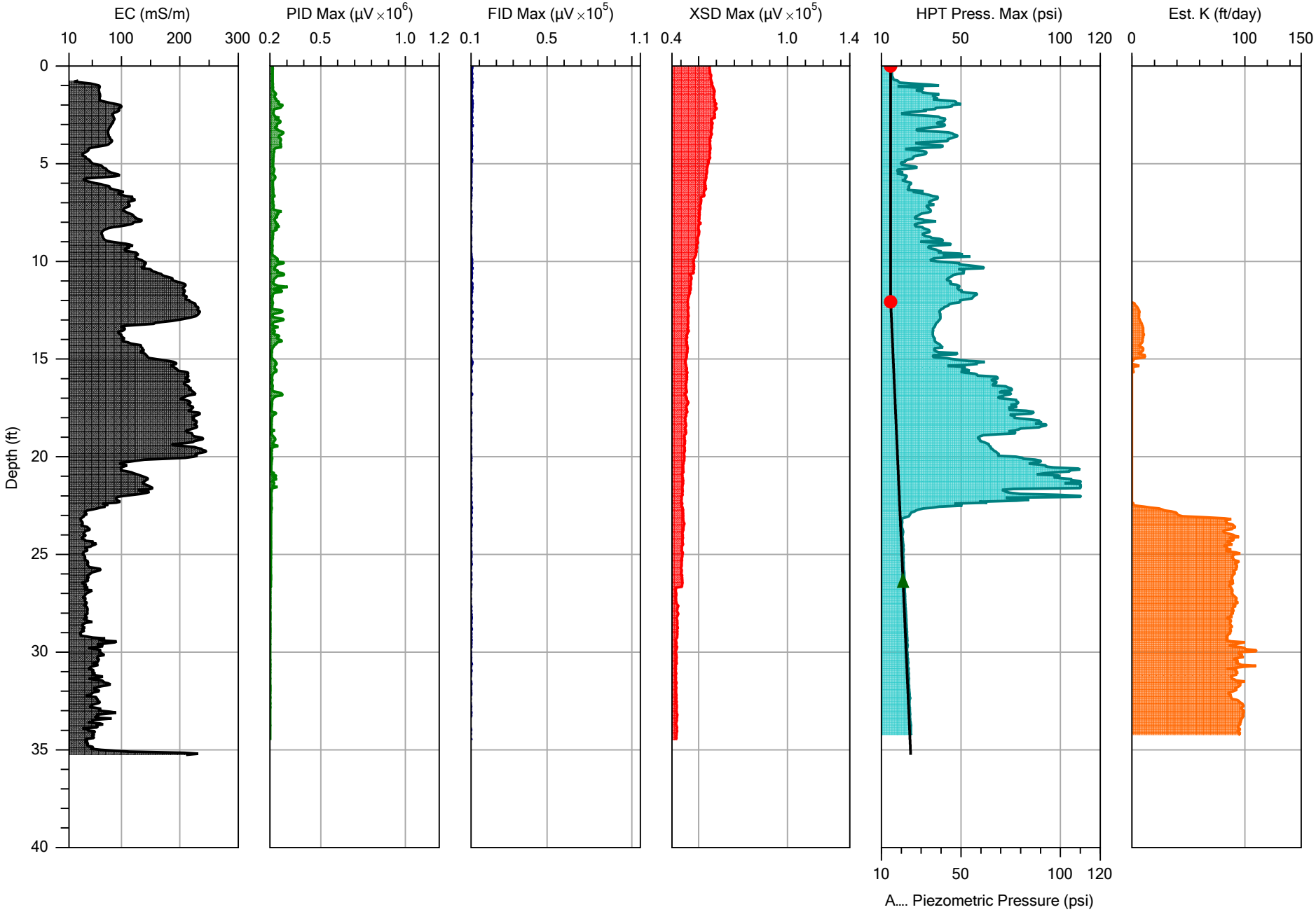
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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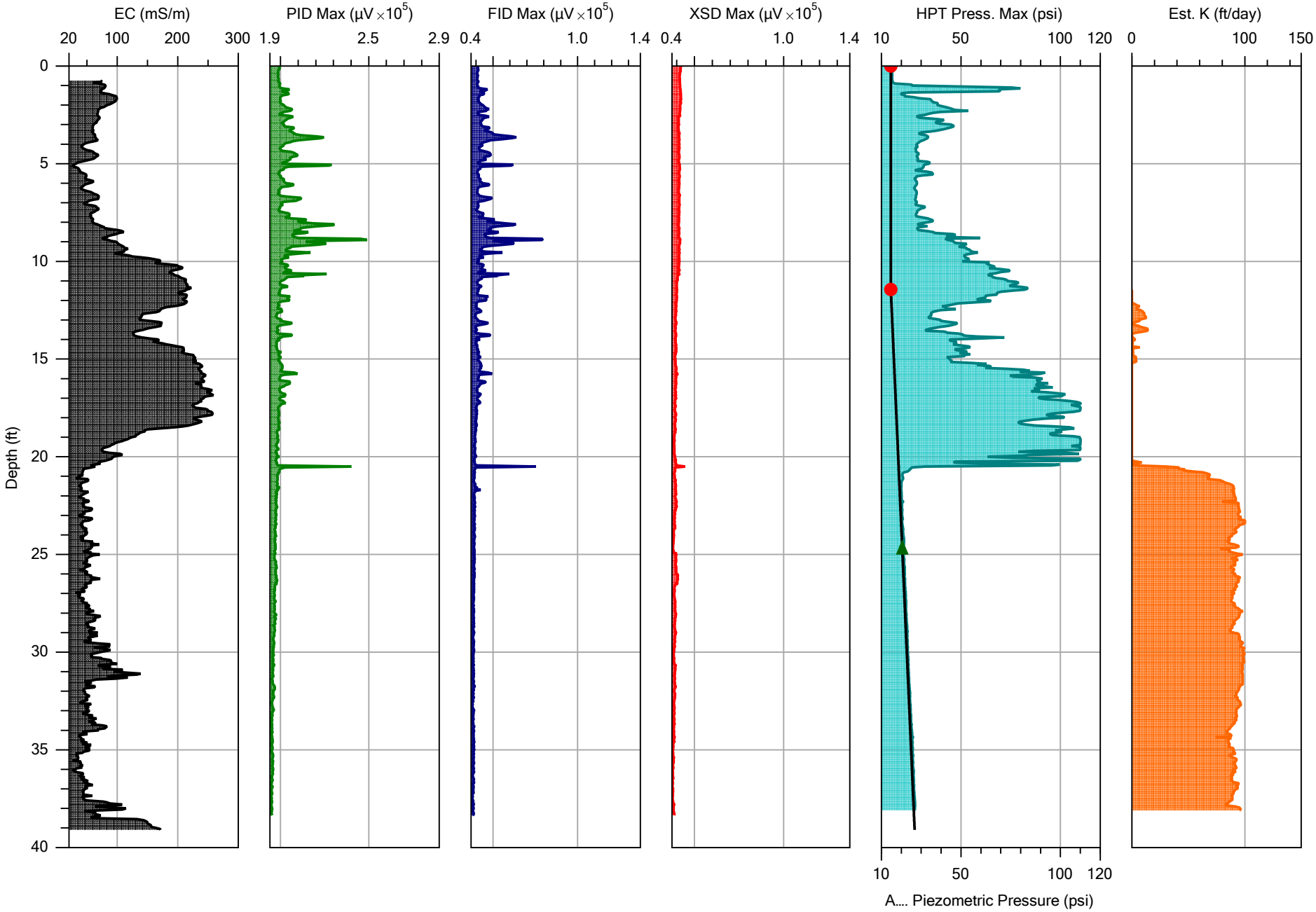
Company: Dakota Technologies	Operator: GHH	Date: 11/13/2017
Project ID: Billings PCE	Client: TriHydro	Location: Billings, MT



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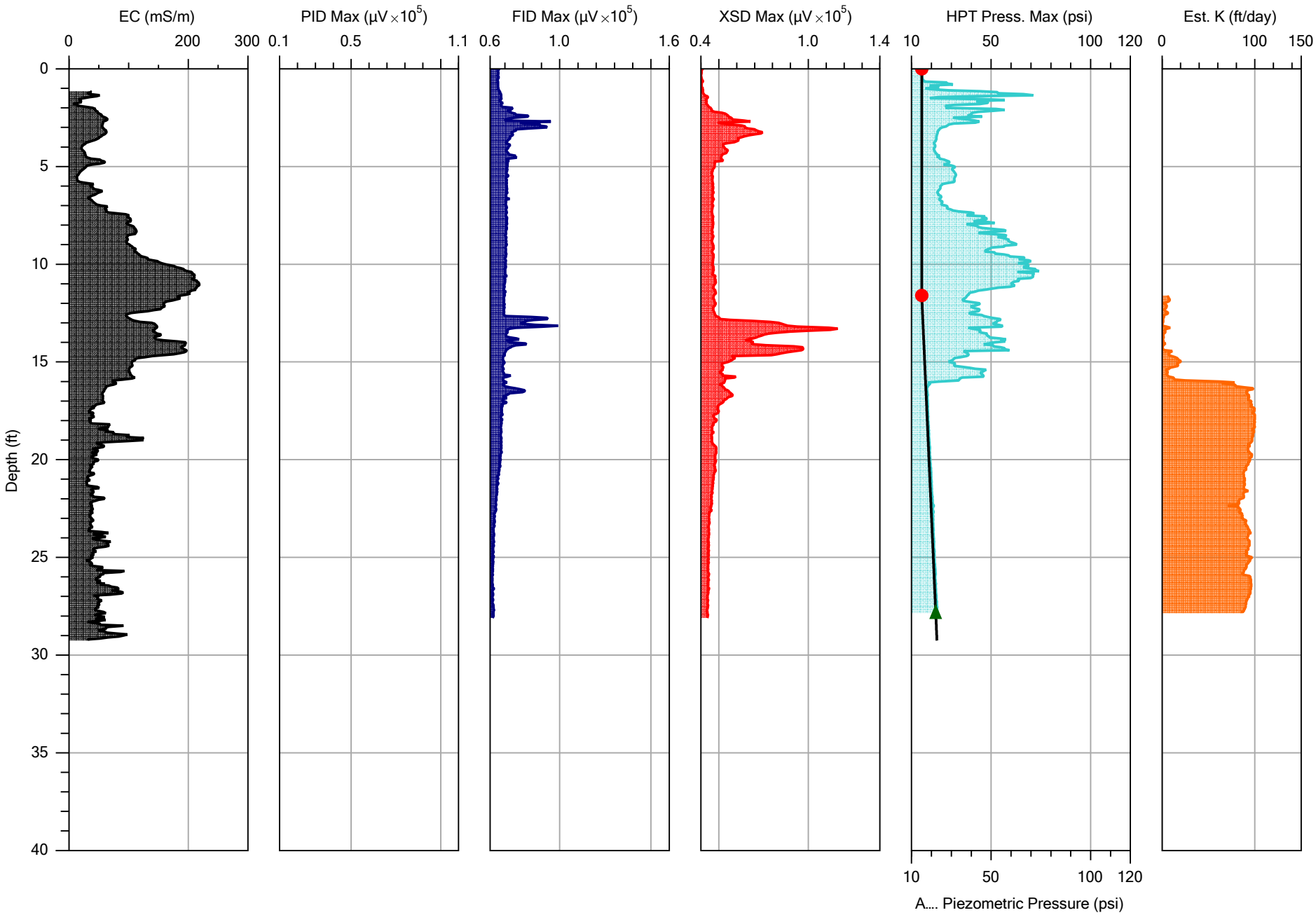
Project ID: Billings PCE	Client: TriHydro	Location: Billings, MT



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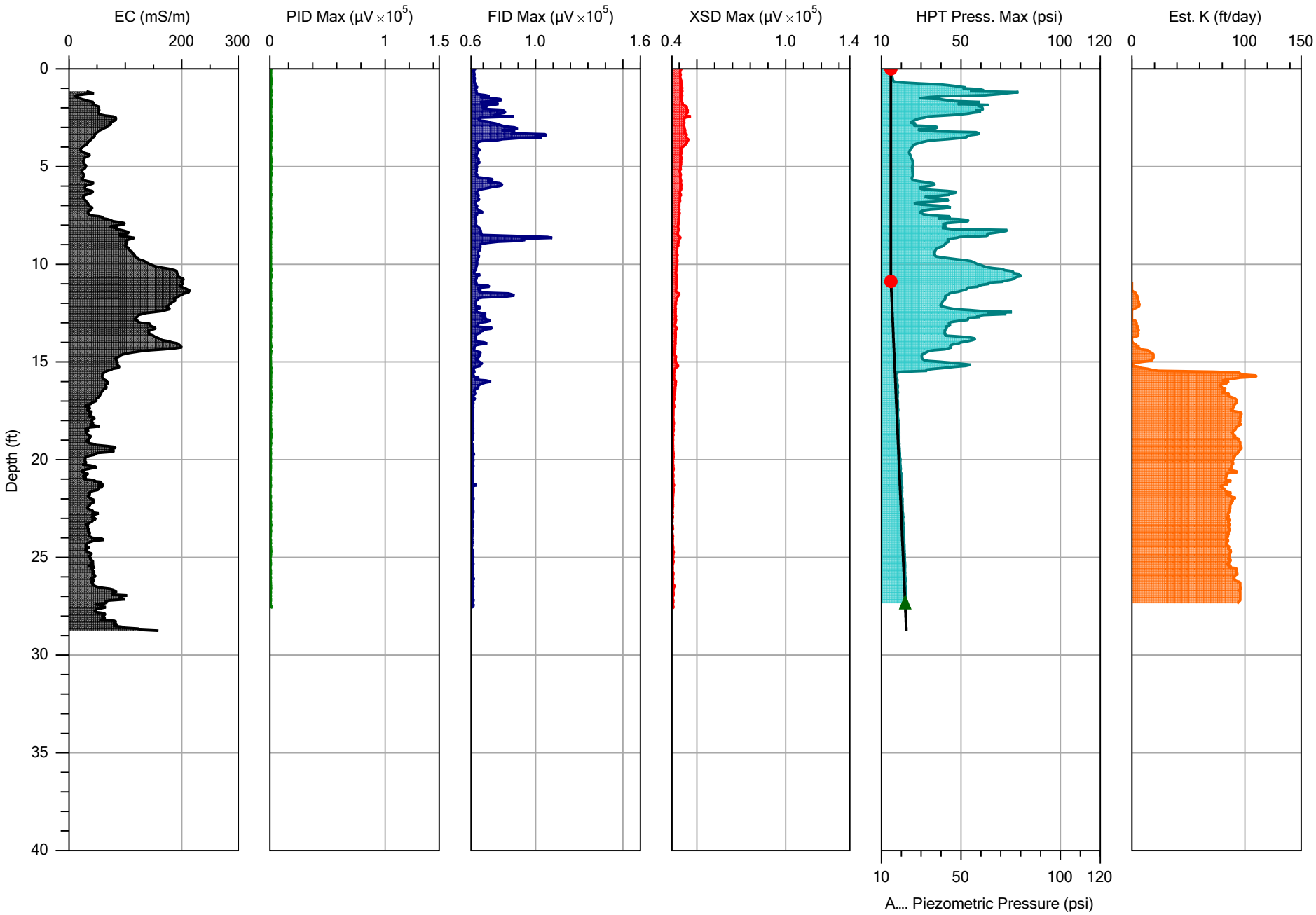
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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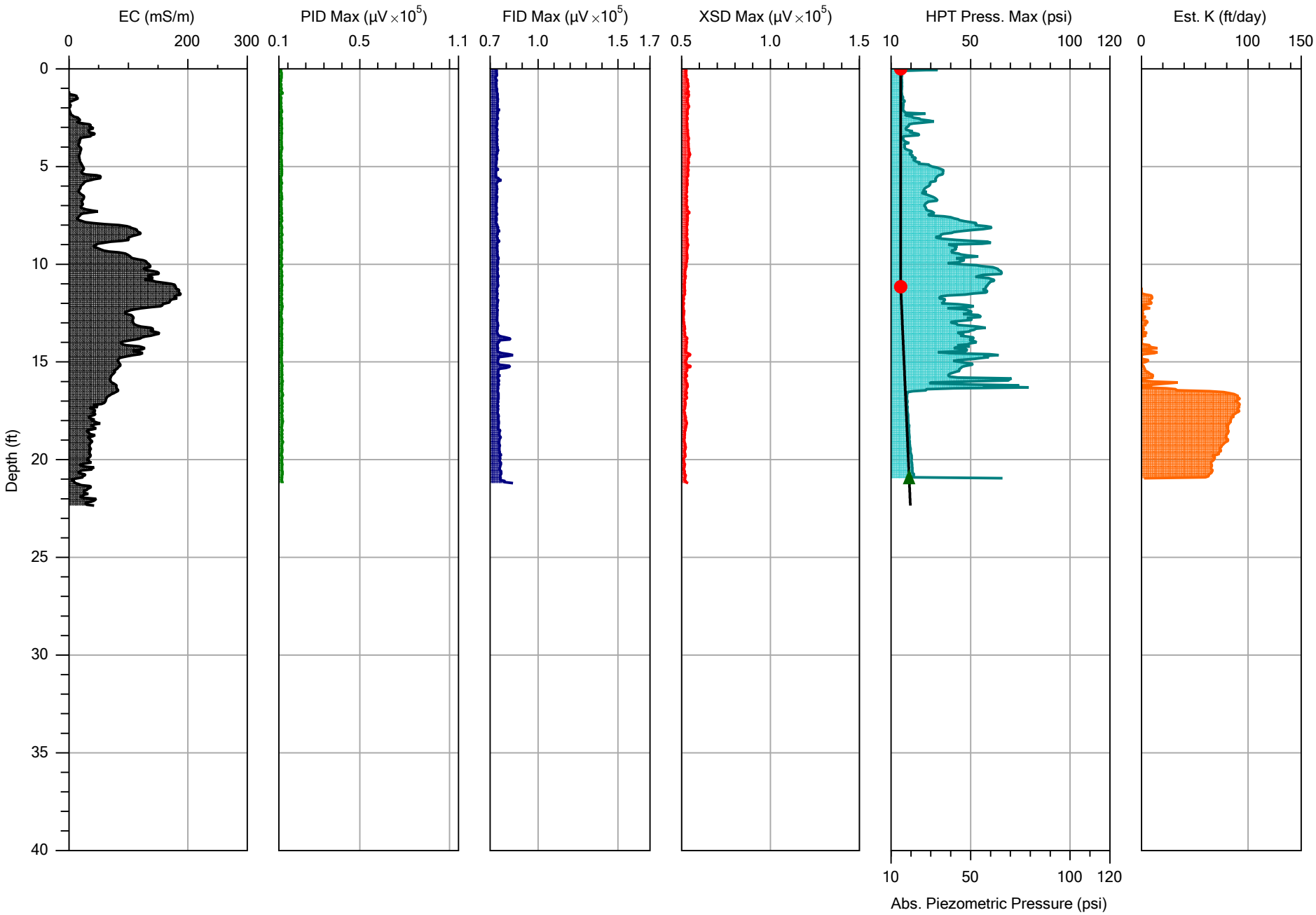

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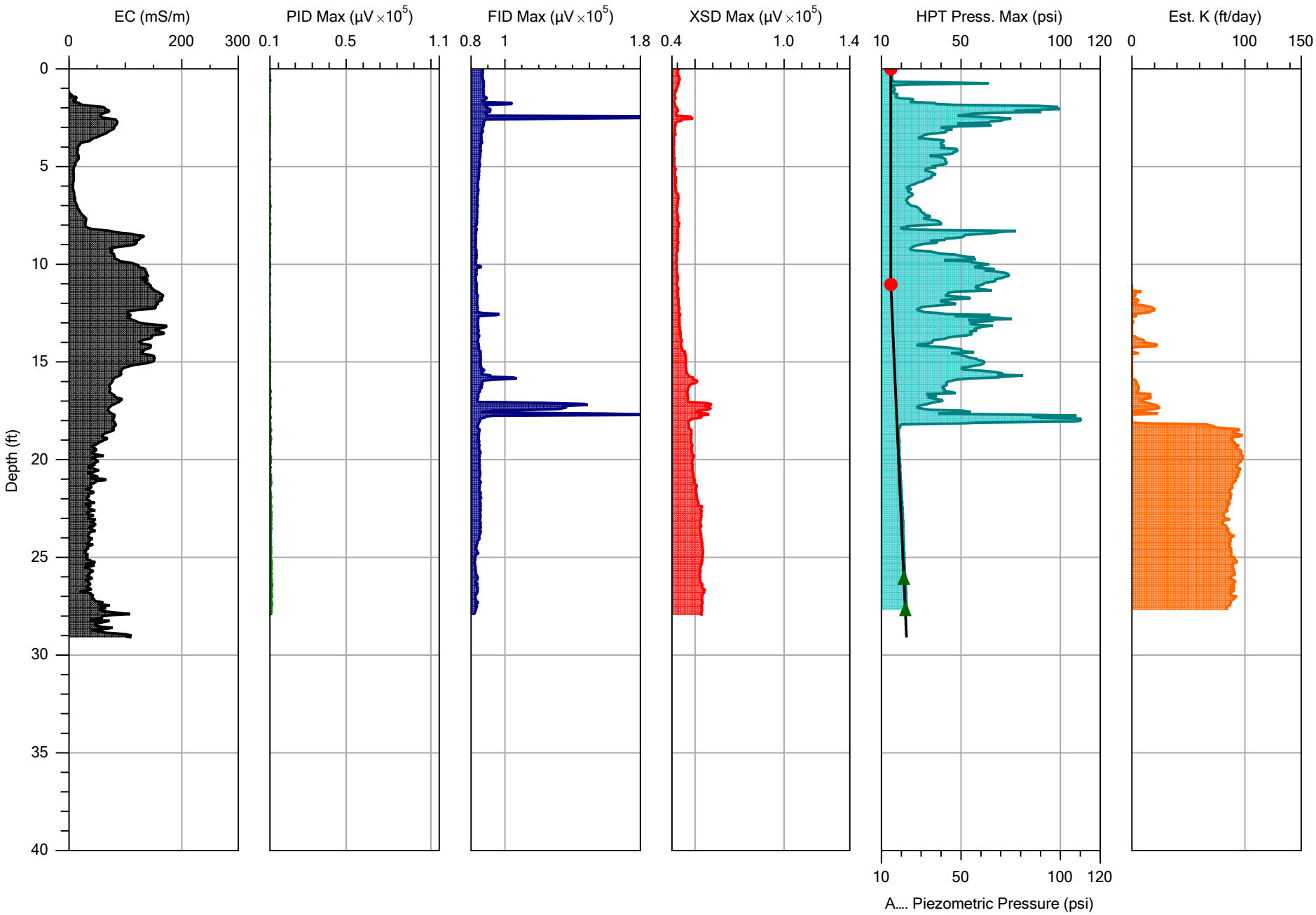
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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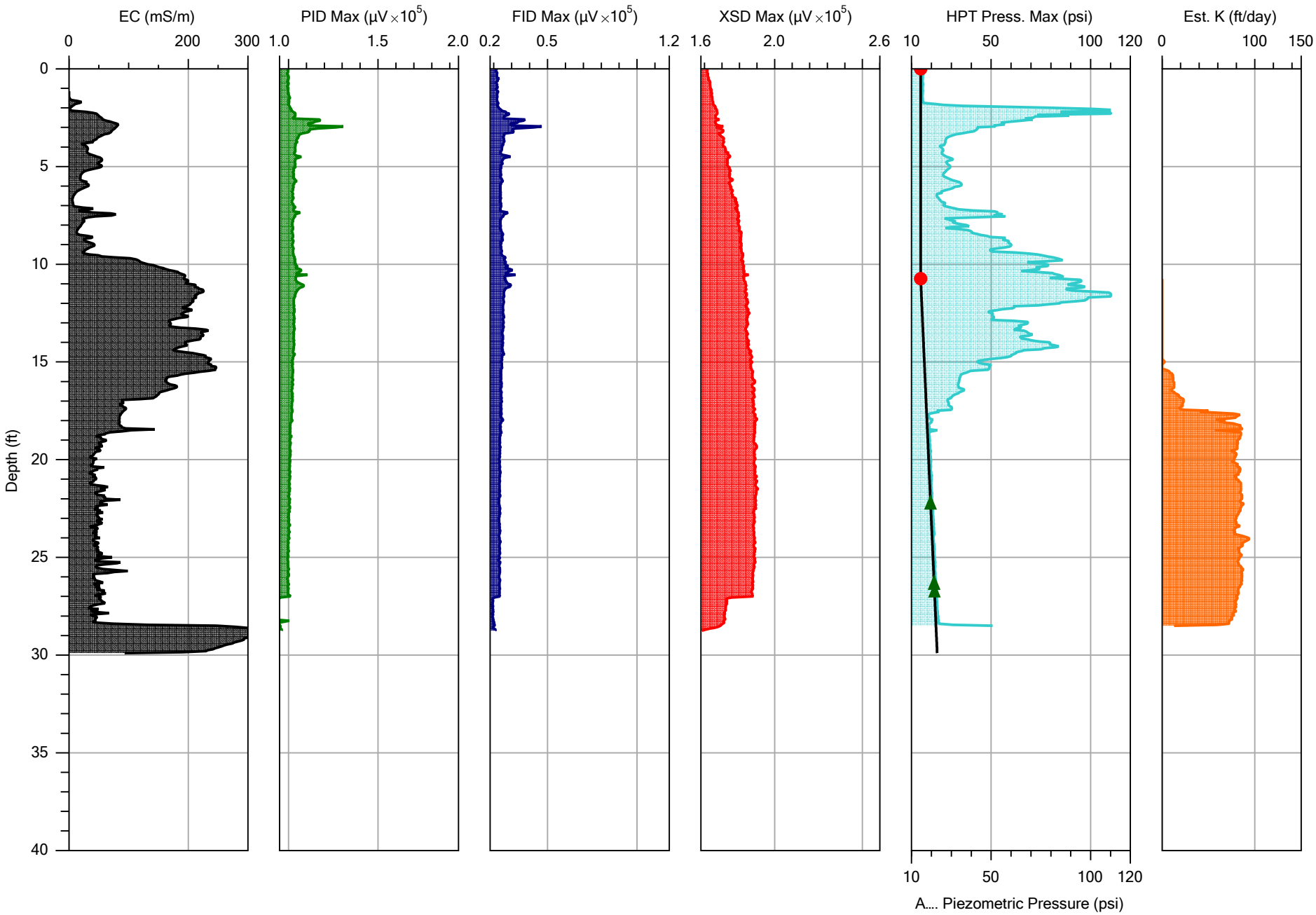
Company: Dakota Technologies	Operator: GHH	Date: 11/14/2017
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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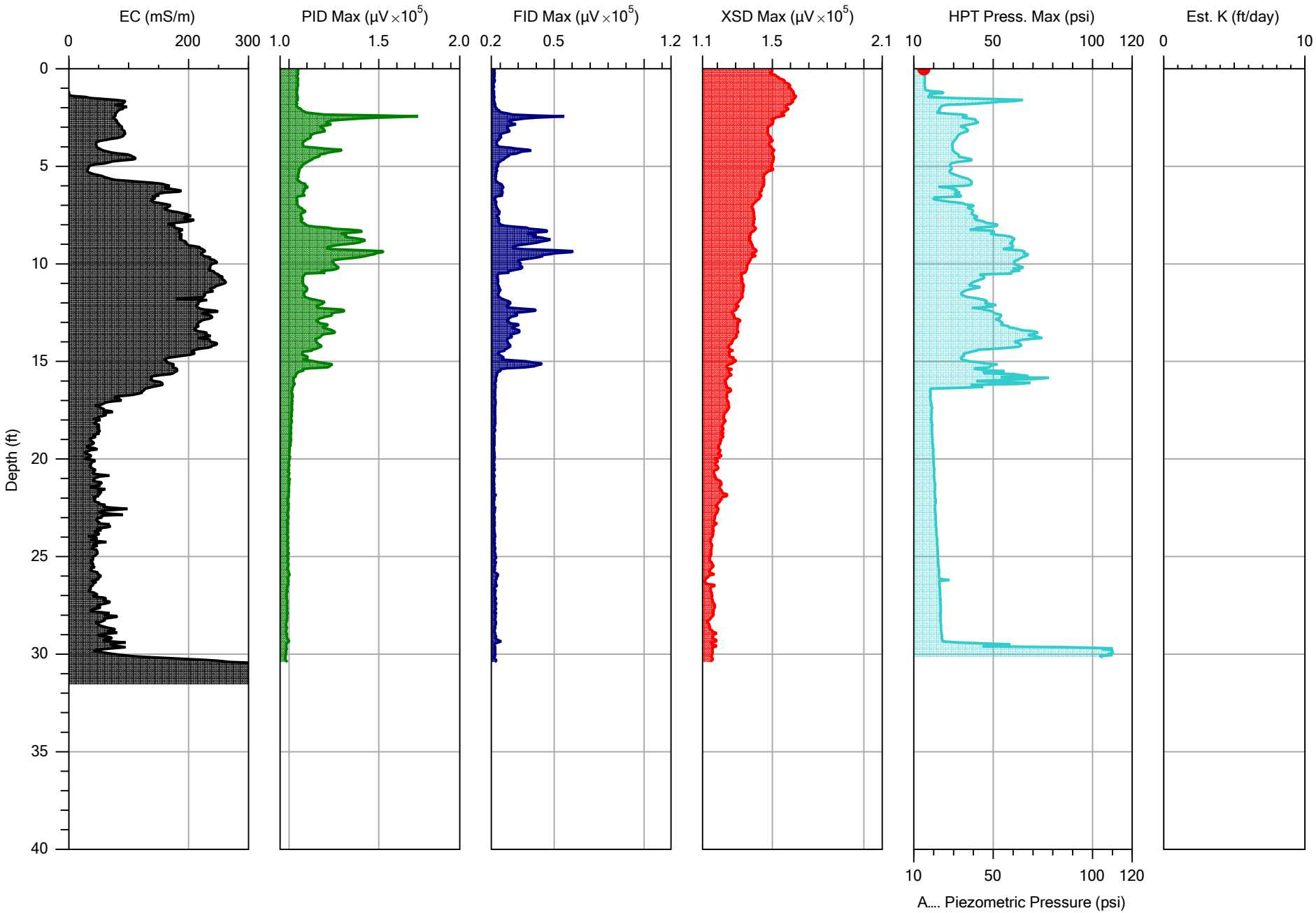
Company: Dakota Technologies	Operator: GHH	Date: 11/15/2017
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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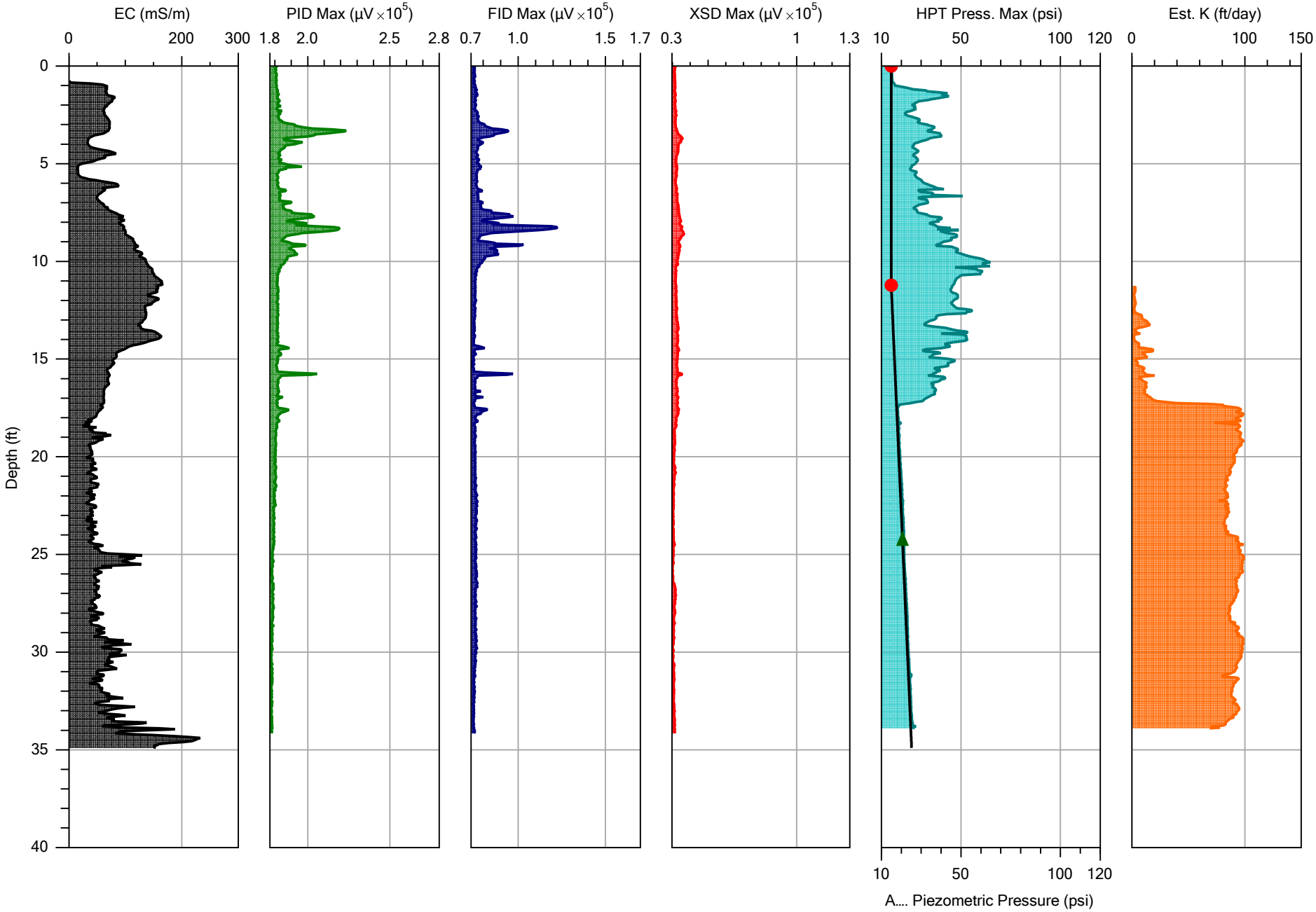
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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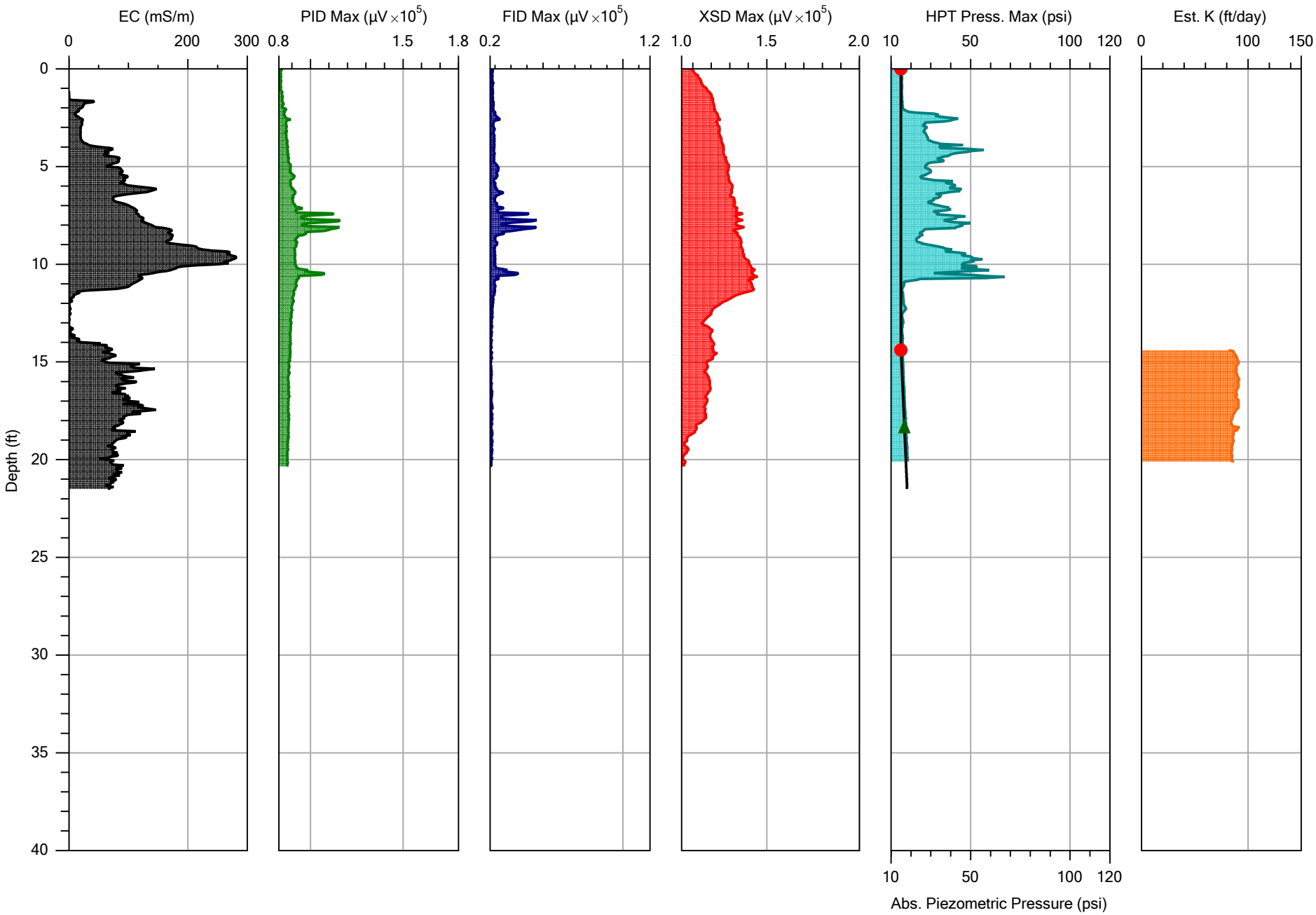
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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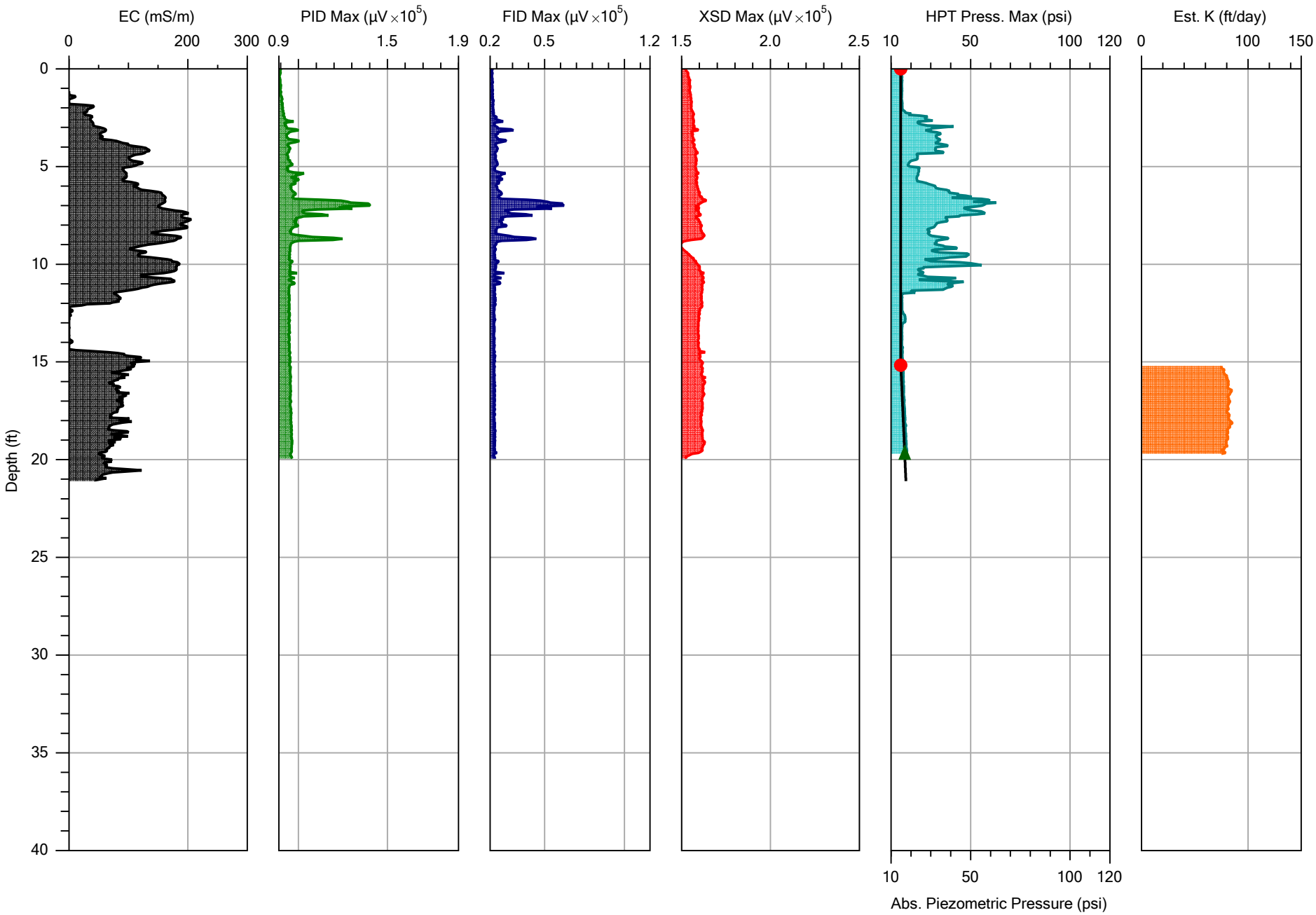
Company: Dakota Technologies	Operator: GHH	Date: 11/17/2017
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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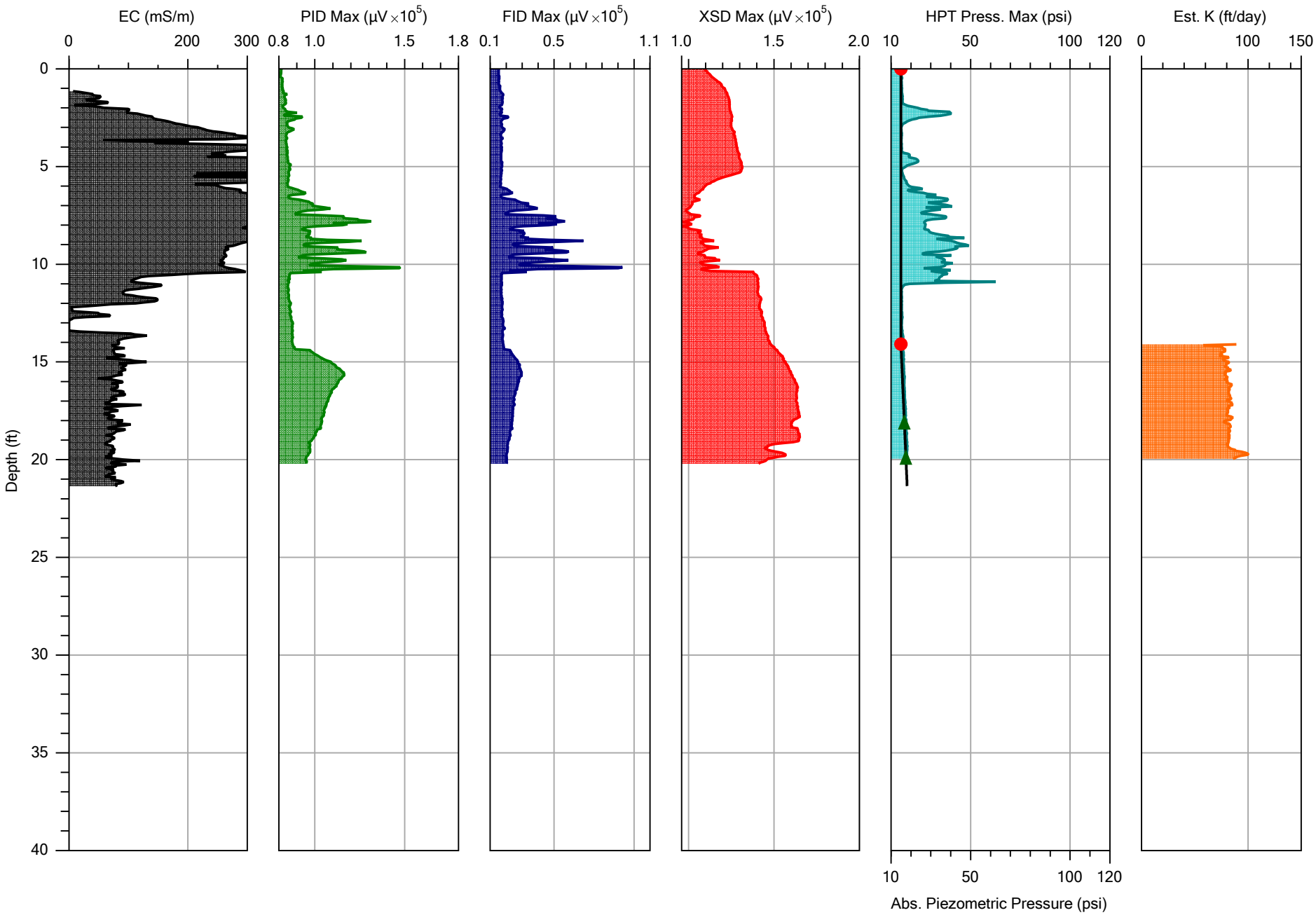
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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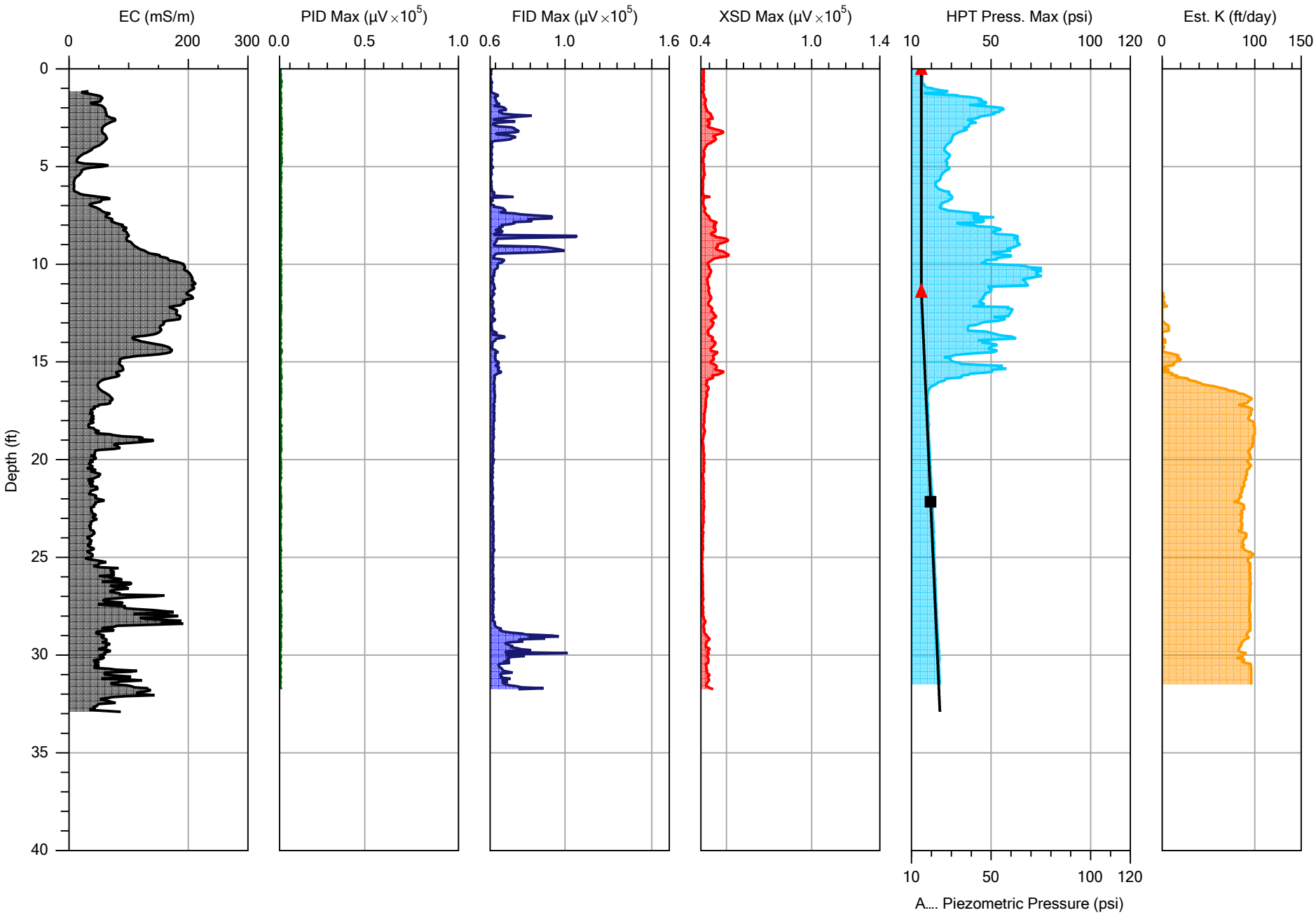
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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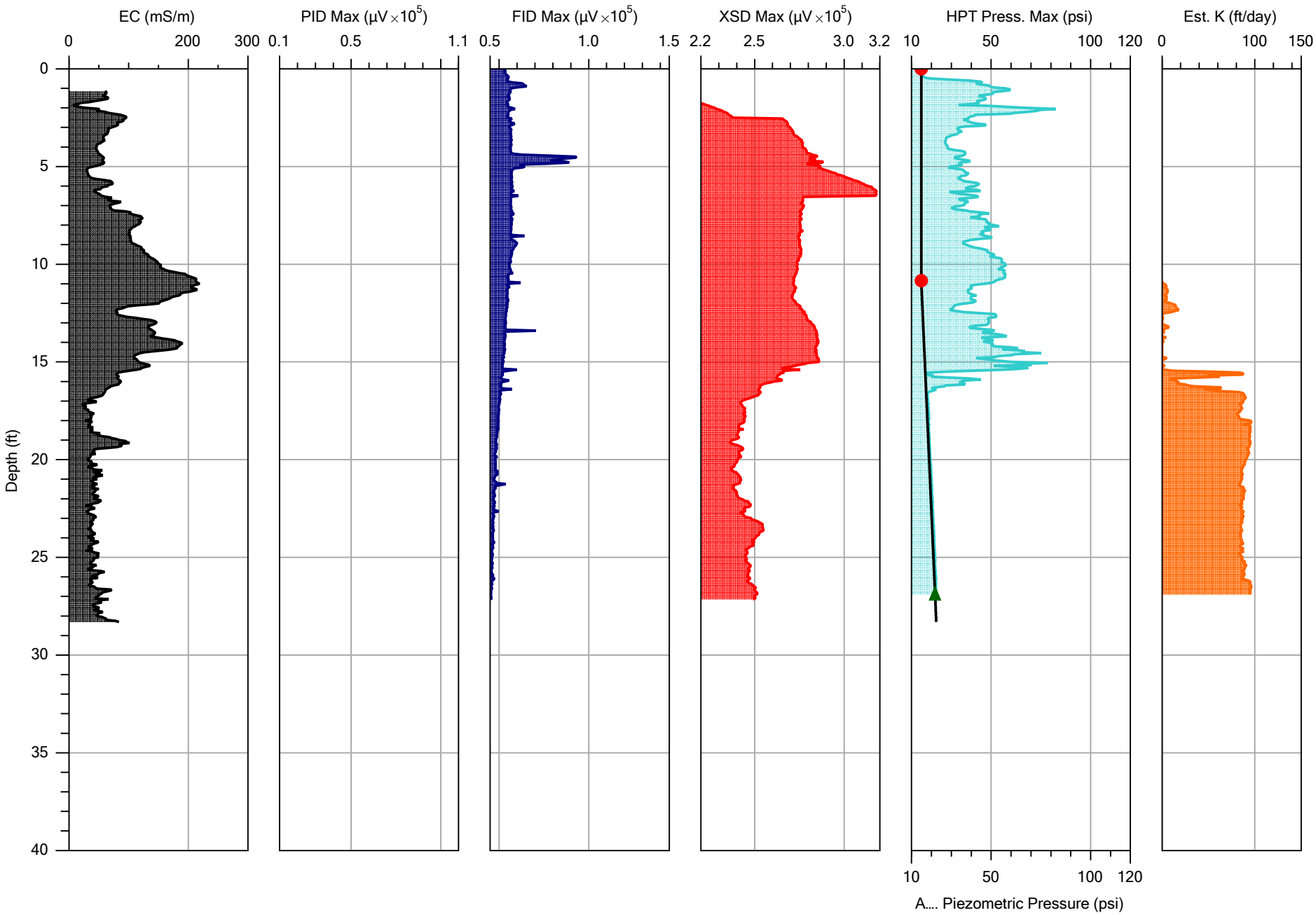

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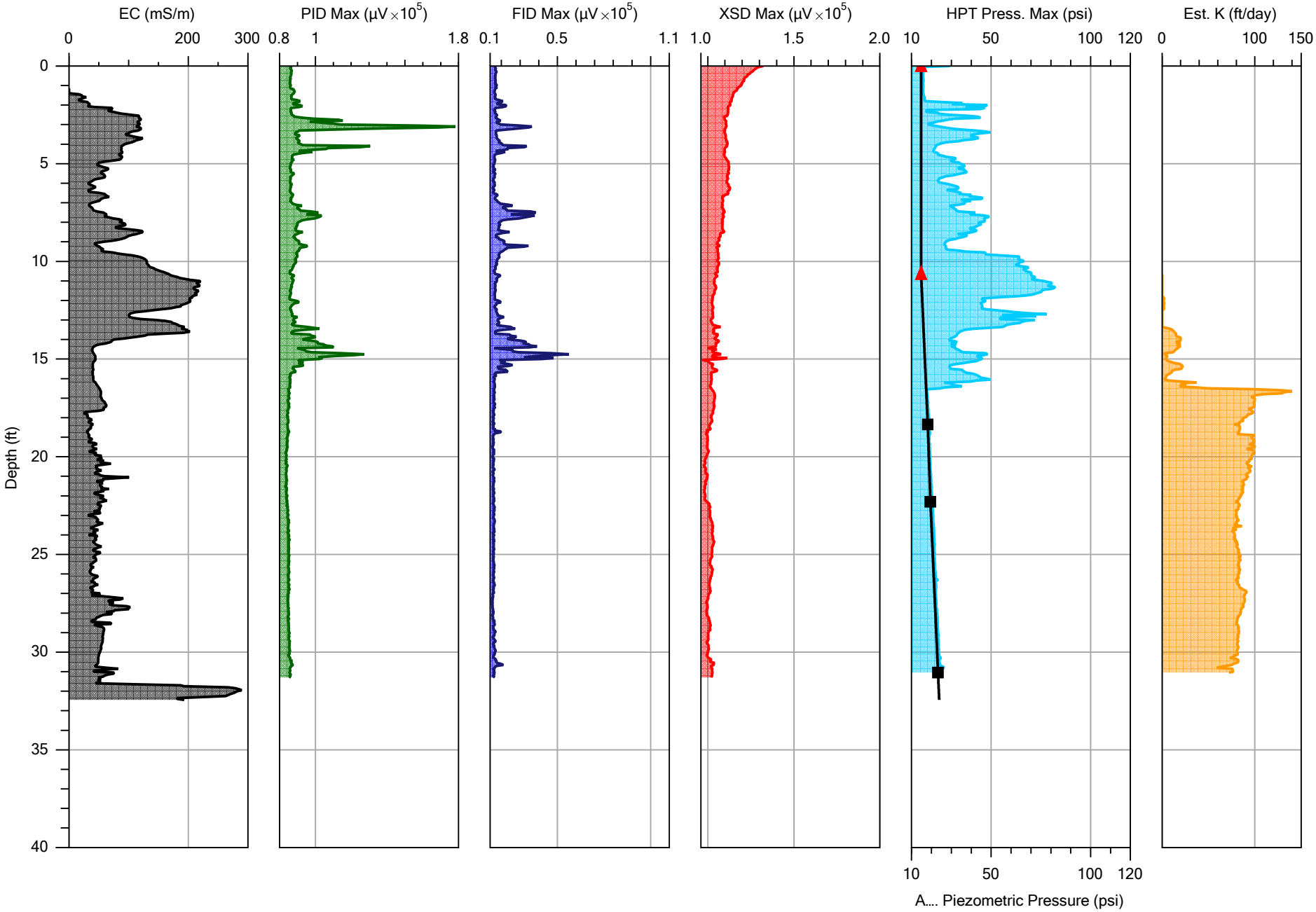

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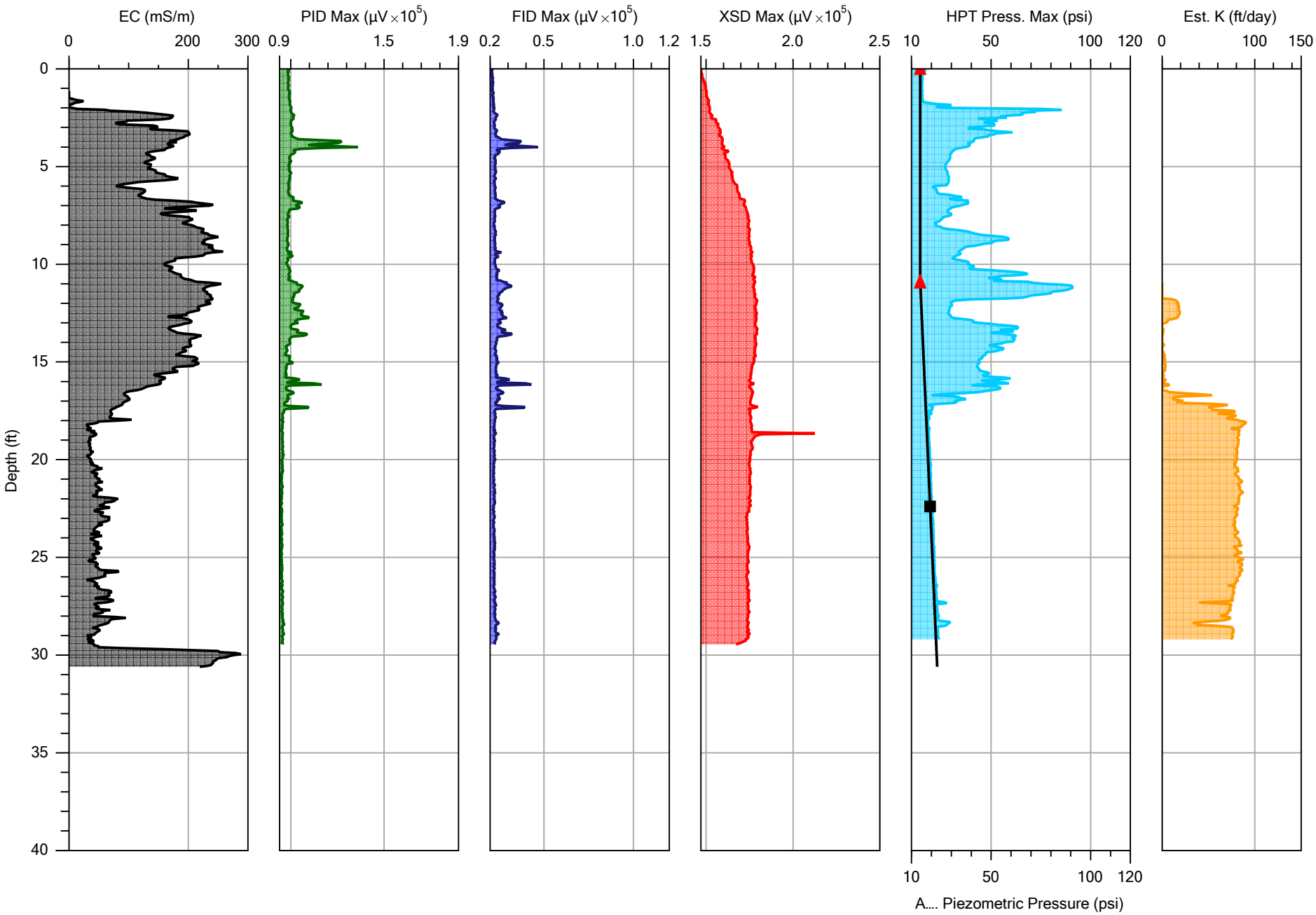
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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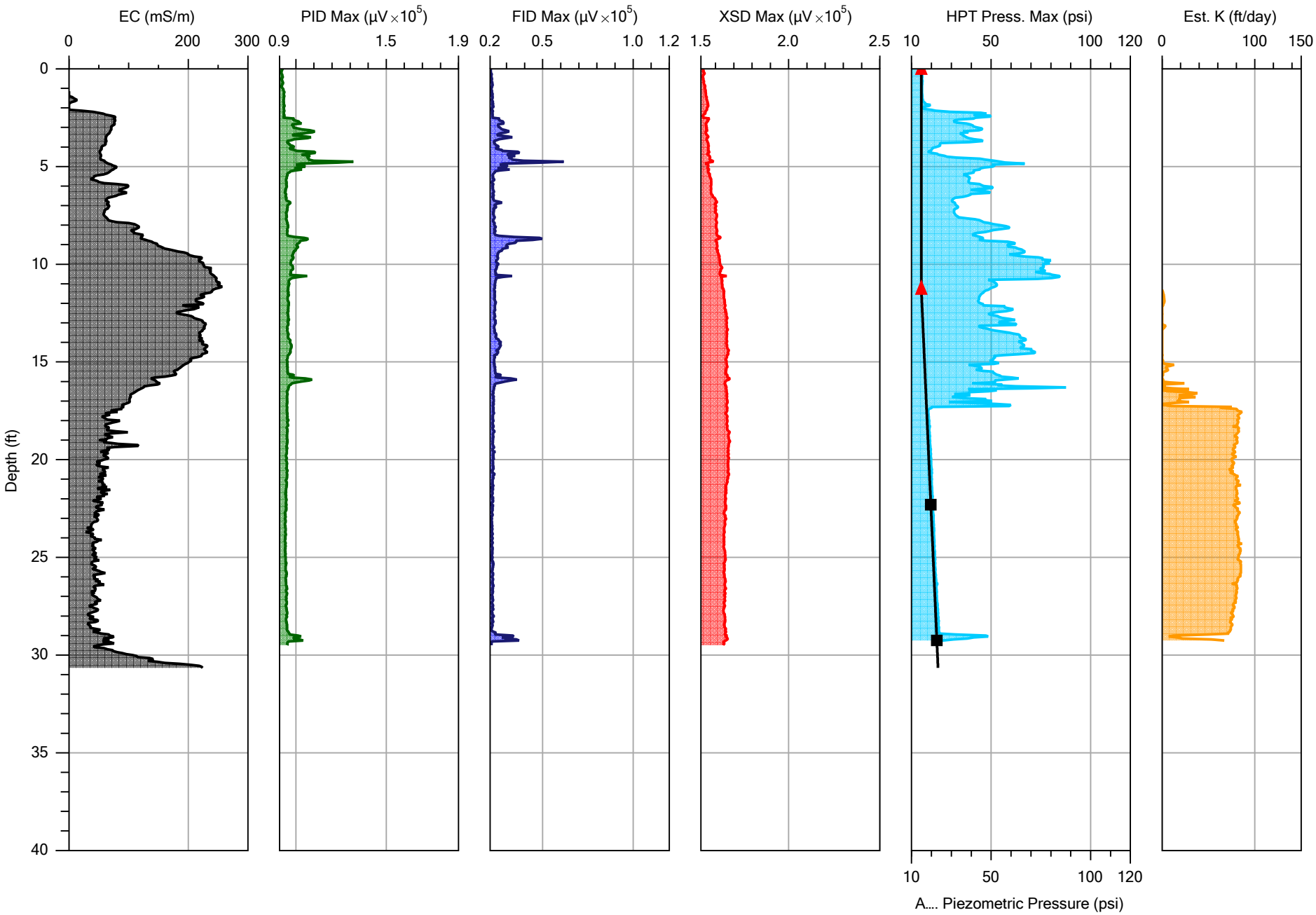

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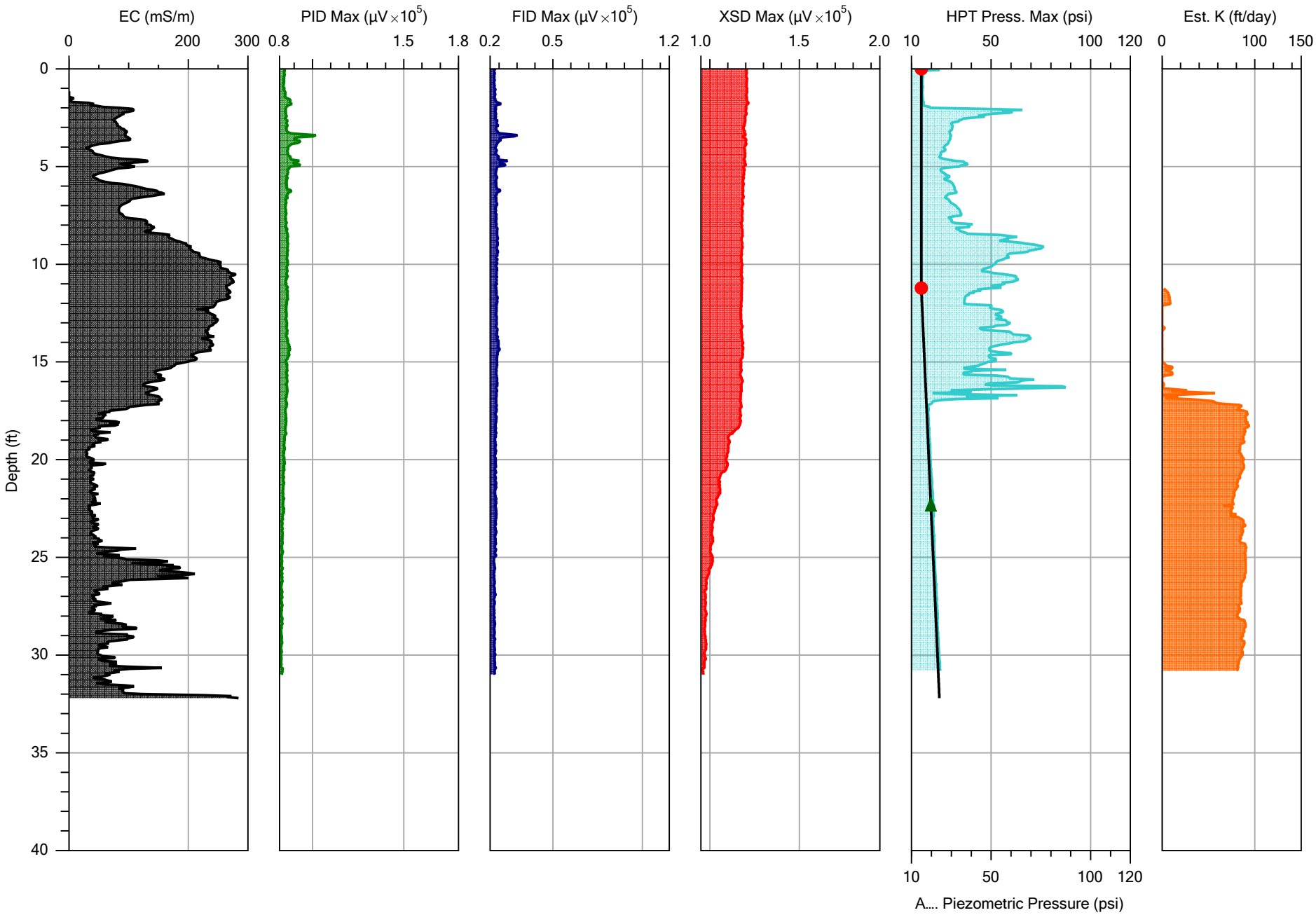

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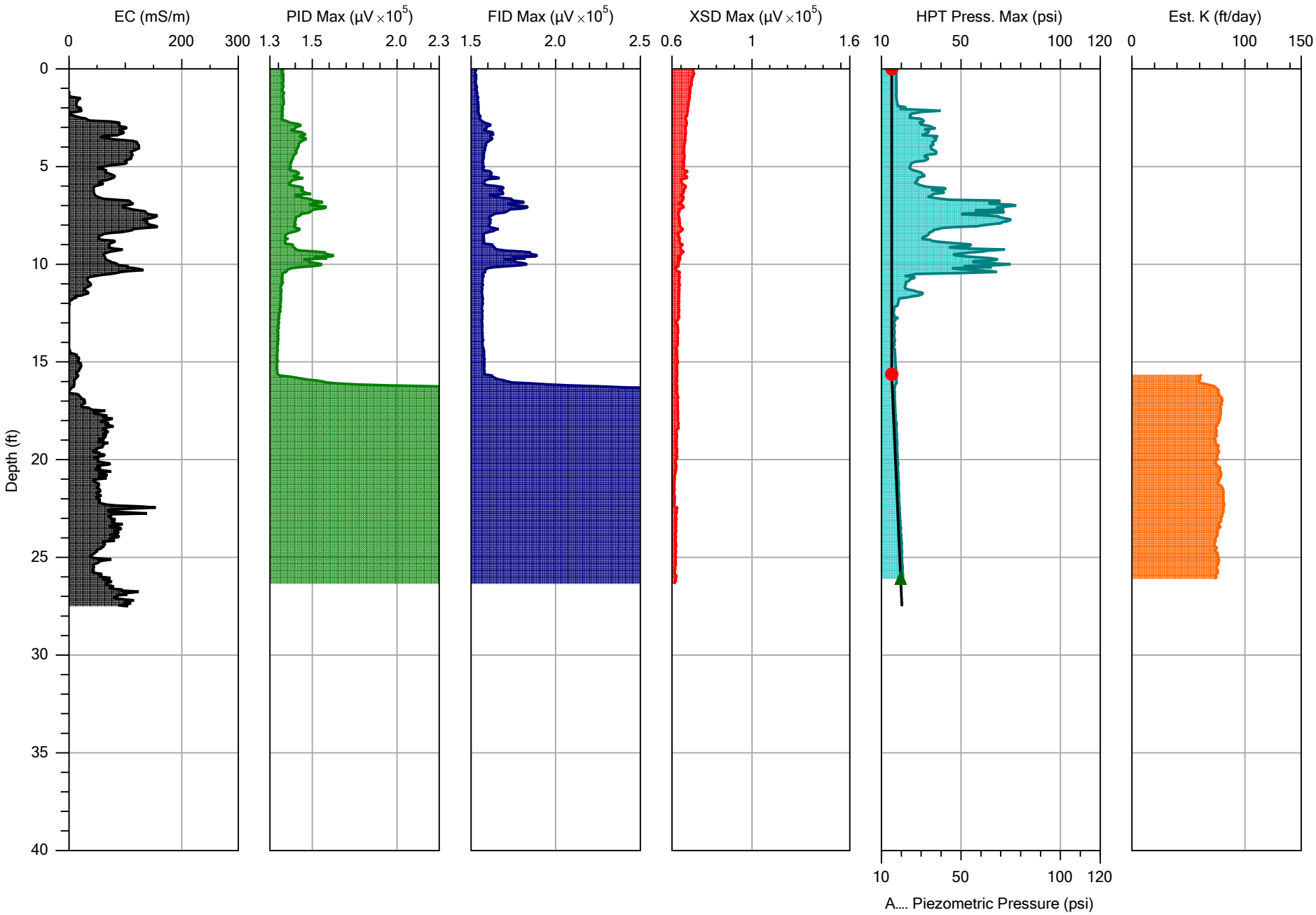
Company: Dakota Technologies	Operator: GHH	Date: 11/16/2017
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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Company: Dakota Technologies	Operator: GHH	Date: 12/2/2017
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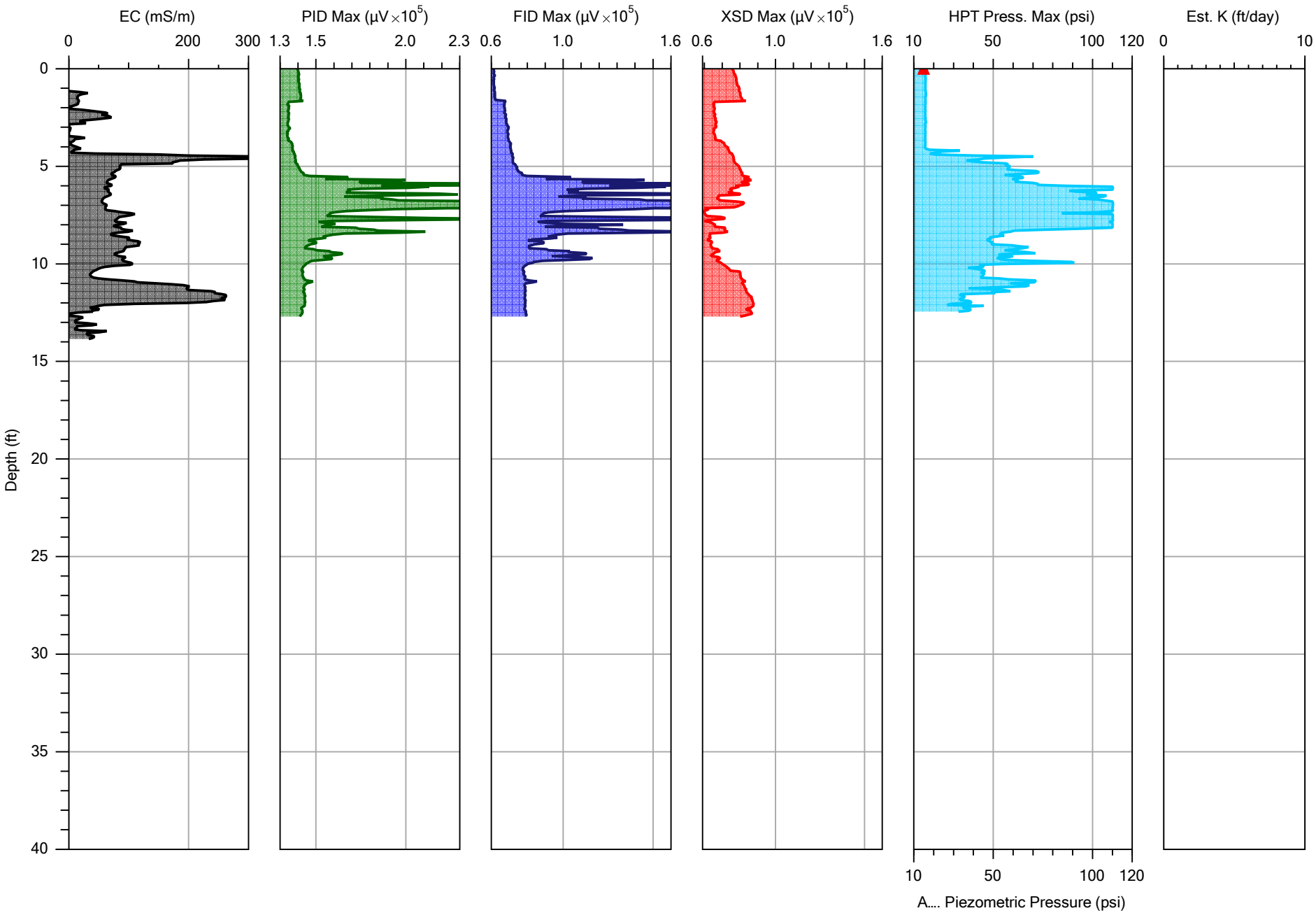

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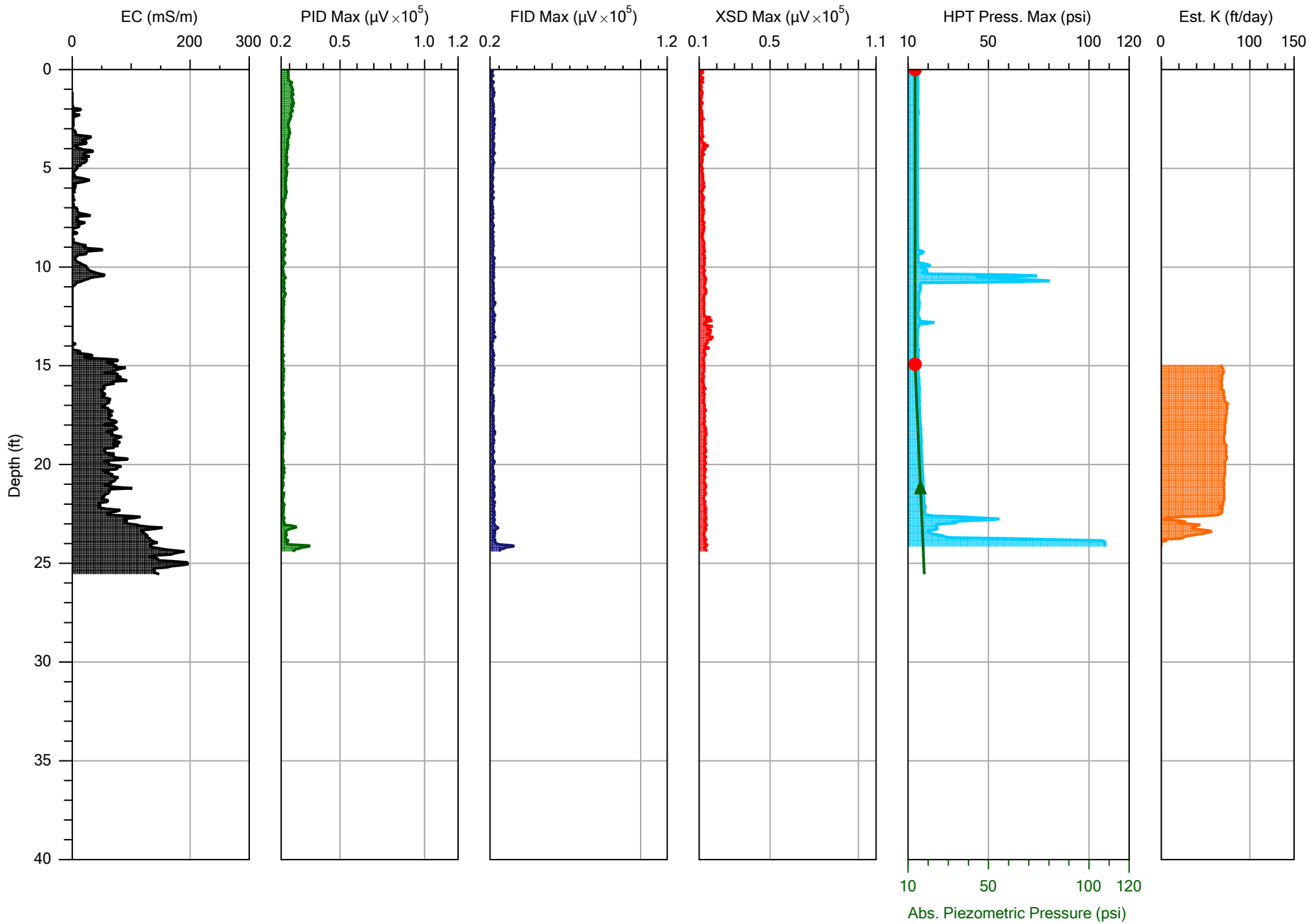
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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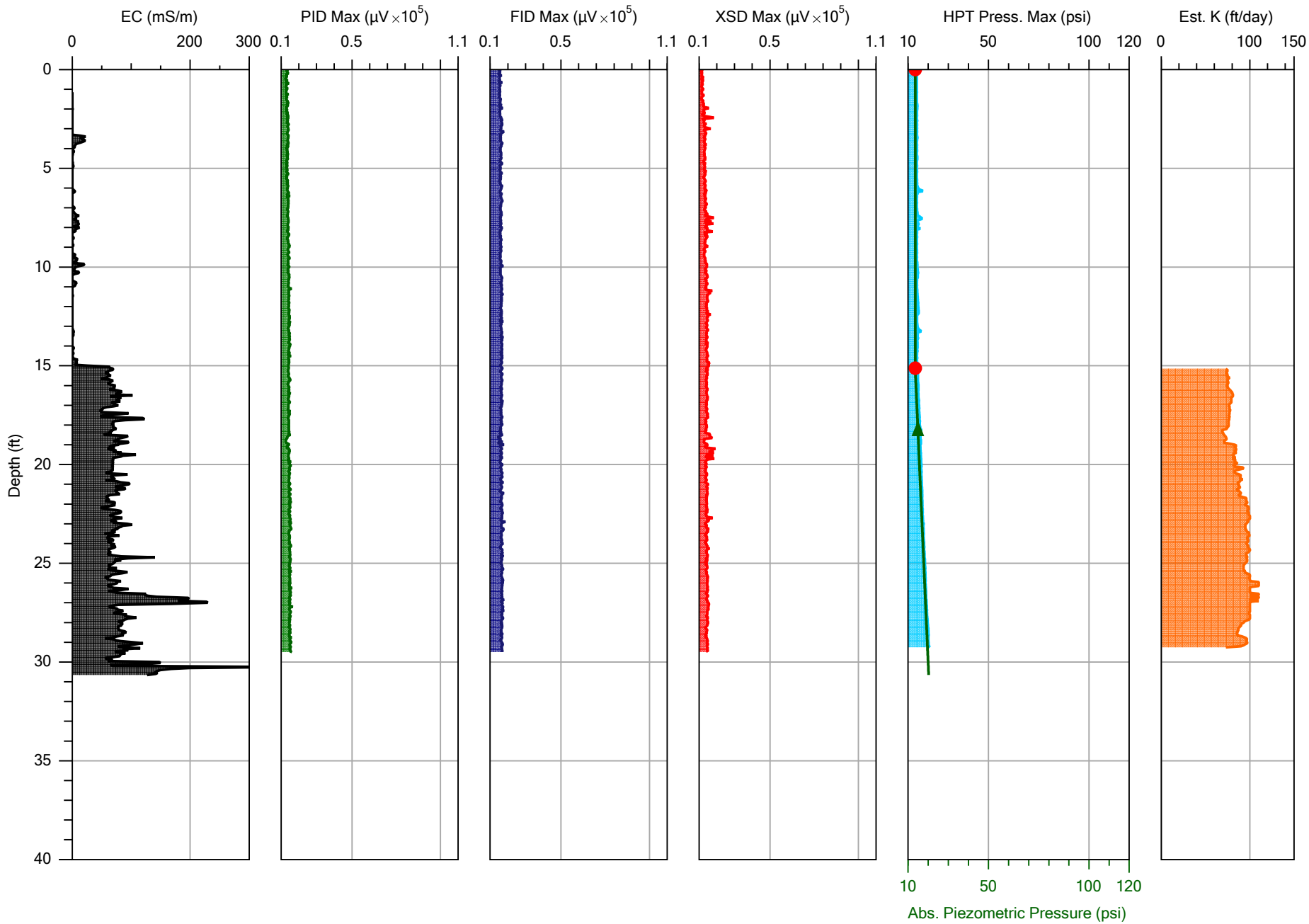
Project ID: 0302.17	Client: Trihydro	Location: Billings, MT



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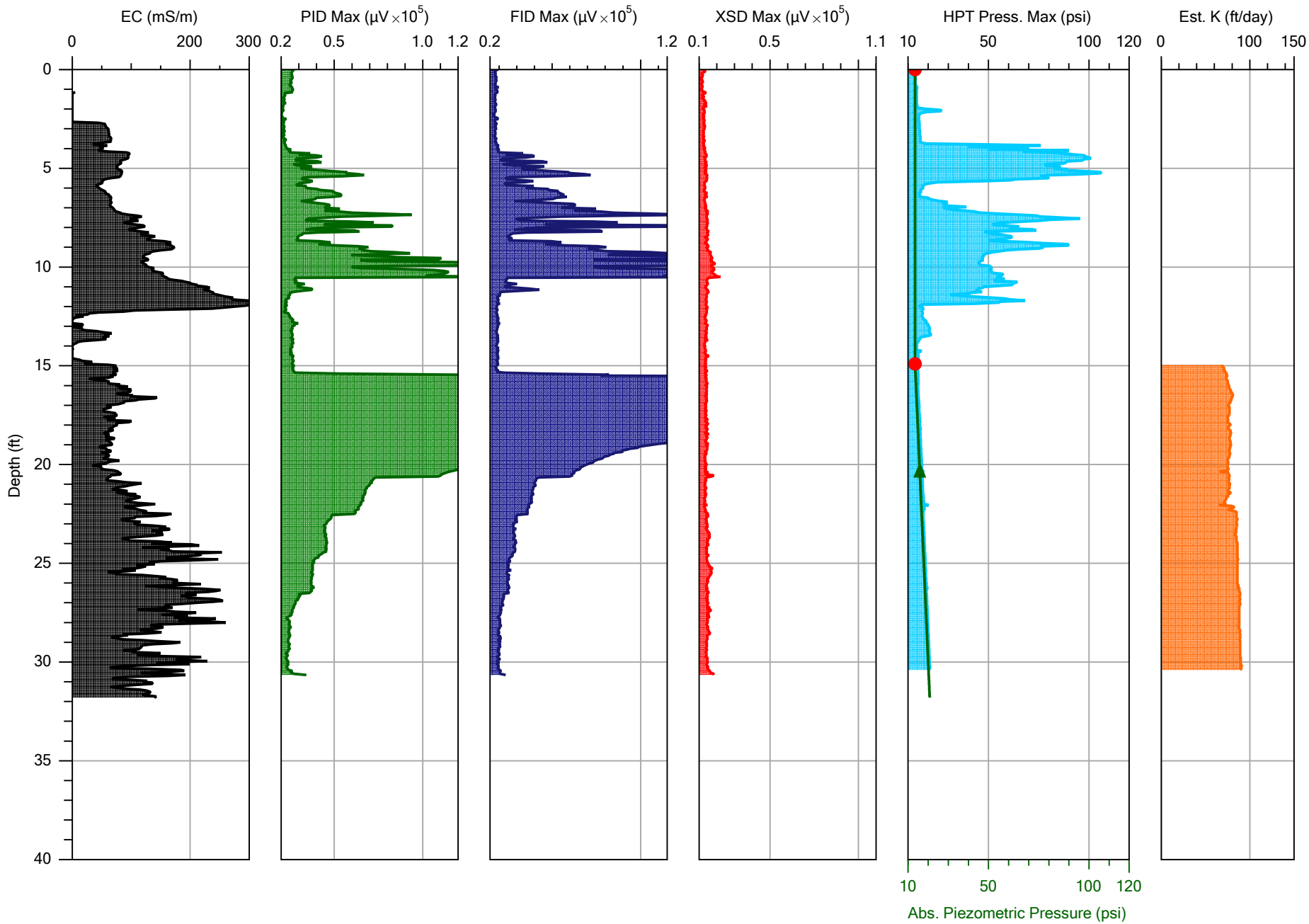

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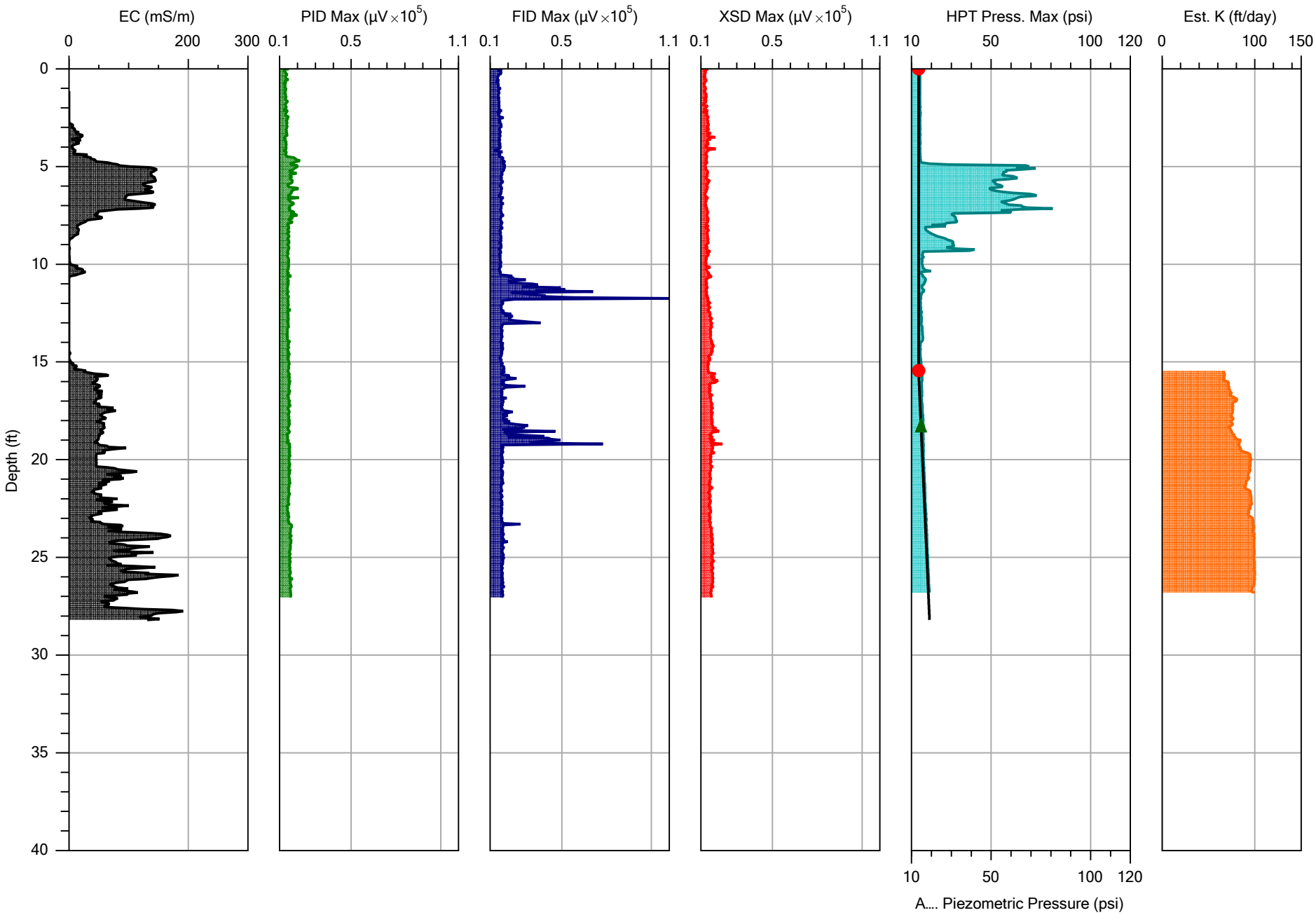

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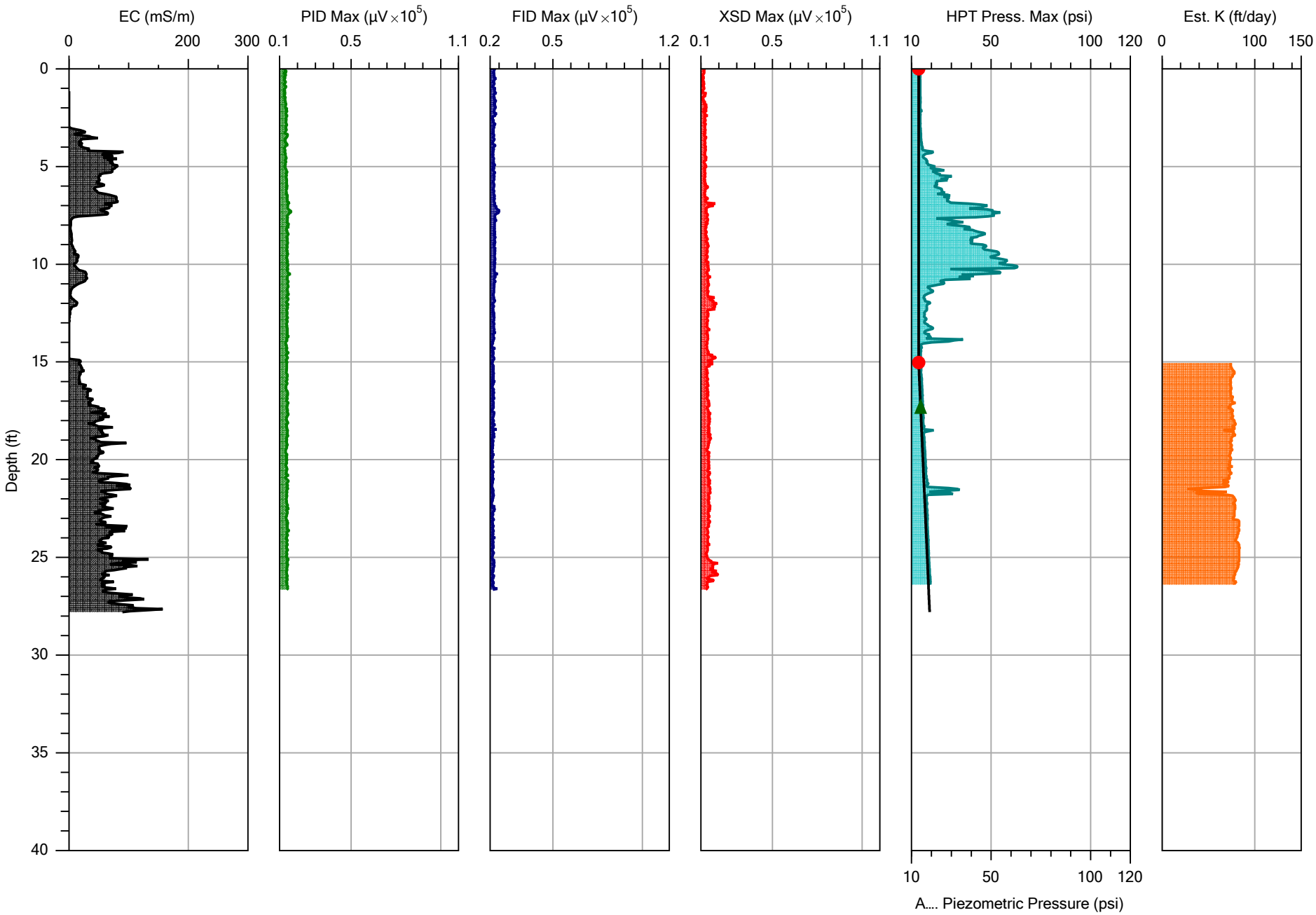

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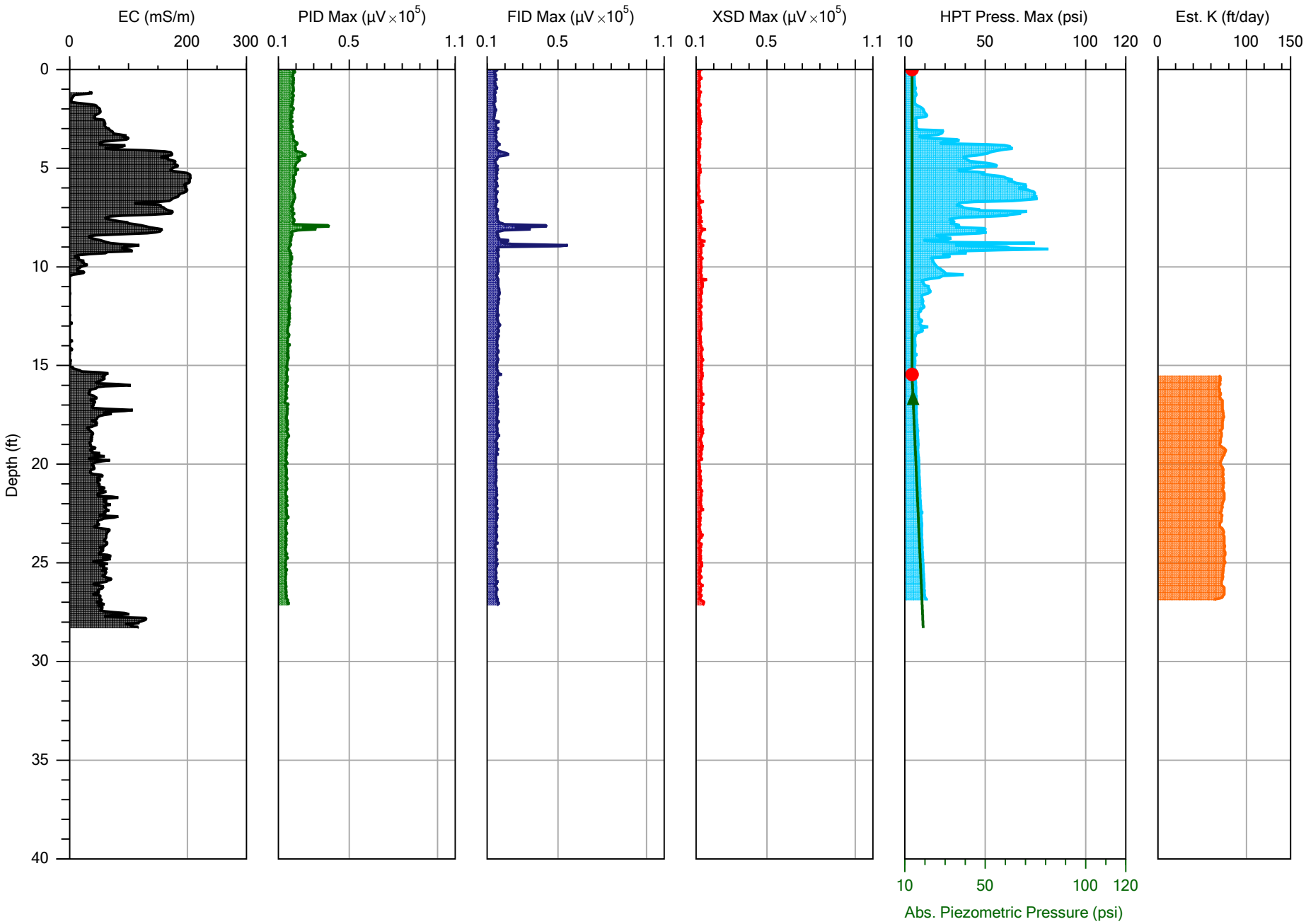

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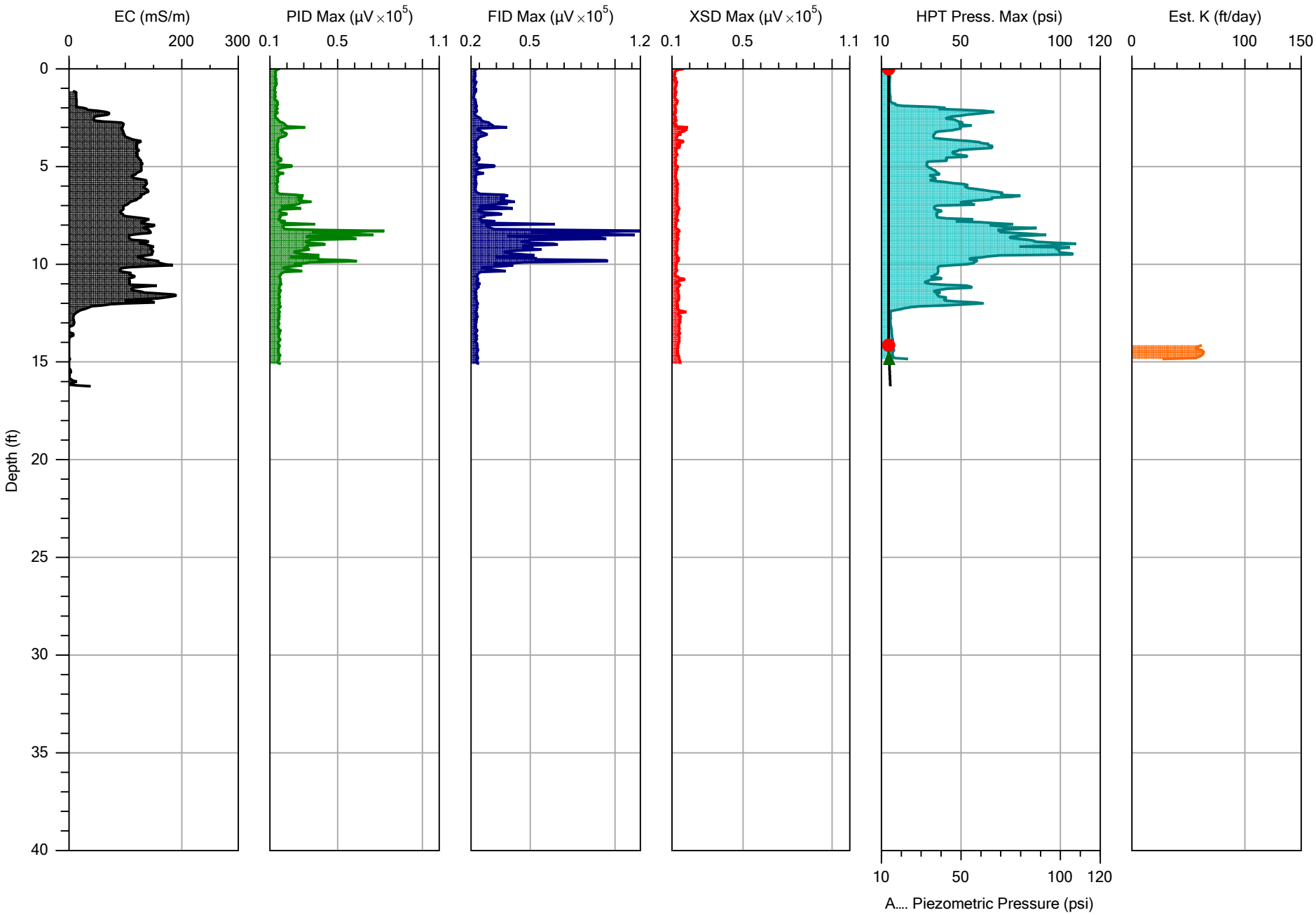
Project ID: 0302.17	Client: Trihydro	Location: Billings, MT



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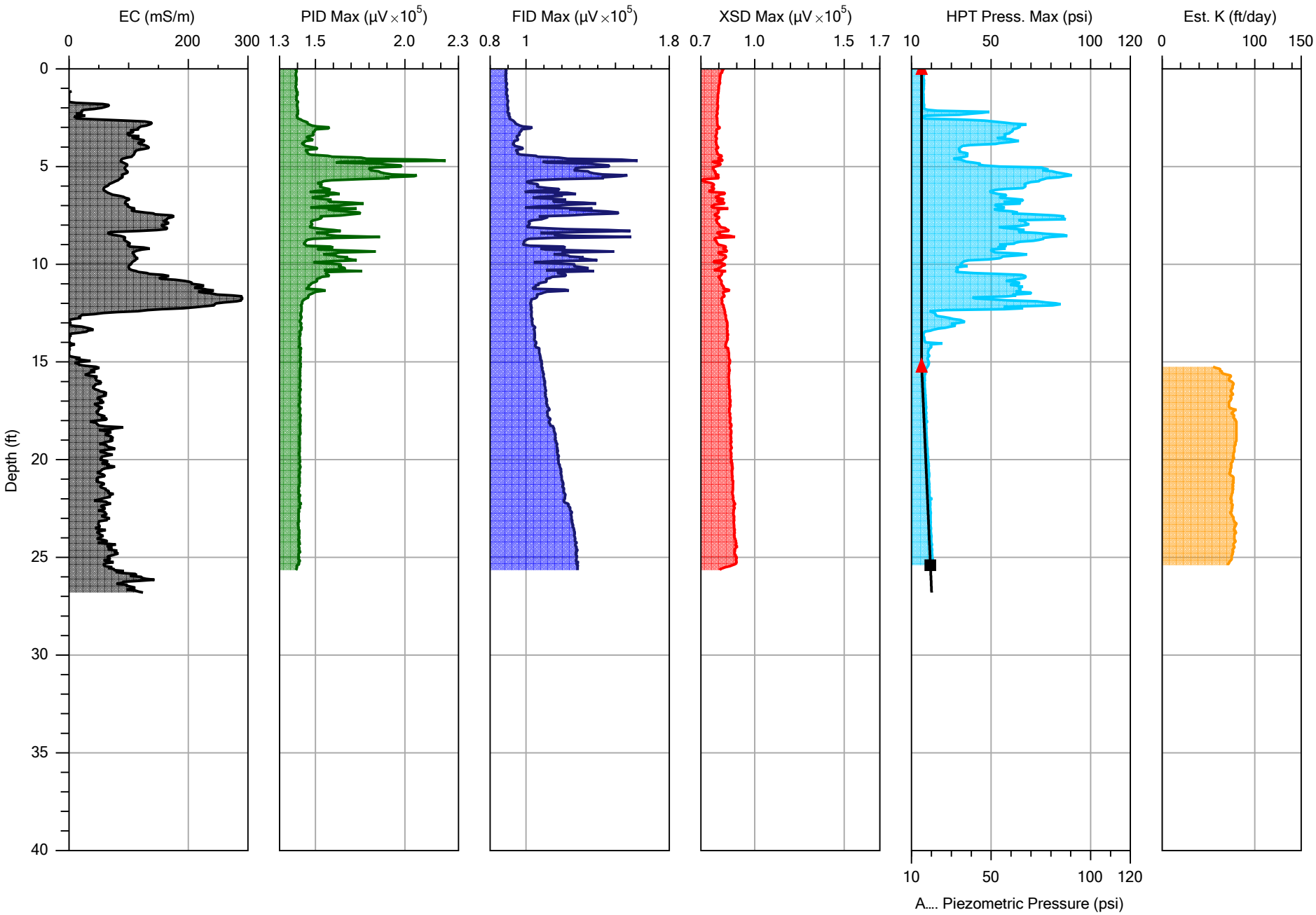
Company: Dakota Technologies	Operator: MJ	Date: 12/19/2017
Project ID: 0302.17	Client: Trihydro	Location: Billings, MT



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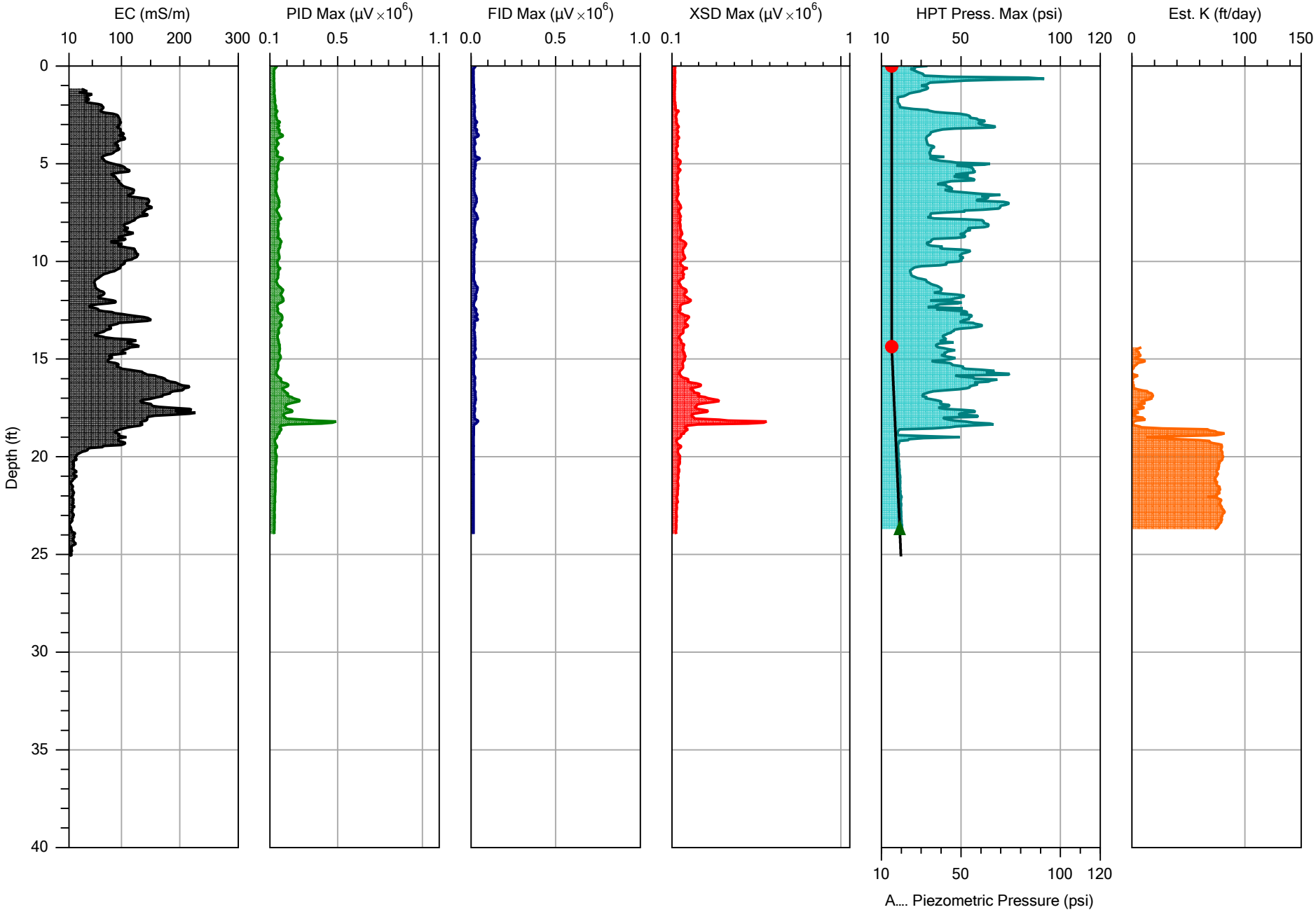
Company: Dakota Technologies	Operator: GHH	Date: 12/2/2017
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT

Appendix D

Select MiHpt Logs with Detectors @ 1,000 mVolts



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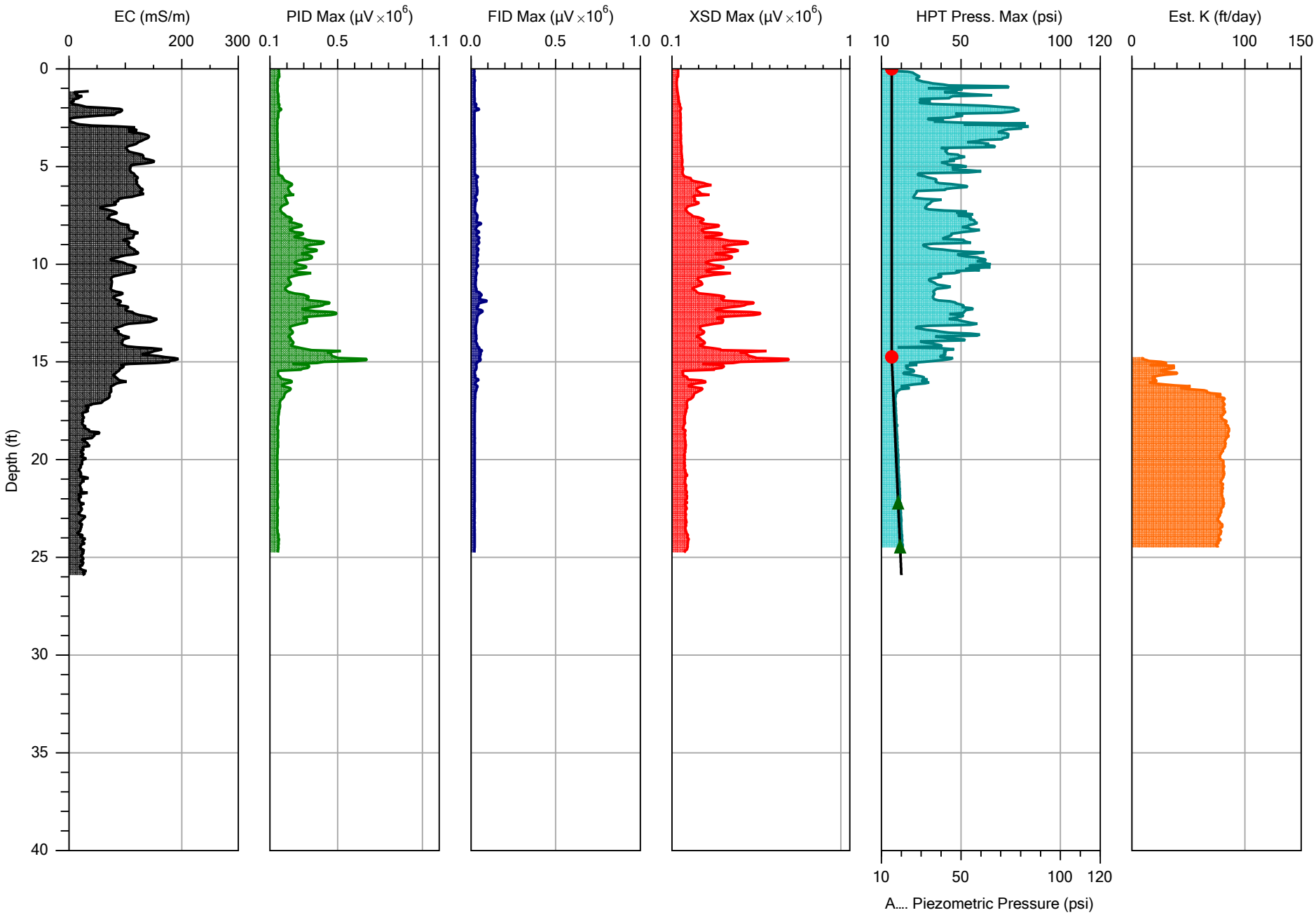
Company: Dakota Technologies	Operator: GHH	Date: 11/30/2017
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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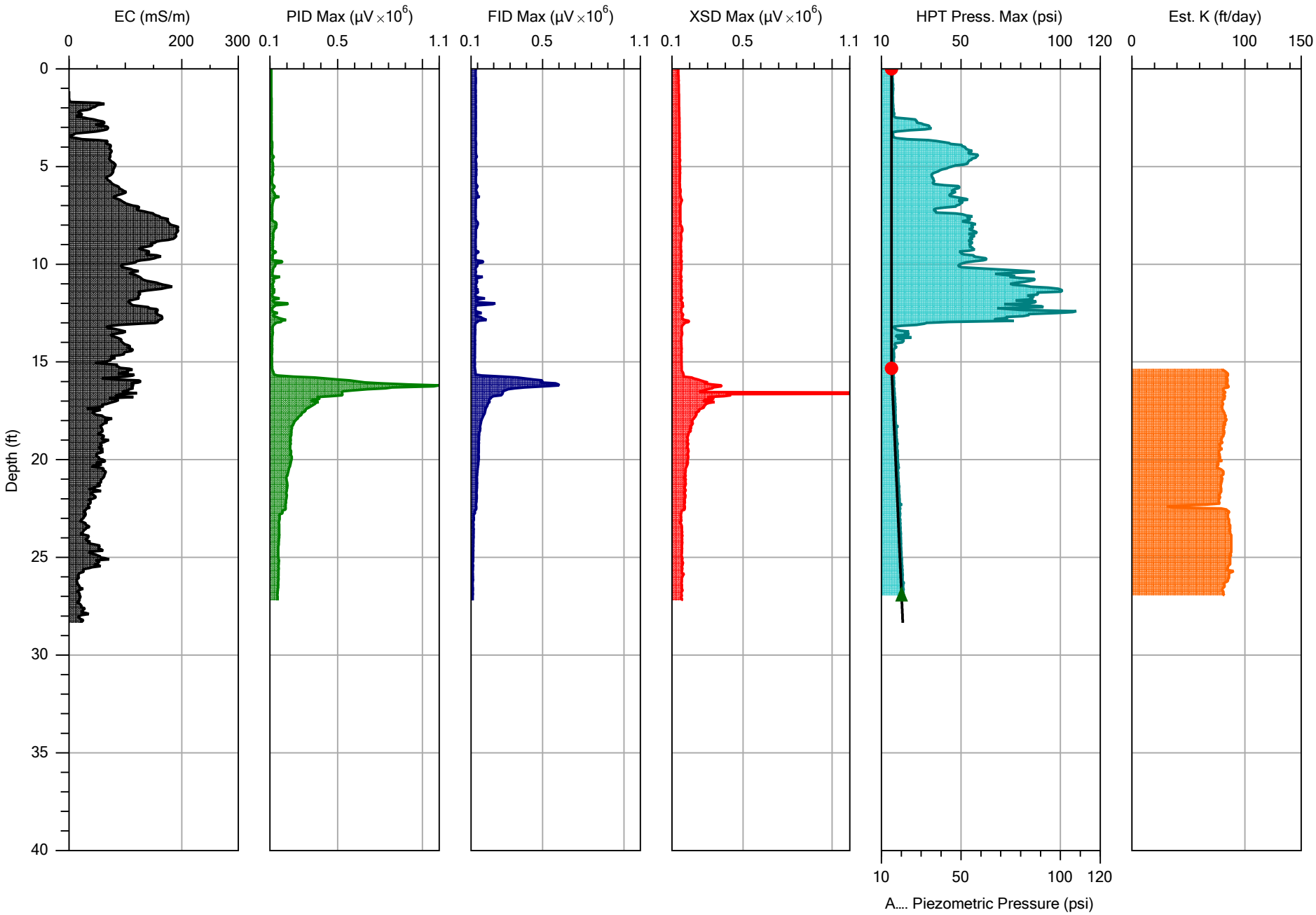

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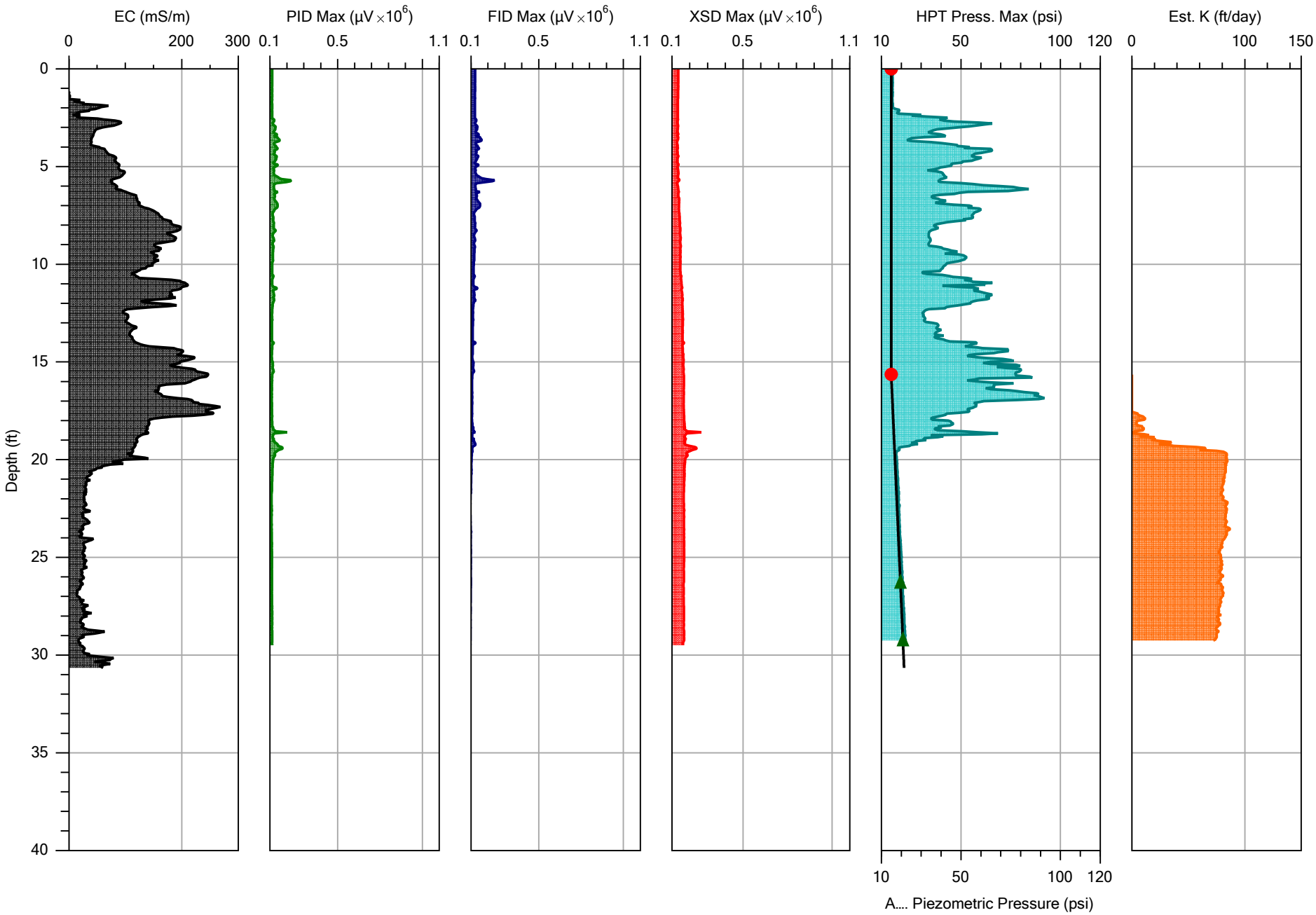
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



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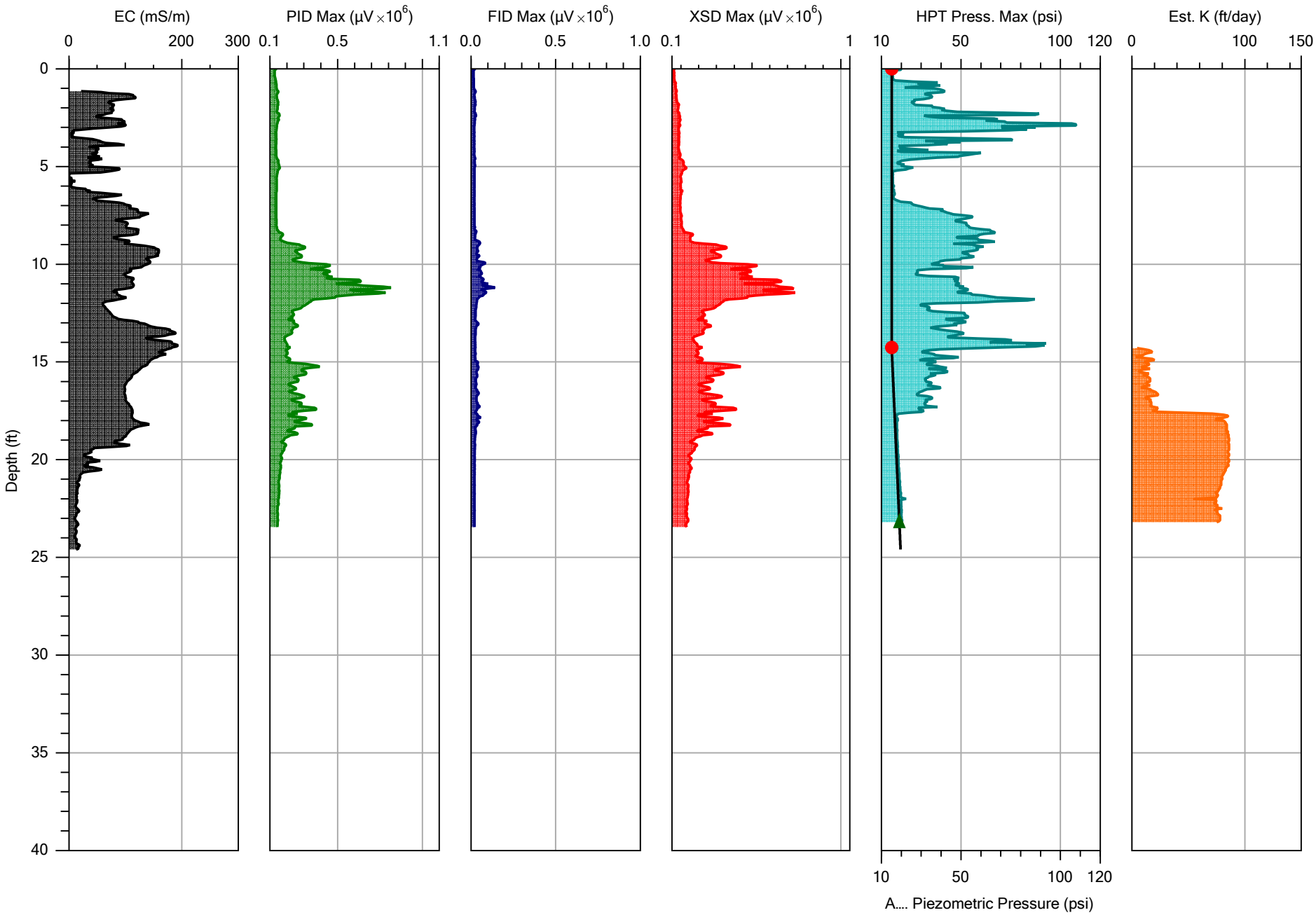
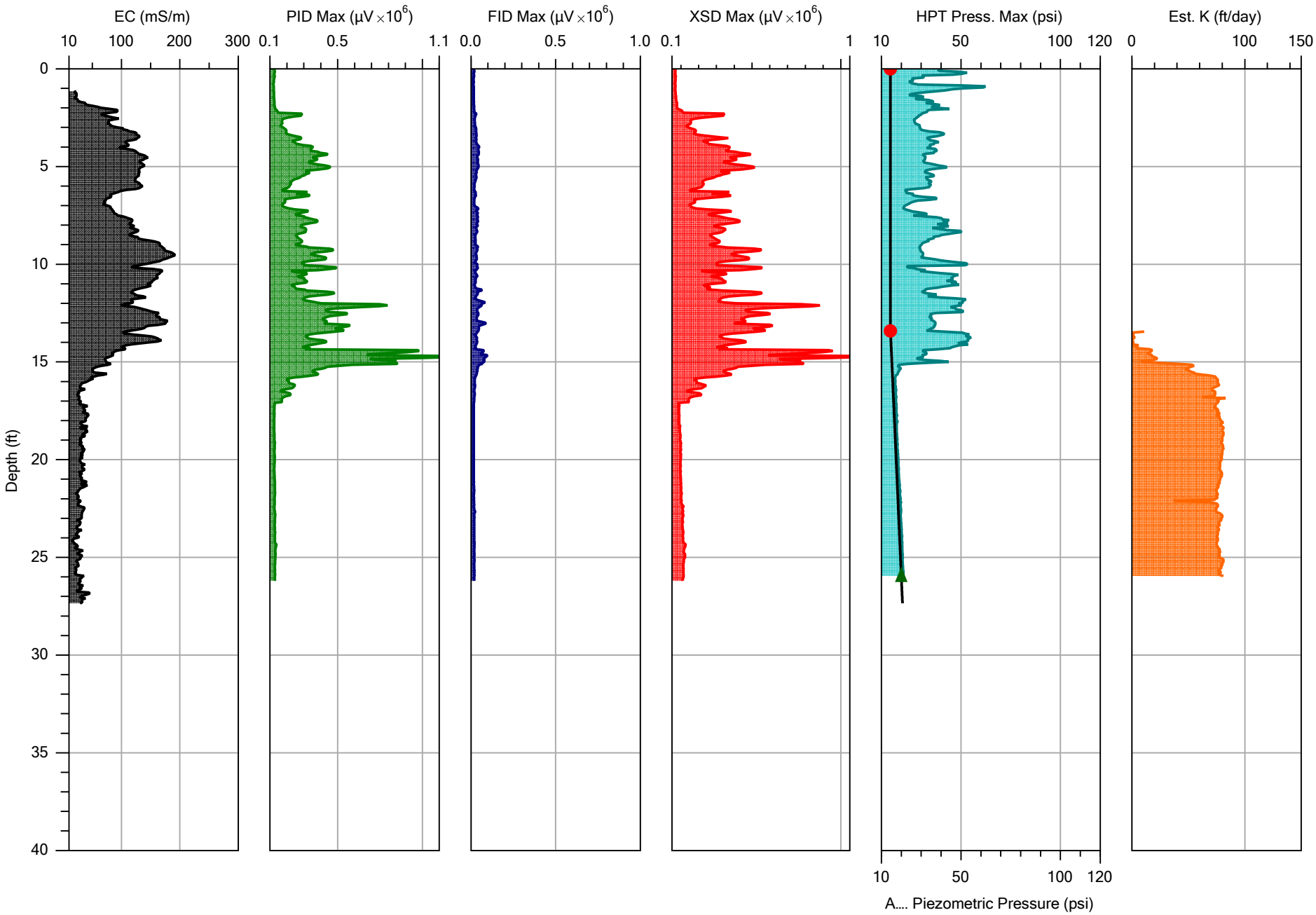
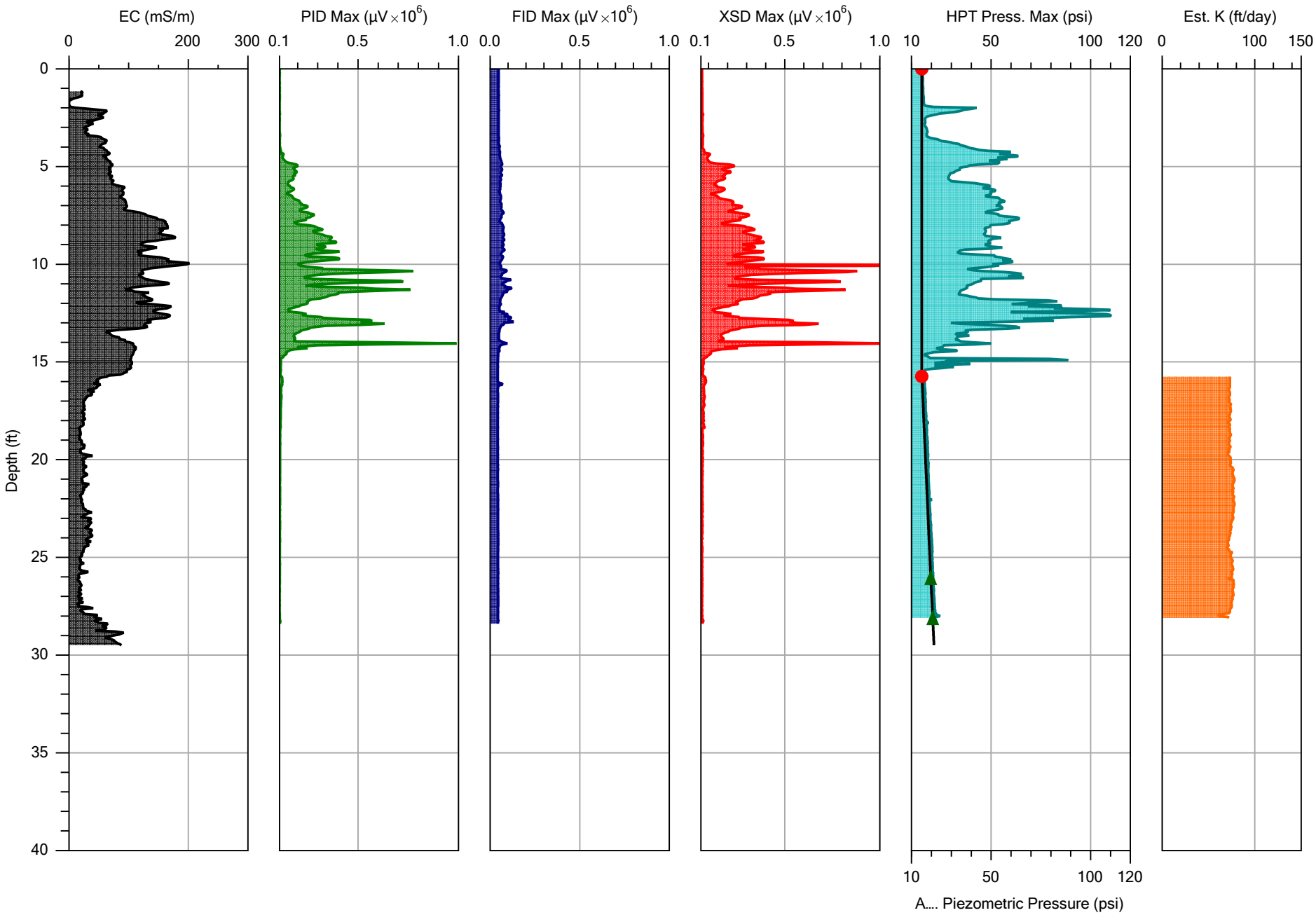
Company: Dakota Technologies	Operator: GHH	Date: 11/28/2017
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



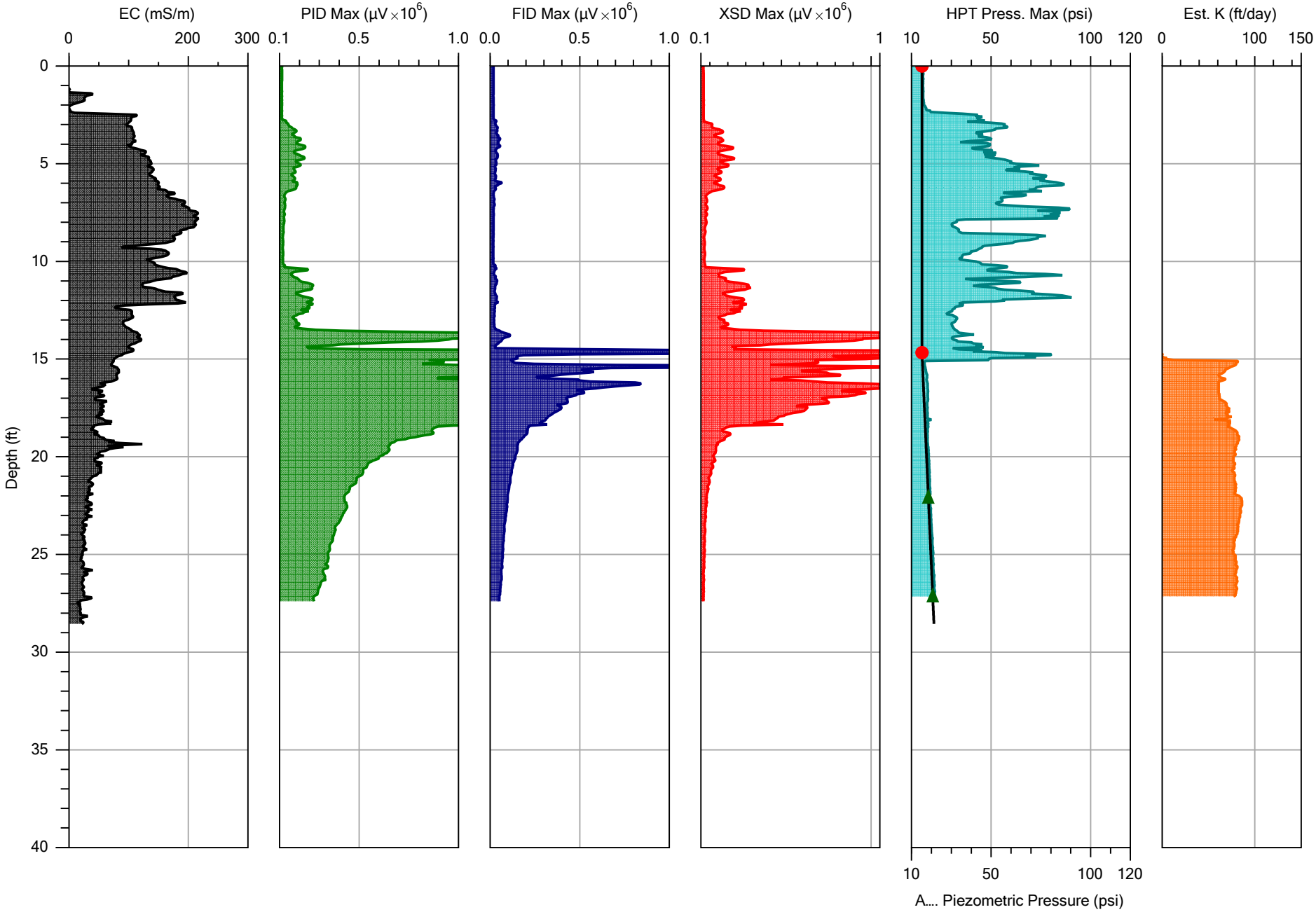
		File: BSL-MIP-T13.MHP
Company: Dakota Technologies	Operator: GHH	Date: 11/30/2017
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



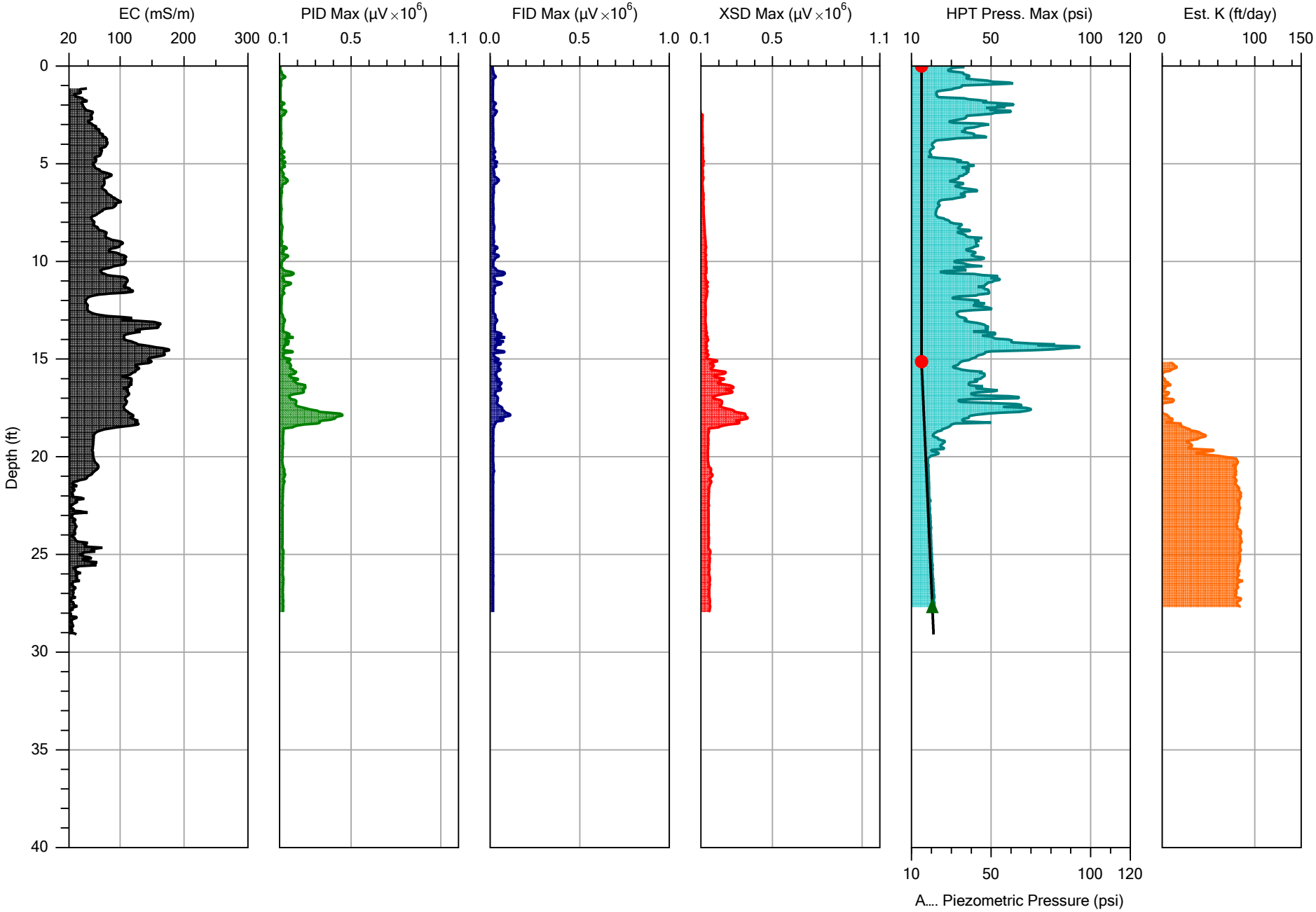
		File: BSL-MIP-T14.MHP
Company: Dakota Technologies	Operator: GHH	Date: 11/30/2017
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



		File: BSL-MIP-T15.MHP
Company: Dakota Technologies	Operator: GHH	Date: 11/28/2017
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



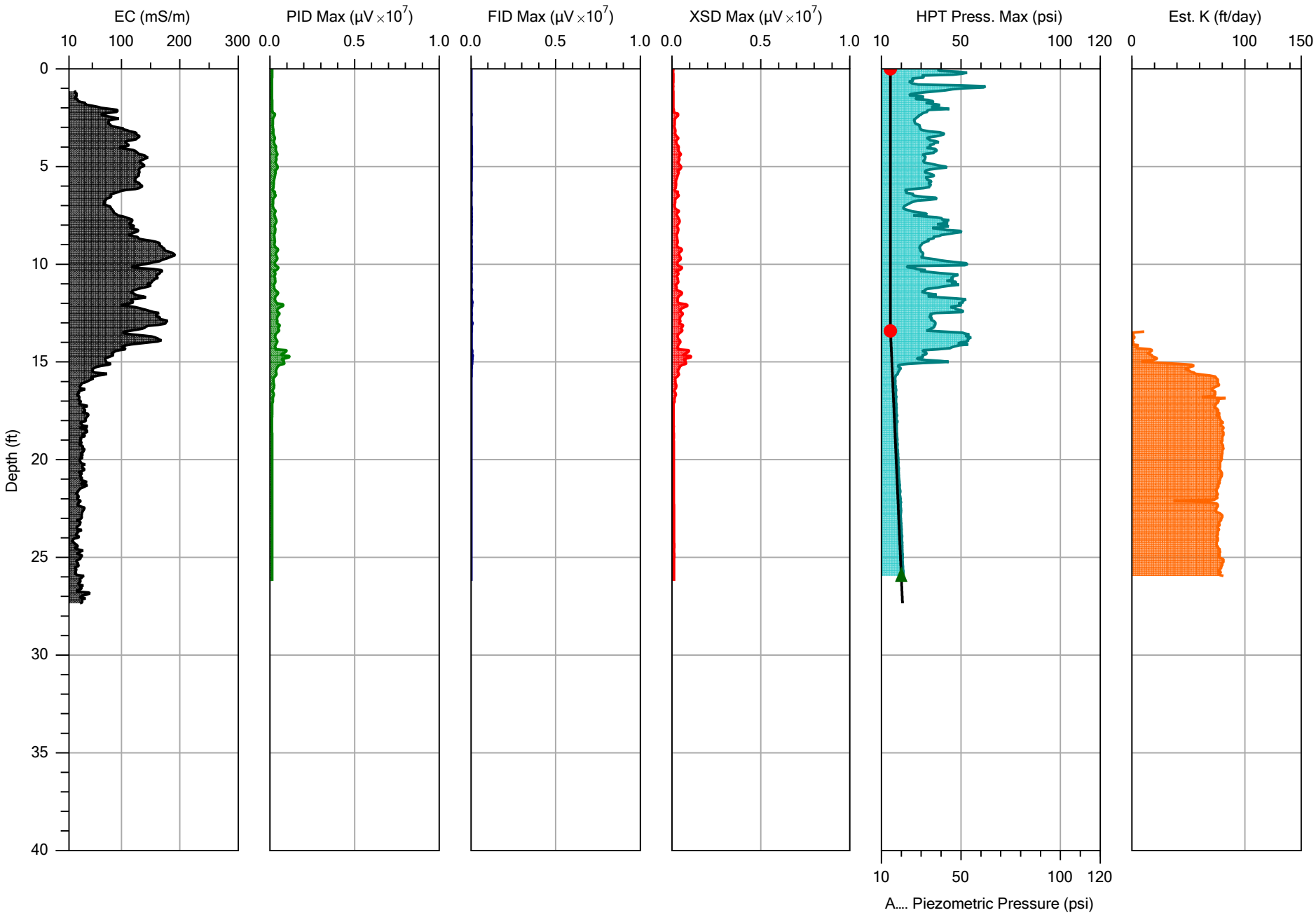
		File: BSL-MIP-T16.MHP
Company: Dakota Technologies	Operator: GHH	Date: 11/29/2017
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



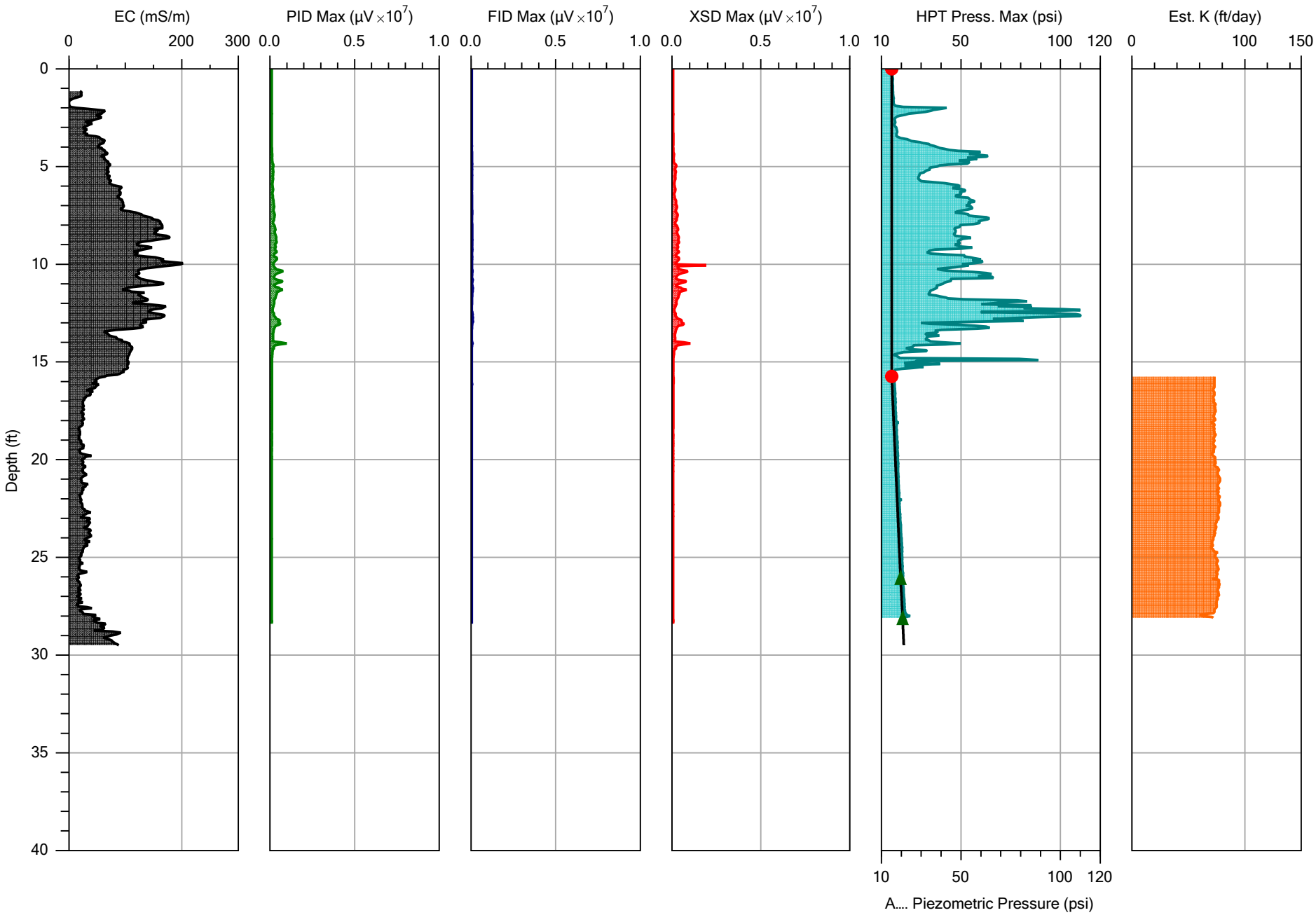
		File: BSL-MIP-T17.MHP
Company: Dakota Technologies	Operator: GHH	Date: 11/29/2017
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT

Appendix E

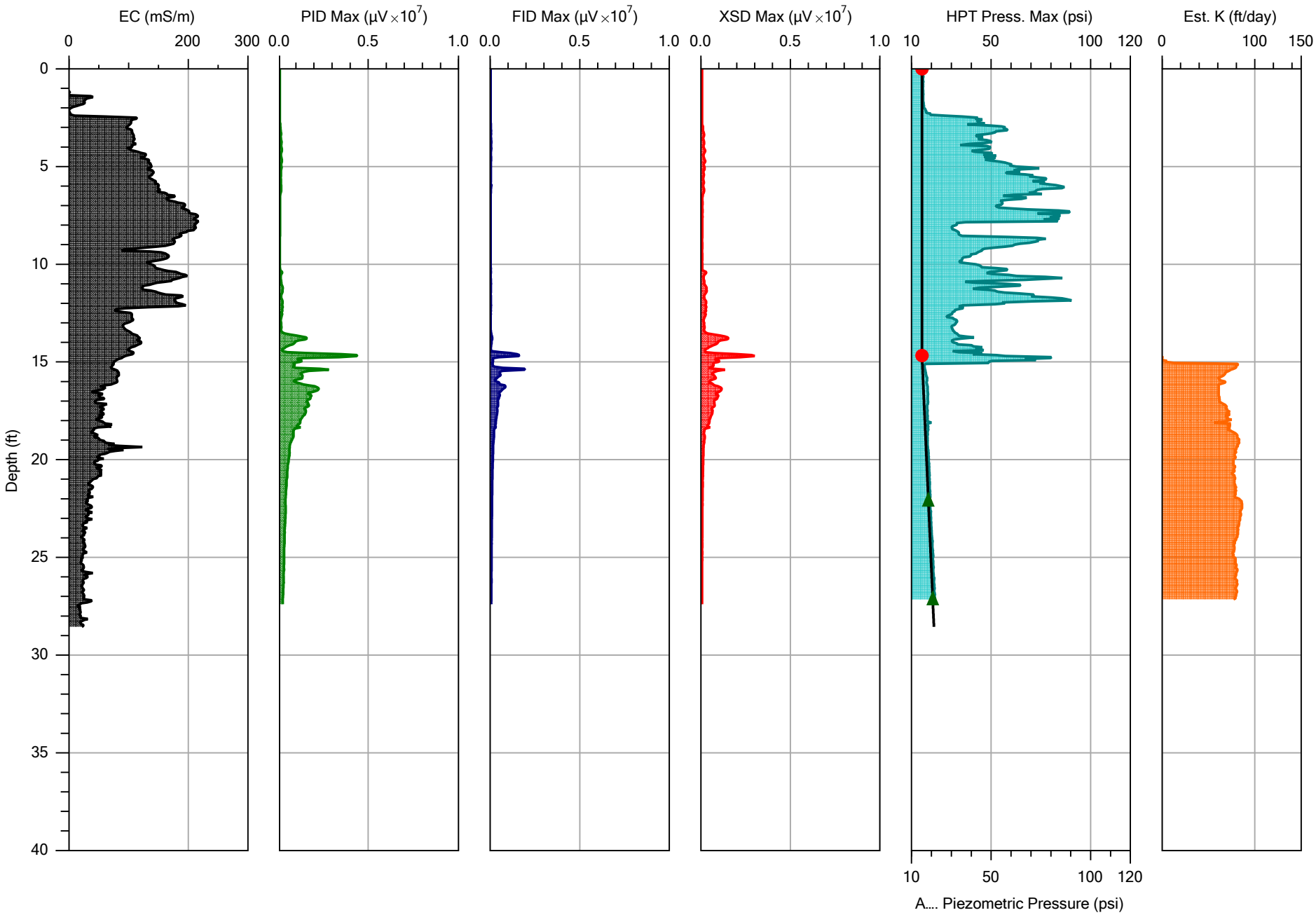
Select MiHpt Logs with Detectors @ 10,000 mVolts



		File: BSL-MIP-T14.MHP
Company: Dakota Technologies	Operator: GHH	Date: 11/30/2017
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT



		File: BSL-MIP-T15.MHP
Company: Dakota Technologies	Operator: GHH	Date: 11/28/2017
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT

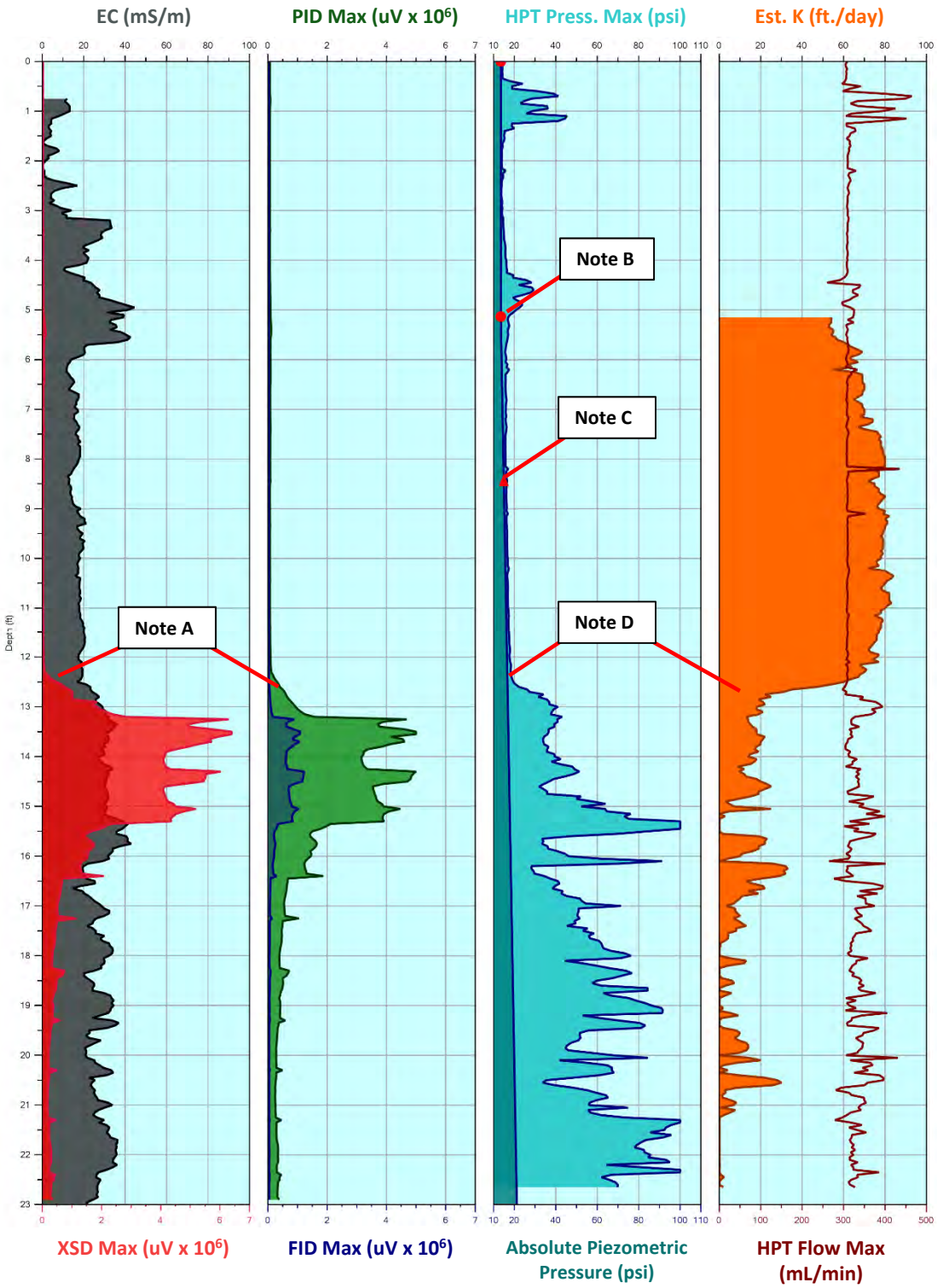


		File: BSL-MIP-T16.MHP
Company: Dakota Technologies	Operator: GHH	Date: 11/29/2017
Project ID: Billings PCE	Client: Trihydro	Location: Billings, MT

Appendix F

MiHpt Reference Log

Dakota Technologies MiHpt Reference Log



Conductivity Plot:

The Electrical Conductivity **(EC)** of the soil is logged simultaneously with the HPT pressure and analytical detector data utilizing a dipole arrangement. The EC provides insight into stratigraphy and contaminant pathways when viewed in relation to detector responses. Typically, an increase in EC is indicative of finer grained, tighter soil types.

HPT Pressure Plot:

The HPT pressure gives insight into hydraulic properties of the soil as water is pumped into the formation at a constant rate. The pressure (unlike EC) is independent of certain factors such as pore water chemistry or mineralogy (contaminants, brines), and so further aids in defining soil/hydraulic properties. Potential contaminant migration pathways can be better understood when pressure data are viewed in relation to detector responses.

Estimated K Plot:

Estimated K is internally calculated with pressure and flow data in conjunction with dissipation tests performed at each location. Hydraulic conductivity data is useful for directing sampling, remediation and slug testing protocols.

PID Plot:

Detects unsaturated, multi-bond compounds (olefins) and aromatic (BTEX) hydrocarbons, as well as GRO to approx. 0.5-1 ppm detection limit in all types of soil.

FID Plot:

Detects all types of hydrocarbons (including methane and butane) to approximately 10 ppm detection limit. Generally, the FID response is an indication of total VOCs/CVOCs present.

XSD Plot:

Detects halogenated compounds (i.e. CVOCs such as TCE and PCE) to approximately 250 ppb detection limit.

Note A:

XSD (and PID/FID) responses starting at 12.5 feet are indicative of moderate level CVOCs.

Note B:

The hydrostatic water level is indicated with a round marker at 5.2 feet.

Note C:

The Absolute Piezometric pressure has been calculated and graphed with the dissipation test point indicated by a triangular marker at 8.4 feet. The pressure begins to increase relative to the head pressure as soon as the water table is encountered, producing the rising piezometric pressure baseline after 5.5 feet.

Note D:

Increasing pressure readings starting at 12.5 feet are indicative of a less permeable soil type (clay). Note that this pertinent data (related to contaminant flow pathway) is not dramatically discerned by the EC plot. Sinking, dense CVOCs are “trapped” in this less transmissive zone (see Est. K plot).

APPENDIX E

FIELD FORMS AND OBSERVATIONS

E-1. DAILY FIELD FORMS AND PHOTOS

E-2. GROUNDWATER SAMPLING FIELD FORMS

E-3. BORING LOGS

E-4. SOIL SAMPLING FIELD FORMS

E-5. VAPOR INTRUSION SAMPLING FIELD FORMS AND PHOTOS

E-6. DEEPER WELL SLUG TESTS AND ANALYSIS

E-7. IDW WASTE MANIFESTS/DISPOSAL RECORD

APPENDIX E-1

DAILY FIELD FORMS AND PHOTOS

	Name:	Company:	
Report Created By	Syris Trahan	Trihydro Corporation	
Date	Monday, July 24, 2017		
Temperature	>85 °F	**Work Day**	2
Weather	Clear	**Work Start**	745
Wind	Calm (<1 mph)	**Work Stop**	1730

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager
Luke Darnell	Project Field Staff
Aaron Loller	Project Field Staff
Brandt Schiche	Project Field Staff
Jeremy Simons	Project Field Staff

Equipment Present Onsite	Count
Oil/water interface probe	2
QED Bladder Pump	4
3/8" fluid level probe	2
Peristaltic pump	2
InSitu Groundwater Meter	2
Transfer pump	2

Health and Safety Comments	High temperatures, exceeding 95 F. Focus on staying hydrated, taking frequent breaks in the shade.
Record of Samples Collected	No samples were collected this day
Work Activities Conducted	Syris and Luke travel to Billings from Helena, transport sampling equipment and supplies. Brandt, Jeremy, and Aaron arrived the previous evening. Collected additional sampling supplies, and deployed secondary containment at the BSL Facility. Collect fluid levels and measure total depths at wells near Big Sky Linen. Redevelop three 2" monitoring wells at LUST facilities within facility boundary.

Setup secondary containment area in gravel lot behind BSL. Place drums in secondary containment for fluid collection.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

	Name:	Company:	
Report Created By	Syris Trahan	Trihydro Corporation	
Date	Tuesday, July 25, 2017		
Temperature	70-85 °F	**Work Day**	2
Weather	Overcast	**Work Start**	730
Wind	Light (1-10 mph)	**Work Stop**	1715

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager
Luke Darnell	Project Field Staff
Aaron Loller	Project Field Staff
Jeremy Simons	Project Field Staff
Brandt Schiche	Project Field Staff

Equipment Present Onsite	Count
Oil/water interface probe	2
3/8" fluid level probe	2
InSitu Groundwater Meter	1
Transfer pump	

Health and Safety Comments	Wells to be measured are in high-traffic areas. Be mindful of streets such as Custer Avenue and 1st Avenue South, where four lane traffic exists, and roadways do not have shoulders. Despite the large well distances from the source area at BSL, wells still contain PCE above DEQ-7 standards. Handle IDW and sampling equipment with care.
Record of Samples Collected	No samples were collected this day.
Work Activities Conducted	Continue fluid measurements in main plume body and eastern edge of plume. Well BPGW10 and BPGP39 were not able to be located. Weston-MW-1 has been abandoned and cannot be sampled. Continue and finish well redevelopment activities of six more wells at the Facility. Install security fencing around secondary

containment at Big Sky Linen. Wells on BNSF property not inspected, due to awaiting permission to access the railyard. Sample bottles requested from PACE a day earlier than expected.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

	Name:	Company:	
Report Created By	Sarah Seitz	Trihydro Corporation	
Date	Wednesday, July 26, 2017		
Temperature	>85 °F	**Work Day**	
Weather	Clear	**Work Start**	730
Wind	Calm (<1 mph)	**Work Stop**	1700

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager
Luke Darnell	Project Field Staff
Aaron Loller	Project Field Staff
Jeremy Simons	Project Field Staff
Brandt Schiche	Project Field Staff
Mike Gipson	DEQ Project Officer

Equipment Present Onsite	Count
Oil/water interface probe	2
3/8" fluid level probe	2
InSitu Groundwater Meter	1
Transfer pump	1
Peristaltic pump	2
QED Bladder Pump	2

Health and Safety Comments	Tailgate safety meeting in the morning - site specific topic of discussion was handling contaminated groundwater aboveground and the hazards and risks associated with potentially contaminated groundwater.
Record of Samples Collected	Twelve groundwater samples were collected on Wednesday, July 26, 2017. Samples were collected from primarily around Big Sky Linen at the following locations: BPGP60

	BPGP66 BPGP54 BPGP59 BPGW01 BPGP32 EMW-11 BPGP80 BPGP08 BPGP05 BPGP85 BPGP88 The following QA/QC samples were also collected: MS/MSD - BPGP50 MS, BPGP50 MSD Blind Duplicate - 20170726-01 with parent sample BPGP60 Trip Blank - unlabeled, but 2 lab-prepared VOAs included in the cooler of VOCs Equipment Blank - none collected Field Blank - none collected
Work Activities Conducted	Groundwater sampling near Big Sky Linen were the primary field activities on July 26, 2017. Trihydro had two, two-person sampling teams using pumps to perform low-flow sampling of the wells. A total of 12 wells were sampled, along with

associated QA/QC samples. Groundwater was observed to be clear with no odor in the wells, with the exception of BPGP66. BPGP66 was clear, but had a sour chemical odor.

Mike Gipson, DEQ project officer, arrived in Billings during the afternoon and met up with the field crew.

Trihydro used fluid level and well location data to update the field plan and present an updated field plan figure to Mike Gipson. Several wells that were anticipated to be sampled are no longer accessible and are likely destroyed and cannot be sampled: BPGW02, BPGP02, BPGP73, BPGP81, BPGP39, BPMW10, Weston-MW-2, CentralPark-I, and GWIC-231548. There are two additional wells that will be used to replace a few of these wells - GSMW-5 and BPGP29. An updated figure was emailed to the project team and Mike Gipson. Trihydro will discuss with Mike tomorrow after he is able to review the figure.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	No	Two deviations from the approved plan occurred during the groundwater sampling event today:1. An equipment blank was not collected on 7/26/2017, which is a deviation since the work plan memo specifies a daily field blank. 2. A field blank was not collected on 7/26/2017, which is a deviation from the work plan memo that indicates a daily field blank.

	Name:	Company:	
Report Created By	Sarah Seitz	Trihydro Corporation	
Date	Thursday, July 27, 2017		
Temperature	>85 °F	**Work Day**	
Weather	Clear	**Work Start**	630
Wind	Calm (<1 mph)	**Work Stop**	1800

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager
Luke Darnell	Project Field Staff
Aaron Loller	Project Field Staff
Jeremy Simons	Project Field Staff
Brandt Schiche	Project Field Staff
Mike Gipson	DEQ Project Officer
Sarah Seitz	Field Task Manager

Equipment Present Onsite	Count
Oil/water interface probe	2
3/8" fluid level probe	2
InSitu Groundwater Meter	1
Transfer pump	1
Peristaltic pump	2
QED Bladder Pump	2

Health and Safety Comments	Tailgate safety meeting in the morning - site specific topic of discussion was working in heat and heat exhaustion. The hazards and risks associated with heat were discussed and everyone was reminded to take breaks from the heat in AC, stay hydrated, and find shade to work in if available.
Record of Samples Collected	Low-flow groundwater samples were collected on Thursday, July 27, 2017. Samples were collected from the following 14 locations:

BPGP49

BPGP78

BPGP61

BPGW04

BPGP65

BPGP63

BPGP63B

BPGP46

BPGP46B

BPGP74

BPGP65B

BPGP51

BPGP51B

BPGP53

For the groundwater sampling method comparison between the peristaltic pump and bladder pump the following sample location had samples collected with both methods:

BPGW04 - parent sample collected with bladder pump and 20170727-A sample was collected with peristaltic pump method.

Associated QA samples were also collected:

Trip Blank - unlabeled, but 2 lab-prepared VOAs included in the cooler of VOCs

Equipment Blank - 20170727-B on a bladder pump that was used by ST/BS

Field Blank - 2017727-C was collected at the northwest corner of Central Ave. and 7th St. W approximately 50-feet from the resurfacing/asphalt project along Central Ave.

Work Activities Conducted

Low -flow groundwater sampling was the primary field activity for July 27, 2017. Many of the locations were in commercial areas along Central Ave. Trihydro had two, two-person sampling teams using pumps to perform low-flow sampling of the wells. A total of 14 wells were sampled, along with associated QA/QC samples. Groundwater was observed to be clear and no odors were noted by the field crew.

Sarah Seitz , Trihydro, arrived on site around 12:30pm. Sarah and Mike discussed the updated field figure and noted the wells that were no longer in existence. Mike is in agreement with the addition of GSMW-5 and BPGP29 for sampling in lieu of other abandoned wells.

Additional waste water collection totes and drums were delivered by Beartooth Environmental at around 1700 at the IDW area in the parking lot north of Big Sky Linen.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes

	Name:	Company:	
Report Created By	Sarah Seitz	Trihydro Corporation	
Date	Friday, July 28, 2017		
Temperature	>85 °F	**Work Day**	
Weather	Clear	**Work Start**	730
Wind	Calm (<1 mph)	**Work Stop**	1830

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager
Luke Darnell	Project Field Staff
Aaron Loller	Project Field Staff
Jeremy Simons	Project Field Staff
Brandt Schiche	Project Field Staff
Mike Gipson	DEQ Project Officer
Sarah Seitz	Field Task Manager

Equipment Present Onsite	Count
Oil/water interface probe	2
3/8" fluid level probe	2
InSitu Groundwater Meter	1
Transfer pump	1
Peristaltic pump	2
QED Bladder Pump	2

Health and Safety Comments	Tailgate safety meeting in the morning - site specific topic of discussion was fatigue after five days of field work. The hazards and risks associated with losing focus after days of field work was discussed.
Record of Samples Collected	Low-flow groundwater samples were collected on Friday, July 28, 2017. Samples were collected from the following 17 locations: BPGP25

EMW-03

BPGP27

BPGP48

CENEX-5

BPGP83

BPGP47

BPGP28

RH-MW-3

BPGP86

BPGP12

BPGP29

BPGP41

EMW-1

BPGP15

BPGP42

BMW-4

For the groundwater sampling method comparison between the peristaltic pump and bladder pump the following sample location had samples collected with both methods:

EMW-03 - parent sample collected with bladder pump and 20170728-A sample was

	collected with peristaltic pump method. RH-MW-03 - parent sample collected with bladder pump and 20170728-C sample was collected with peristaltic pump method. EMW-1 - parent sample collected with bladder pump and 20170728-D sample was collected with peristaltic pump method. Associated QA samples were also collected: MS/MSD - BPGP25MS, BPGP25MSD Blind Duplicates - 20170728-B is a blind duplicate for parent sample BPGP27, Trip Blank - 20170728-G Equipment Blank - 20170728-F, Friday equipment blank taken on a decontaminated 1/4" water level probe used by LD/AL Field Blank - 2017728-E, Friday field blank taken near BPGP42 on N 34th St between Montana Ave and 1st Ave near 10 N 34th St, Billings, MT 59101
Work Activities Conducted	Low -flow groundwater sampling was the primary field activity for July 28, 2017. The locations were in commercial and residential areas. Trihydro had two, two or three-person sampling teams using pumps to perform low-flow sampling of the wells. A total of 17 wells were sampled, along with associated QA/QC samples. Groundwater was observed to be clear and no odors were noted by the field crew with two exceptions. RH-MW-03 was cloudy, but had no observed odor. EMW-21 had a strong hydrocarbon odor and a sorbent sock was discovered in the well prior to sampling. A slight sheen developed on the purge water, and the well was sampled with both a bladder pump and peristaltic pump for VOCs. Mike Gipson left the facility around mid-day after talking with property owners and coordinating with the field crew.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

	Name:	Company:	
Report Created By	Sarah Seitz	Trihydro Corporation	
Date	Saturday, July 29, 2017		
Temperature	>85 °F	**Work Day**	
Weather	Clear	**Work Start**	730
Wind	Calm (<1 mph)	**Work Stop**	1330

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager
Luke Darnell	Project Field Staff
Aaron Loller	Project Field Staff
Jeremy Simons	Project Field Staff
Brandt Schiche	Project Field Staff
Mike Gipson	DEQ Project Officer
Sarah Seitz	Field Task Manager

Equipment Present Onsite	Count
Oil/water interface probe	2
3/8" fluid level probe	2
InSitu Groundwater Meter	1
Transfer pump	1
Peristaltic pump	2
QED Bladder Pump	2

Health and Safety Comments	Tailgate safety meeting in the morning was a quick hazard review by each field team. There was no tailgate form filled out for this sample day.
Record of Samples Collected	Low-flow groundwater samples were collected on Saturday, July 29, 2017. Samples were collected from the following 6 locations: BMW-1

	BPGP91 EMW-18 BMW07-1 EMW-26 EMW-28 Associated QA samples were also collected: MS/MSD - EMW-18 MS, EMW-18 MSD Trip Blank - 20170729-A Equipment Blank - 20170729-B, Saturday equipment blank taken on a decontaminated QED bladder pump used by JS/BS Field Blank - 2017728-C, Saturday field blank taken near EMW-26 in front of the Billings Housing Authority near 2415 1st Ave N Billings, MT 59101.
Work Activities Conducted	Low -flow groundwater sampling was the primary field activity for July 28, 2017. The locations were in commercial and residential areas. Trihydro had two, two or three-person sampling teams using pumps to perform low-flow sampling of the wells. A total of 6 wells were sampled, along with associated QA/QC samples. No odors were noted for the groundwater samples. Work day was shortened to allow weekend rest time for the field crew.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes

	Name:	Company:	
Report Created By	Syris Trahan	Trihydro Corporation	
Date	Monday, August 28, 2017		
Temperature	>85 °F	**Work Day**	
Weather	Overcast	**Work Start**	715
Wind	Calm (<1 mph)	**Work Stop**	530

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager
Brian Schmalz	Project Field Staff

Equipment Present Onsite	Count
GPS Surveying Equipment	1

Health and Safety Comments	Heavy traffic in the area. High temperatures expected throughout the day.
Record of Samples Collected	None.
Work Activities Conducted	Survey team met at IDW storage area behind Big Sky Linen at 0730. Conducted safety briefing and site orientation. Brian has already completed survey of approximately 50 wells in the vicinity of Big Sky Linen. GPS station set up. GPS survey conducted for wells beginning at PEP07, and progressing northeast through the downtown wells. Survey also conducted along 1st Avenue South from Access Road to Riverstone Health Clinic. EPA and their consultants are onsite sampling groundwater wells at Big Sky Linen. Site staff discussed sampling with Kerry Guy, Terrence Johnson, and David Edgerton. Groundwater sampling is being conducted on the same wells as those sampled in 2015. Trihydro staff helped EPA staff locate several wells. EPA identified the location of BPGP02, which had been previously unlocated during well inventory activities. EPA staff confirmed that BPGP75 and BPGP73 are both lost/destroyed.

Trihydro staff discussed upcoming sampling events with EPA staff, including Vapor Intrusion sampling. EPA staff noted that they would be interested in coordinating on VI sampling to ensure that redundant samples were not collected.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

	Name:	Company:	
Report Created By	Syris Trahan	Trihydro Corporation	
Date	Tuesday, August 29, 2017		
Temperature	70-85 °F	**Work Day**	
Weather	Overcast	**Work Start**	700
Wind	Calm (<1 mph)	**Work Stop**	

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager
Brian Schmalz	Project Field Staff

Equipment Present Onsite	Count
GPS Surveying Equipment	1

Health and Safety Comments	Surveying near high traffic areas. Be cognizant of surroundings, including potential hazards from sidewalk installation along 1st Avenue South.
Record of Samples Collected	None.
Work Activities Conducted	Work began with surveying remaining wells along 1st Avenue South, including BNSF wells located off of BNSF property. Attempted to locate well D5, E1, and F3, at Big Sky Recycling, but were unsuccessful. It appears that the wells have been destroyed during decommissioning efforts at the recycling plant. An additional well was located at the former Garfield Elementary School, and was surveyed as a replacement well. Trihydro personnel spoke with the Facility maintenance manager for the school building (Pat), and explained the work being conducted. The school building and irrigation system both use city water, and do not rely on groundwater. The well BNMW-21 is located in a vehicle storage lot used by Jim's Auto Repair and Towing (248-3701). Property owners were contacted, and we were allowed on site to survey the well. Met with Scott Emerick of the City of Billings sanitation department and coordinated potential scoping and daylighting of CoB sanitary sewer lines.

potential scoping and daylighting of CoB sanitary sewer lines.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Thursday, August 31, 2017	
Temperature		**Work Day**
Weather		**Work Start**
Wind		**Work Stop**

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager
Brian Schmalz	Project Field Staff
Luke Darnell	Project Field Staff
Mark Engdahl	
Mark Goodson	

Equipment Present Onsite	Count
GPS Surveying Equipment	1
InSitu Groundwater Meter	1
Oil/water interface probe	1
QED Bladder Pump	1

Health and Safety Comments	Groundwater sampling and surveying in the BNSF Billings Railyard. Be cognizant of heavy machinery and railroad crossings. Mark Goodson on site to provide flagging services by MRL.
Record of Samples Collected	BNMW-20 BNMW-8 BNMW-17 BNMW-9 BNMW-9MS

	BNMW-9MS BNMW-9MSD BNMW-24 20170830-A 20170830-B 20170830-C 20170830-D
Work Activities Conducted	Met Mark Engdahl on site at 0700. Began surveying in wells not located within 25' of the tracks. Could not locate BL-GW-5. Mark noted that he believed groundwater samples F3, D5, and E1 were all direct push grab samples at the recyclers, as part of lease termination requirements, but did not specify if BNSF still owned the property. Well BNMW-7 contained approximately 0.02 inches of free product, and was not sampled. BNMW-17 was used as a replacement well. Mark noted that he did not believe other wells were located further west and south of the wells sampled in the railyard area, but noted that DEQ may be able to install wells further south, if they wish. Met with Bill Kemp, Boris Krizek, and a member of the utility scoping team from the City of Billings Street-Traffic Division. Discussed with them the need for surveying storm sewer lines to investigate the potential for discharge to the subsurface.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	No	BNMW-7 contained free product, and well BNMW-17 was sampled instead. Mark Engdahl noted that BNMW-7 has consistently contained hydrocarbon sheens or films over the past few years.

	Name:	Company:	
Report Created By	Syris Trahan	Trihydro Corporation	
Date	Friday, September 1, 2017		
Temperature	>85 °F	**Work Day**	
Weather	Overcast	**Work Start**	700
Wind	Calm (<1 mph)	**Work Stop**	1730

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager
Luke Darnell	Project Field Staff

Equipment Present Onsite	Count
InSitu Groundwater Meter	1
Oil/water interface probe	1
QED Bladder Pump	1
Peristaltic pump	1

Health and Safety Comments	Heavy smoke due to wildfire in region. Air quality is poor.
Record of Samples Collected	BNMW-21 BNMW-23 BPGP02 EMW-32 20170831-A 20170831-B 20170831-C

Work Activities Conducted

Met L. Darnell onsite at 0700, conducted tailgate safety meeting. Noted that primary hazards would be traffic and high temperatures. Vehicle was found to be obstructing BNMW-23. Attempted to sample Garfield MW-1. Well appeared to be 15.50 feet deep, with minor debris at the bottom, but no water.

Mark Engdahl identified additional wells on BNSF property, currently used by Advantage Electric Plus. One well was located in the easement behind McBride Mechanical, and was identified as a replacement well for previously identified wells that were no longer available. It was sampled for Suite C. Mr. Engdahl also noted that the wells were slated for abandonment under a petroleum mixing zone.

Well BNMW-21 is located on property currently leased by Jim's Auto Repair &Towing. The property is fenced, and locked at all times. Trihydro personnel coordinated with Chris at Jim's Auto Repair, and he sent a driver to open the gates and accompany the sample team during sample collection. The driver noted that a new monitoring well had been installed at some point recently, and identified it's location in the far southwest corner of the fenced yard. It was not sampled at that time.

During sampling efforts at BNMW-23, Mike Yakawich of the Billings City Council stopped to ask about the work being completed. Trihydro staff explained the purpose of the groundwater sampling, and provided Mr. Yakawich with contact information for DEQ's project officer, as well as an informational sheet about the sampling event.

Deviation from approved plans:

Work conducted in accordance with approved plans? Yes

	Name:	Company:	
Report Created By	Syris Trahan	Trihydro Corporation	
Date	Tuesday, November 7, 2017		
Temperature	<32 °F	**Work Day**	
Weather	Clear	**Work Start**	745
Wind	Light (1-10 mph)	**Work Stop**	1330

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager

Health and Safety Comments	Tailgate safety meeting conducted to discuss HASP with TruPipe subcontractor. Primary hazard identified is working in traffic in local arterial street. Specific attention called to risk associated with poor driving conditions and increased stopping distance due to icy conditions.
Record of Samples Collected	N/A
Work Activities Conducted	Arrived on site at Central Avenue Laundry at 745. Snow covered the site. TruPipe personnel, working with Mountain West Holding company (a Traffic management subcontractor) set up to scope sanitary sewer lines in front of Big Sky Linen. Confirmed with Mike, of TruPipe, that Mountain West had an approved traffic control plan in place with the City of Billings. Scoping began at manhole 45-5 to the west, towards the section of sanitary sewer which had been replaced during EPA activities. Due to low temperatures and high humidity, significant water vapor was present in the sewer line during scoping. This made observing pipeline walls challenging. The sewer was confirmed to be vitrified clay pipe, and appeared to be 18" in diameter, installed in roughly 4 ft sections. The camera was advanced up the pipeline, and stopped at each pipe joint, and the length of the joint was inspected. In general the vitrified clay piping was very clean and in good condition. Joints in the piping varied both in completion and in size. A tar like material appeared to be present in some, but not all, of the pipe joints. A small crack was observed at approximately 38 ft. along the pipeline. Scoping was completed to

roughly 112 ft to the west of manhole 45-4, to manhole 45-40. The sewer cam had some difficulty entering the manhole at 45-40. The new manhole at 45-40 was completed in concrete, and the pipe transition, to the extent visible, also appeared to be made of concrete. Joint gaskets or sealants observed intermittently along pipe.

Next, the sanitary sewer was scoped from 45-5 east towards manhole 45-4. Vitrified clay pipe was also confirmed east of manhole 45-5. Similarly, intermittent gasketing was also observed. No cracks or readily apparent failures observed, and scoping was terminated after 130 feet.

Scoping was next conducted in the 8" sanitary sewer located in the alley at Central Avenue Laundry. Sewer was confirmed to be constructed of vitrified clay pipe.Some staining at sewer inlet at 54 feet. Dark staining and tar sealant was observed at sewer inlet at 72.5 feet from manhole 46-35. A hairline crack was observed at 94 feet from manhole 46-35. Fauna and insect activity observed at 94 and 98 feet from 46-35, suggesting that the sanitary sewer may be accessing the subsurface. A joint crack was noted at 103 feet. A white buildup was observe agglomerating around gaskets intermittently along the lines. Gasket material between roughly 60 and 200 feet from the manhole show crumbling degradation. No specific large fissures into the subsurface observed, outside of potential gasket degradation. Some sewer service line connections to the main line were very haphazardly done, and could potentially serve as conduits between the subsurface and the sewer interior, though they were typically located above the water line.

Next, the sanitary sewer line from 46-34 to manhole 46-33 was scoped. Signs of groundwater infiltration (and potentially, exfiltration) were observed at 10.4, 31, 39.7, 43.6, 47.9 and 55.7 feet from manhole 46-34. An obstruction below the water line at 98.70 feet from 46-34 prevented further access of the line at this time.

Next, the sanitary sewer at Rex's Cleaners was scoped. Beginning at manhole 9-3, and heading south towards 1st Avenue South. Condition of the vitrified clay pipe in this line is significantly worse than CAL or BSL. Consistent cracks noted at most joints. Joint seals show potential signs of failure. A sewer inlet at 11.4 ft in showed signs for broken piping. At 27.5 feet, a significant joint was observed that may be open to the subsurface, slightly. At 28.2 a service line towards Rex Cleaners was observed, containing obstruction in the form of solids, a large crack and a pipe joint that was beginning to separate. At 39.7 feet there is a large crack high in the line where another service line enters the main. At 48.2 feet another service line

breakage cause a crack which passes below the water line. At 65.2 a service inlet is poorly connected, resulting in cracks to main sewer. At 69.2 feet, a long crack is observed in top of sewer, culminating in a small missing chunk of sewer line. At 73.4, deep cracks in the sewer joint are noted. At 78.0, a service line pointing towards Rex appears to be filled with dirt or other sludge. At 80.30 feet, an unidentifiable obstruction in the line prevents further advancement of the scope.

Finally, manhole 9-83 is scoped to the southwest. PVC is expected, however the pipeline appears to be 12" ductile iron with a grouted interior. Some groundwater may be infiltrating into 9-83. Interior seems to be in good working order. Some rust at each joint, at roughly 10 foot intervals. Several active sewer services connect to the line. Line not scoped to the northeast as the newer line will not be able to provide insight into historical releases.

Deviation from approved plans:

Work conducted in accordance with approved plans?

	Name:	Company:	
Report Created By	Syris Trahan	Trihydro Corporation	
Date	Wednesday, November 8, 2017		
Temperature	<32 °F	**Work Day**	
Weather	Overcast	**Work Start**	915
Wind	Light (1-10 mph)	**Work Stop**	1330

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager

Health and Safety Comments	Storm sewer scoping with City of Billings personnel. Continued activity located primarily in City of Billings rights-of-ways; primarily identified hazard is working in and near traffic.
Record of Samples Collected	N/A
Work Activities Conducted	Scoping began at Big Sky Linen, at stormwater manhole 45-42 located in Central Avenue, scoping west towards the 7th Street West intersection. Storm sewer line appears to be in generally good condition, 30" concrete pipe, bottom located roughly 8 ft bgs. Storm water service inlet located 38.9 feet from entry point; 8-10" service line, connected to sewer main using black gasketing. Heavy silt encountered throughout line, sewer cam rover unable to pass beyond 235.1 successfully. Camera withdrawn, and sewer is jetted and vacuumed to allow passage of rover and clearer observation of joints in piping. Possible signs of groundwater infiltration at 68 and 75.9 feet. Minor joint separation noted at 173.2 and 181.5 feet from entry point. Black gasketing visible in piping joint, but appears intact. Another slight joint separation noted at 230 feet. A stormwater inlet from the south side of the road located at 256 feet from the entry point. Significant joint separation at 263.5 ft from entry point. City personnel then jetted the line from manhole 45-43 towards the east for approximately 100 feet. Concrete piping continues from manhole 45-43 east. Piping appears to be older and in somewhat more worn condition, however pipe integrity appears to be good. Gaskets are visible in each joint, and are often swollen where they have been in contact with sewer contents, sticking into the sewer line. No

notable cracks or separations noted along the line.

Next, the storm sewer line was investigated at 4th street west. Beginning at Manhole 44-36, the rover was advanced approximately 2 feet to the south to look into the storm sewer construction where it turned north from Montana Avenue and entered 4th Street. The storm sewer appeared to "Y" under montana avenue, with a branch of the Y passing south beneath the BNSF railyard. Did not enter MDT right of way to confirm if the Y was capped or continued onwards. Line was constructed of concrete, approximately 36" in diameter. Concrete appeared to be older, constructed from pouring into slatted wooden forms. Joints along the sewer line appeared to be grouted, potentially with rebar in each joint. Many of the joints showed signs of deterioration, including degraded concrete and rusting rebar. At 74 feet, a portion of the joint appears to have failed. At 100 and 106.6 feet exposed rebar and deteriorated concrete joints are present. At 113.4 feet an obstruction was encountered that the rover could not bypass or move. As the condition of the pipe seemed to be generally known, the scope was completed at that point.

Finally, the storm sewer line running in 28th Street near Rex was scoped. It was an 18" PVC line. Scoping began at manhole 9-79 and proceeded south to manhole 9-113. The MDT right of way at the intersection of 1st Avenue South was not scoped. The storm sewer drain for Rex appeared to enter the line at 26.3 feet from the entry point. PVC joints throughout the line are well sealed and in good condition. No signs of degradation or deterioration of the line. Scoping terminated at subsequent manhole, 136.1 feet from entry point.

Deviation from approved plans:

Work conducted in accordance with approved plans?

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Monday, November 13, 2017		
Temperature	32-50 °F	**Work Day**	1
Weather	Clear	**Work Start**	800
Wind	Calm (<1 mph)	**Work Stop**	1800

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager
Andrew Vann	Project Manager
Sarah Seitz	Project Field Staff
Luke Darnell	Project Field Staff
Charles VanHeuvelen	Project Field Staff
Mike Gipson	DEQ Project Officer
Logan McLonth/Dakota Technologies	Project Field Staff
Geoff Hardaway/Dakota Technologies	Project Field Staff

Equipment Present Onsite	Count
Geoprobe 6610DT	1
MiHPT mobile lab van	1
GPS Surveying Equipment	1
MiniRae PID	1

Health and Safety Comments	Health and Safety orientation and on-boarding with new project staff and subcontractors. Tailgate topics included JSA review of direct push drilling, drill rig inspection and complete utility clearance checklist.
Record of Samples Collected	None
Work Activities Conducted	Oversight of direct push drilling and MiHPT logging at locations:

1. CAL-MIP-1
2. CAL-MIP-2
3. CAL-MIP-10

Talk with owner of Big Sky Laundry about upcoming work.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

Photo Date:	11/13/2017
Direction:	Northwest
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Direct push drilling at CAL-MIP-1.

Photo Date:	11/13/2017
Direction:	West
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Unloading geoprobe at CAL site.

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Tuesday, November 14, 2017		
Temperature	32-50 °F	**Work Day**	2
Weather	Overcast	**Work Start**	32
Wind	Calm (<1 mph)	**Work Stop**	38

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager
Andrew Vann	Project Manager
Sarah Seitz	Project Field Staff
Luke Darnell	Project Field Staff
Charles VanHeuvelen	Project Field Staff
Logan Melonth/ Dakota Technologies Co.	Project Field Staff
Geoff Hardaway/ Dakota Technologies Co.	Project Field Staff
Mike Gipson	DEQ Project Officer

Equipment Present Onsite	Count
Geoprobe 6610DT direct push rig	1
MiHPT mobile lab van	1
MiniRAE PID	1
Trimble GPS	1

Health and Safety Comments	Tailgate Safety Meeting - Decon procedures and use of tarp between rig and lab van to catch mud/soil on cable.
Record of Samples Collected	None
Work Activities Conducted	Logs points with MiHPT at: CAL-MIP-7, CAL-MIP-6, CAL-MIP-5, CAL-MIP-4, MIP-T03 and MIP-T02.

Conducted oversight of the drilling and logging of the above borings. Continued to meet adjacent property owners to schedule upcoming sampling and VI sampling.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

Photo Date:	11/14/2017
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Mobile lab equipment.

Photo Date:	11/14/2017
Direction:	Northeast
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Driving and logging MIP-T02.

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Wednesday, November 15, 2017		
Temperature	<32 °F	**Work Day**	34
Weather	Partly Cloudy	**Work Start**	23
Wind	Calm (<1 mph)	**Work Stop**	32

Onsite Personnel (name/company)	Role
Andrew Vann	Project Manager
Luke Darnell	Project Field Staff
Charles VanHeuvelen	Project Field Staff
Logan McLonth/Dakota Technologies	Project Field Staff
Geoff Hardaway/Dakota Technologies	Project Field Staff
Syris Trahan	Field Task Manager
Sarah Seitz	Project Field Staff
Mike Gipson	DEQ Project Officer

Equipment Present Onsite	Count
Geoprobe 6610DT	1
MiHPT mobile lab van	1
GPS Surveying Equipment	1
MiniRae PID	1

Health and Safety Comments	Tailgate topic- use cones while working in parking lot and stay aware of moving vehicles.
Record of Samples Collected	Lab samples.
Work Activities Conducted	1. Continuously soil logged CAL-MIP-8 and CAL-MIP-9. 2. Repaired XSD sensor and PID switch in mobile lab van and calibrated instruments.

3. MiHPT logged CAL-MIP-8 and CAL-MIP-9.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

Photo Date:	11/15/2017
Direction:	North
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Acetate core liner samples from CAL-MIP-8.

Photo Date:	11/15/2017
Direction:	North
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Acetate core liner samples from CAL-MIP-9

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Thursday, November 16, 2017		
Temperature	32-50 °F	**Work Day**	4
Weather	Partly Cloudy	**Work Start**	700
Wind	Calm (<1 mph)	**Work Stop**	1615

Onsite Personnel (name/company)	Role
Andrew Vann	Project Manager
Luke Darnell	Project Field Staff
Charles VanHeuvelen	Project Field Staff
Logan McLonth/ Dakota Technologies Co.	Project Field Staff
Geoff Hardaway/ Dakota Technologies Co.	Project Field Staff
Mike Gipson	DEQ Project Officer

Equipment Present Onsite	Count
Geoprobe 6610DT direct push rig	1
MiHPT mobile lab van	1
MiniRAE PID	1
Trimble GPS	1

Health and Safety Comments	Tailgate safety - securing equipment from people walking past site. PM - (arrive at new site, 711 Central) parking lot traffic, utility clearance checklist.
Record of Samples Collected	Log DP locations with MiHPT at; MIP-T07, MIP-T08, MIP-T09, MIP-T06 and BSL-MIP-11.
Work Activities Conducted	Completed the oversight of the direct push points listed above at CAL site and moved to 711 Central location. Checked District 7 site for logging tomorrow and the REX and Wetzels sites for upcoming work.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

Photo Date:	11/16/2017
Direction:	Northeast
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	TD 30.3' bgs @ BSL-MIP-11, 711 Central.

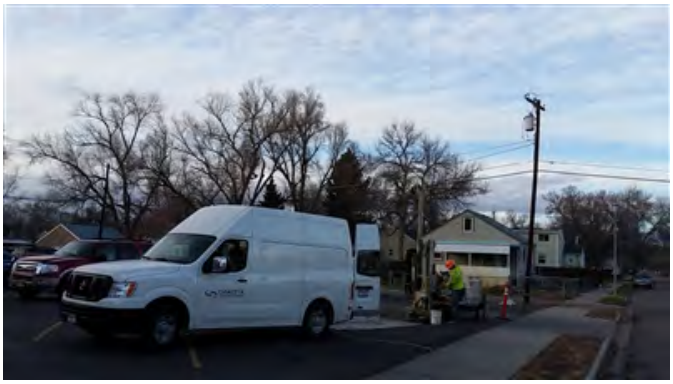


Photo Date:	11/16/2017
Direction:	Northwest
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Mobile lab and geoprobe after drill rod was tripped out.

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Friday, November 17, 2017		
Temperature	32-50 °F	**Work Day**	5
Weather	Overcast	**Work Start**	700
Wind	Light (1-10 mph)	**Work Stop**	1200

Onsite Personnel (name/company)	Role
Andrew Vann	Project Manager
Luke Darnell	Project Field Staff
Charles VanHeuvelen	Project Field Staff
Logan McLonth/Dakota Technologies	Project Field Staff
Geoff Hardaway/Dakota Technologies	Project Field Staff

Equipment Present Onsite	Count
Geoprobe 6610DT	1
MiHPT mobile lab van	1
GPS Surveying Equipment	1
ppbRae PID	1

Health and Safety Comments	Tailgate H &S - avoid last day complacency by performing WSSA's, Evaluate new site conditions.
Record of Samples Collected	Lab samples
Work Activities Conducted	Completed MiHPT logging and oversight at points; 1. D7HRC-MIP-03 2. D7HRC-MIP-02 3. D7HRC-MIP-01 Unloaded and secured equipment for holiday weekend.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

Photo Date:	11/17/2017
Direction:	North
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Driving MiHPT point with utility clearances marked.

Photo Date:	11/17/2017
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Core logged at D7HRC-MIP-01.

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Tuesday, November 28, 2017		
Temperature	32-50 °F	**Work Day**	6
Weather	Clear	**Work Start**	700
Wind	Calm (<1 mph)	**Work Stop**	1700

Onsite Personnel (name/company)	Role
Luke Darnell	Project Field Staff
Charles VanHeuvelen	Project Field Staff
Logan McLonth/Dakota Technologies	Project Field Staff
Geoff Hardaway/Dakota Technologies	Project Field Staff
Syris Trahan	Field Task Manager
Joel Riebli	Project Field Staff
Jake Scott	Project Field Staff
Charles Grensen/Dakota Technologies	Project Field Staff
Oray Tangen/ Dakota Technologies	Project Field Staff

Equipment Present Onsite	Count
Geoprobe 6610DT	1
MiHPT mobile lab van	1
GPS Surveying Equipment	1
ppbRae PID	2
Geoprobe 7720DT	1

Health and Safety Comments	Health and Safety orientation and kickoff for new staff arriving at site, Tailgate topic - traffic at each site and utility clearance.
Record of Samples Collected	Lab samples
Work Activities Conducted	Began collecting soil samples at CAL site;

•CAL-MIP-02; 3 discrete intervals
•CAL-MIP-04; 6 discrete intervals
•MIP-T03; 2 discrete intervals, plus additional fate and transport
•Returned to CAL-MIP-02 to collect FOC samples at 3 discrete intervals

Using a Geoprobe 6610DT and MiHPT mobile van lab, completed and logged the following investigation points at the Big Sky Linen area:

•BSL-MIP-8: refusal (bed rock) at 29.5 feet below the ground surface; impacts noted in the 18.5-19.5 feet interval.
•BSL-MIP-7: refusal at 27.2 feet; possible large impacts 16-17 feet interval.
•BSL-MIP-10: refusal at 30.2 feet; slight impacts in the 10.5-11.5 feet interval.
•BSL-MIP-6 (location moved NE): refusal at 30.3 feet; slight impacts just above the bed rock.
•BSL-MIP-T15: refusal at 28.4 feet; heavy impacts between 4-14 feet interval.

Deviation from approved plans:

Work conducted in accordance with approved plans?

Photo Date:	11/28/2017
Direction:	West
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	View towards BSL-MIP-6.

Photo Date:	11/28/2017
Direction:	South
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Samples and core at CAL-MIP-04.

Photo Date:	11/28/2017
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Core recovered from MIP-T03.

Photo Date:	11/28/2017
Direction:	Southwest
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Samples and core from CAL-MIP-02

Photo Date:	11/28/2017
Direction:	Southwest
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	FOC core and samples from CAL-MIP-02

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Wednesday, November 29, 2017		
Temperature	32-50 °F	**Work Day**	7
Weather	Partly Cloudy	**Work Start**	700
Wind	Moderate (11-25 mph)	**Work Stop**	1700

Onsite Personnel (name/company)	Role
Luke Darnell	Project Field Staff
Charles VanHeuvelen	Project Field Staff
Logan McLonth/Dakota Technologies	Project Field Staff
Geoff Hardaway/Dakota Technologies	Project Field Staff
Syris Trahan	Field Task Manager
Joel Riebli	Project Field Staff
Jake Scott	Project Field Staff
Charles Grensen/Dakota Technologies	Project Field Staff
Oray Tangen/ Dakota Technologies	Project Field Staff
Vince Domenico/ Alsco Consultant	Project Field Staff

Equipment Present Onsite	Count
Geoprobe 6610DT	1
MiHPT mobile lab van	1
GPS Surveying Equipment	1
ppbRae PID	2
Geoprobe 7720DT	1

Health and Safety Comments

Conduct H&S orientation for new staff on site.

Tailgate topic - traffic in parking lot and walk site to confirm utility clearance at each location.

Record of Samples Collected	Lab samples
Work Activities Conducted	Continuously log and sample locations at the Alsco site; •ALSCO-GW-01; gw sample collected •ALSCO-GW-02; soil and gw sample collected •ALSCO-GW-05; gw sample collected •ALSCO-GW-04; soil and gw sample collected •Moved to Wetzel Cleaners site, setup and tagged refusal 3 x @ 9' bgs, WETZ-GW-01. Using a Geoprobe 6610DT and MiHPT mobile van lab, completed and logged the following investigation points at the Big Sky Linen area: •BSL-MIP-T17: refusal (bed rock) at 27.9 feet below the ground surface; impacts noted in the 14.5-18.5 feet interval. •BSL-MIP-T19: refusal at 30.0 feet; slight impacts at 12 feet. •BSL-MIP-T16: refusal at 27.4 feet; heavy impacts in the 10-16 feet interval. •BSL-MIP-3: refusal at 19.3 feet; slight impacts at 12 feet. •BSL-MIP-1: refusal at 28.4 feet; slight impacts between 18-19 feet interval. •BSL-MIP-T12: refusal at 30.3 feet; slight impacts between 14.5 feet interval.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

Photo Date:	11/29/2017
Direction:	Southwest
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Working at location BSL-MIP-3

Photo Date:	11/29/2017
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Core sample collected from ALSCO-GW-01.

Photo Date:	11/29/2017
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Core sample collected from ALSCO-MP-02.

Photo Date:	11/29/2017
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Core sample collected from ALSCO-GW-05.

Photo Date:	11/29/2017
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Core sample collected from ALSCO-GW-04

Photo Date:	11/29/2017
Direction:	Southeast
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Drill crew deconning rod.

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Thursday, November 30, 2017		
Temperature	32-50 °F	**Work Day**	8
Weather	Clear	**Work Start**	700
Wind	Light (1-10 mph)	**Work Stop**	1700

Onsite Personnel (name/company)	Role
Charles VanHeuvelen	Project Field Staff
Logan McLonth/Dakota Technologies	Project Field Staff
Geoff Hardaway/Dakota Technologies	Project Field Staff
Syris Trahan	Field Task Manager
Joel Riebli	Project Field Staff
Jake Scott	Project Field Staff
Charles Grensen/Dakota Technologies	Project Field Staff
Oray Tangen/ Dakota Technologies	Project Field Staff

Equipment Present Onsite	Count
Geoprobe 6610DT	1
MiHPT mobile lab van	1
GPS Surveying Equipment	1
ppbRae PID	2
Geoprobe 7720DT	1

Health and Safety Comments	Tailgate topic - work at Wetzel property must be 12' from aged comm line in the alley, utility clearance.
Record of Samples Collected	Lab samples
Work Activities Conducted	Work activities completed today;

•Drive and offset WETZ-GW-01 to 9' and 11' bgs tagging refusal.
•Core, drive WETZ-GW-02 to 9' bgs tagging refusal.
•Continuous log and gw sample and soil sample ALSCO-GW-03.
•Collect gw sample at 4C-GW-01.

•Collect gw sample at 4D-GW-01.

Using a Geoprobe 6610DT and MiHPT mobile van lab, completed and logged the following investigation points at the Big Sky Linen area:

•BSL-MIP-T14: refusal (bed rock) at 26.2 feet below the ground surface; impacts noted in the 2-16 feet interval.
•BSL-MIP-5: refusal at 24.7 feet; impacts at 5-16 feet.
•BSL-MIP-T13: refusal at 23.4 feet; impacts in the 9-19 feet interval.
•BSL-MIP-4: refusal at 23.9 feet; impacts at 16-18.5 feet.
•BSL-MIP-T11: refusal at 28.8 feet; no impacts noted.

Deviation from approved plans:

Work conducted in accordance with approved plans? Yes

Photo Date:	11/30/2017
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Core sample collected at WETZ-GW-02, refusal 9' bgs.

Photo Date:	11/30/2017
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Concrete coring WETZ-GW-02.

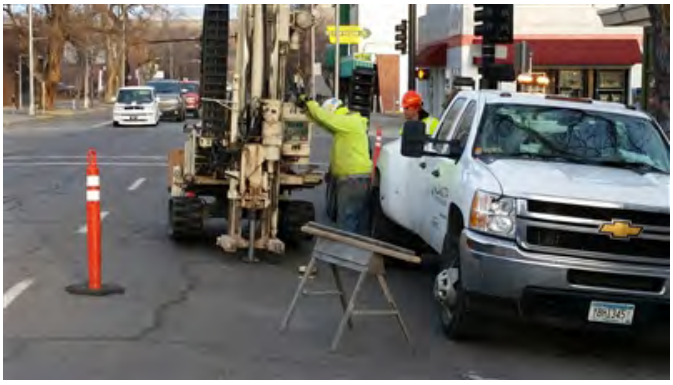


Photo Date:	11/30/2017
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Dakota driving WETZ-GW-01_offset, refusal 9'bgs.

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Friday, December 1, 2017		
Temperature	32-50 °F	**Work Day**	50
Weather	Clear	**Work Start**	34
Wind	Calm (<1 mph)	**Work Stop**	45

Onsite Personnel (name/company)	Role
Charles VanHeuvelen	Project Field Staff
Logan McLonth/Dakota Technologies	Project Field Staff
Geoff Hardaway/Dakota Technologies	Project Field Staff
Syris Trahan	Field Task Manager
Joel Riebli	Project Field Staff
Jake Scott	Project Field Staff
Charles Grensen/Dakota Technologies	Project Field Staff
Oray Tangen/ Dakota Technologies	Project Field Staff
Luke Darnell	Project Field Staff

Equipment Present Onsite	Count
Geoprobe 6610DT	1
MiHPT mobile lab van	1
GPS Surveying Equipment	1
ppbRae PID	2
Geoprobe 7720DT	1

Health and Safety Comments	Tailgate topic-how to avoid complacency, slow down approach and perform WSSA's prior to each task and location.
Record of Samples Collected	Lab samples
Work Activities Conducted	Trihydro performed drilling oversight and collected samples at the following

locations;

•HLS-GW-04, soil and gw sample
•HLS-GW-03, soil and gw sample
•5B-GW-01, gw sample
•6A-GW-01, gw sample
•5A-GW-01, gw sample

Using a Geoprobe 6610DT and MiHPT mobile van lab, completed and logged the following investigation points at the Big Sky Linen area:

•BSL-MIP-2: refusal (bed rock) at 30.3 feet below the ground surface; impacts noted in the 9-16 feet interval.
•BSL-MIP-T10: refusal at 30.1 feet; impacts at 8-16 feet.
•BSL-MIP-T20 (alleyway north of BSL-MIP-T16) : refusal at 31.0 feet; impacts in the 5-15 feet interval; possible hydrocarbon impacts at the 14-15 interval.
•BSL-MIP-T21 (alleyway northwest of BSL-MIP-10): refusal at 28.3 feet; minor impacts at 10-13 feet interval.

Deviation from approved plans:

Work conducted in accordance with approved plans?

Photo Date:	12/2/2017
Direction:	East
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Location BSL-MIP-2

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Saturday, December 2, 2017		
Temperature	32-50 °F	**Work Day**	10
Weather	Partly Cloudy	**Work Start**	700
Wind	Calm (<1 mph)	**Work Stop**	1700

Onsite Personnel (name/company)	Role
Charles VanHeuvelen	Project Field Staff
Logan McLonth/Dakota Technologies	Project Field Staff
Geoff Hardaway/Dakota Technologies	Project Field Staff
Syris Trahan	Field Task Manager
Joel Riebli	Project Field Staff
Jake Scott	Project Field Staff
Charles Grensen/Dakota Technologies	Project Field Staff
Oray Tangen/ Dakota Technologies	Project Field Staff
Luke Darnell	Project Field Staff

Equipment Present Onsite	Count
Geoprobe 6610DT	1
MiHPT mobile lab van	1
GPS Surveying Equipment	1
ppbRae PID	2
Geoprobe 7720DT	1

Health and Safety Comments	Tailgate topic - site and equipment safety while working, keep tools picked up and some neighborhoods require the truck to be locked.
Record of Samples Collected	Lab samples
Work Activities Conducted	Trihydro conducted oversight and sampled the following locations;

•HLS-GW-05; gw sample
•3B-GW-01; gw sample
•3E-GW-01; gw sample
•3A-GW-01; gw sample
•1A-GW-01; gw sample
•1B-GW-01; gw sample
•2A-GW-01; gw sample

Using a Geoprobe 6610DT and MiHPT mobile van lab, completed and logged the following investigation points at the REX Cleaners area:

•REX-MIP-9: refusal at 14 feet below the ground surface (attempted two locations both reaching 14 feet); impacts noted in the 6-10 feet interval.
•REX-MIP-T27: refusal at 25.6 feet; no notable impacts noted.
•REX-MIP-8: refusal at 26.3 feet; impacts in the 6-10 and 16-20 feet intervals; possible strong hydrocarbon impacts at the 16-20 interval.

The MiHPT crew wrapped up and de-mobed.

Deviation from approved plans:

Work conducted in accordance with approved plans? Yes

Photo Date:	12/3/2017
Direction:	East
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Dakota driving REX-MIP-8.

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Sunday, December 3, 2017		
Temperature	32-50 °F	**Work Day**	11
Weather	Overcast	**Work Start**	700
Wind	Calm (<1 mph)	**Work Stop**	1100

Onsite Personnel (name/company)	Role
Charles VanHeuvelen	Project Field Staff
Syris Trahan	Field Task Manager
Charles Grensen/Dakota Technologies	Project Field Staff
Oray Tangen/ Dakota Technologies	Project Field Staff

Equipment Present Onsite	Count
GPS Surveying Equipment	1
ppbRae PID	1
Geoprobe 7720DT	1

Health and Safety Comments	Tailgate topic - slow down approach, 3 stage decon.
Record of Samples Collected	Lab samples
Work Activities Conducted	Trihydro conducted oversight and collected samples at the following locations; •2A-GW-02; gw sample •BSL-MIP-01; soil and gw sample and an additional duplicate.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Monday, December 4, 2017		
Temperature	<32 °F	**Work Day**	12
Weather	Snow	**Work Start**	700
Wind	Calm (<1 mph)	**Work Stop**	1700

Onsite Personnel (name/company)	Role
Charles VanHeuvelen	Project Field Staff
Syris Trahan	Field Task Manager
Charles Grensen/Dakota Technologies	Project Field Staff
Oray Tangen/ Dakota Technologies	Project Field Staff
Luke Darnell	Project Field Staff

Equipment Present Onsite	Count
GPS Surveying Equipment	1
ppbRae PID	1
Geoprobe 7720DT	1

Health and Safety Comments	Tailgate topics - confirm all locates are in with the ground covered in snow. Mid-day focus - watch road conditions and be aware of ice/slick spots
Record of Samples Collected	Lab samples.
Work Activities Conducted	Trihydro conducted oversight and sampled the following locations;

•BSL-MIP-20; soil and gw sample
•3C-GW-01; gw sample
•4B-GW-02; gw sample
•4B-GW-01; gw sample
•1B-GW-02; gw sample
•1A-GW-02; gw sample

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

Photo Date:	12/5/2017
Direction:	North
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Core logged from BSL-MIP-20.

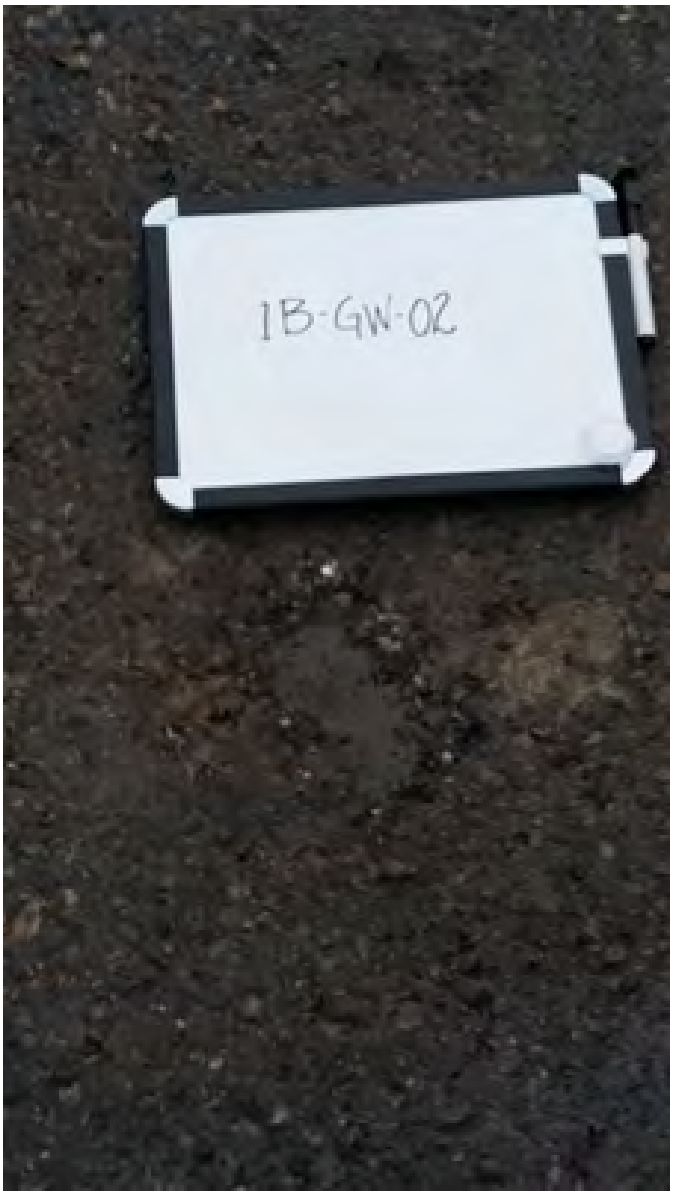


Photo Date:	12/5/2017
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Asphalt patch at 1B-GW-02

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Tuesday, December 5, 2017		
Temperature	32-50 °F	**Work Day**	13
Weather	Overcast	**Work Start**	700
Wind	Moderate (11-25 mph)	**Work Stop**	1700

Onsite Personnel (name/company)	Role
Charles VanHeuvelen	Project Field Staff
Syris Trahan	Field Task Manager
Charles Grensen/Dakota Technologies	Project Field Staff
Oray Tangen/ Dakota Technologies	Project Field Staff
Luke Darnell	Project Field Staff

Equipment Present Onsite	Count
GPS Surveying Equipment	1
ppbRae PID	1
Geoprobe 7720DT	1

Health and Safety Comments	Tailgate topic - working in high winds, watch for slamming car doors and blowing debris. Mid-day focus - traffic during end of school day.
Record of Samples Collected	Lab samples
Work Activities Conducted	Trihydro conducted oversight and collected groundwater samples at the following locations; •2B-GW-02 •2A-GW-03 •3D-GW-01 •3B-GW-02

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Wednesday, December 6, 2017		
Temperature	32-50 °F	**Work Day**	14
Weather	Partly Cloudy	**Work Start**	700
Wind	Moderate (11-25 mph)	**Work Stop**	1700

Onsite Personnel (name/company)	Role
Charles VanHeuvelen	Project Field Staff
Syris Trahan	Field Task Manager
Charles Grensen/Dakota Technologies	Project Field Staff
Oray Tangen/ Dakota Technologies	Project Field Staff
Luke Darnell	Project Field Staff

Equipment Present Onsite	Count
GPS Surveying Equipment	1
ppbRae PID	1
Geoprobe 7720DT	1

Health and Safety Comments	Tailgate topic - evacuation routes (upwind) and hospital route refresher.
Record of Samples Collected	Lab samples.
Work Activities Conducted	Trihydro conducted oversight and groundwater sampled the following direct push locations; •4D-GW-02 •4E-GW-02 •4E-GW-01 •4C-GW-03 •6C-GW-02

•6B-GW-02

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

Photo Date:	12/6/2017
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Cleared and patched borehole at 4E-GW-01

Photo Date:	12/6/2017
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Patched borehole at 6B-GW-02.

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Thursday, December 7, 2017		
Temperature	32-50 °F	**Work Day**	42
Weather	Clear	**Work Start**	39
Wind	Calm (<1 mph)	**Work Stop**	42

Onsite Personnel (name/company)	Role
Charles VanHeuvelen	Project Field Staff
Syris Trahan	Field Task Manager
Charles Grensen/Dakota Technologies	Project Field Staff
Oray Tangen/ Dakota Technologies	Project Field Staff
Luke Darnell	Project Field Staff

Equipment Present Onsite	Count
GPS Surveying Equipment	1
ppbRae PID	1
Geoprobe 7720DT	1

Health and Safety Comments	Tailgate topic - slow down approach and maintain focus for last day of DP work.
Record of Samples Collected	Lab samples.
Work Activities Conducted	Trihydro conducted oversight and collected groundwater samples at the following locations; •6C-GW-01 •3D-GW-02 •3E-GW-02

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

Photo Date:	12/7/2017
Direction:	Southwest
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Geoprobe 7720DT and Geopump set up at location 6C-GW-01.

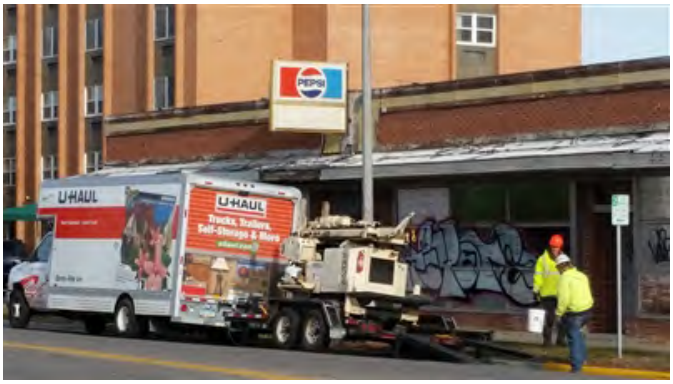


Photo Date:	12/7/2017
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Rental truck used by Dakota to complete last 3 direct push locations.

Photo Date:	12/7/2017
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Asphalt patch at location 6C-GW-01.

Photo Date:	12/11/2017
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	-108.51
Y Coordinate:	45.78388888
Location:	
Description:	Asphalt patch at location 3E-GW-02.

Photo Date:	12/11/2017
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	-108.51333333
Y Coordinate:	45.78277777
Location:	
Description:	Asphalt patch at location 3D-GW-02

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Monday, December 18, 2017		
Temperature	32-50 °F	**Work Day**	16
Weather	Overcast	**Work Start**	910
Wind	Light (1-10 mph)	**Work Stop**	1730

Onsite Personnel (name/company)	Role
Luke Darnell	Project Field Staff
Logan McLonth/ Dakota Technologies Co.	Project Field Staff
Joel Riebli	Project Field Staff
Mike Gipson / MDEQ	Project Manager

Equipment Present Onsite	Count
Geoprobe 6610DT direct push rig	1
GPS Surveying Equipment	1
ppbRae PID	1

Health and Safety Comments	Safety topic: double check all utility markings.
Record of Samples Collected	Groundwater PCE screen only laboratory samples.
Work Activities Conducted	Trihydro conducted oversight and collection groundwater samples at the following locations: •3C-GW-02 •2A-GW-04 •2A-GW-05 •5A-GW-02 Purge water was transported and placed in the IDW area.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

Photo Date:	12/18/2017
Direction:	West
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Purging groundwater at 2A-GW-04 from 22 ft bgs.

Photo Date:	12/18/2017
Direction:	East
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Purging groundwater at 2A-GW-05 from 22 ft bgs.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Tuesday, December 19, 2017		
Temperature	32-50 °F	**Work Day**	17
Weather	Overcast	**Work Start**	700
Wind	Light (1-10 mph)	**Work Stop**	1730

Onsite Personnel (name/company)	Role
Luke Darnell	Project Field Staff
Logan McLonth/ Dakota Technologies Co.	Project Field Staff
Joel Riebli	Project Field Staff
Mike Gipson / MDEQ	Project Manager
Mike Jenson/ Dakota Technologies Co.	Project Field Staff

Equipment Present Onsite	Count
Geoprobe 6610DT direct push rig	1
GPS Surveying Equipment	1
MiHPT mobile lab van	1

Health and Safety Comments

Tailgate safety topics: site security and stop work authority.

Record of Samples Collected

None collected today.

PCE screen samples collected on 12/18/2017 were dropped off at Pace Analytical.

Work Activities Conducted

Attempted to collect a groundwater sample at 6B-GW-01; however obstructions were encountered at 12' bgs. Possible brick debris observed on the drill rod tip.

Using the MiHTP unit, collected subsurface data at four REX property locations:

•REX-MIP-7: rods pushed to 15' bgs before reaching obstruction. Slight solvent detections in the 3-4 and 11 foot intervals. Possible

hydrocarbon detections 5-10 feet.

- REX-MIP-5 (location moved east because of utilities): rods pushed to 26.6 feet. Very slight detections at 7, 12, and 15 feet.
- REX-MIP-2: rods pushed to 29.5 feet. No detections noted.
- REX-MIP-4: rods pushed to 27 feet. Methane detected between 11-19 feet. No solvents noted.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

Photo Date:	12/19/2017
Direction:	Northeast
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Logging soils with the MiHTP at REX-MIP-5.

Photo Date:	12/20/2017
Direction:	North
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Pushing rods and logging soils at REX-MIP-2.

Photo Date:	12/19/2017
Direction:	Northeast
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Pushing rods and logging soils at REX-MIP-4.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Wednesday, December 20, 2017		
Temperature	<32 °F	**Work Day**	
Weather	Snow	**Work Start**	715
Wind	Light (1-10 mph)	**Work Stop**	1840

Onsite Personnel (name/company)	Role
Logan McLonth/ Dakota Technologies Co.	Project Field Staff
Joel Riebli	Project Field Staff
Mike Gipson / MDEQ	Project Manager
Mike Jenson/ Dakota Technologies Co.	Project Field Staff
Jake Scott	Project Field Staff

Equipment Present Onsite	Count
Geoprobe 6610DT direct push rig	1
GPS Surveying Equipment	1
MiHPT mobile lab van	1
ppbRae PID	1
Peristaltic pump	1

Health and Safety Comments	Tailgate safety meeting topics: snow and using WSSA at each new work area. With the snow falling in the afternoon, it may be very difficult to clear future work areas of utilities.
Record of Samples Collected	Collected two groundwater PCE screen only laboratory samples.
Work Activities Conducted	Went back to the 6B-GW-01 area, and attempted three more times to reach groundwater. A third attempt was successful. Collected a groundwater sample at 5C-GW-02 near the REX-MIP-3 location.

Using the MiHTP unit, collected subsurface data at three REX property locations:

- REX-MIP-3: rods pushed to 30.6 feet bgs. Hydrocarbon impacts between 4-27 feet with minor solvent also present in a few intervals.
- REX-MIP-1: rods pushed to 24.4 feet. Very slight solvent detections in the 4 and 12-14 foot intervals.
- REX-MIP-6: rods pushed to 27.6 feet. Very minor solvent detections at 6.5 and 11 foot intervals; hydrocarbon detections at 4 and 8-9 foot intervals.

Groundwater purge fluids were placed in the IDW area at the end of the day.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes

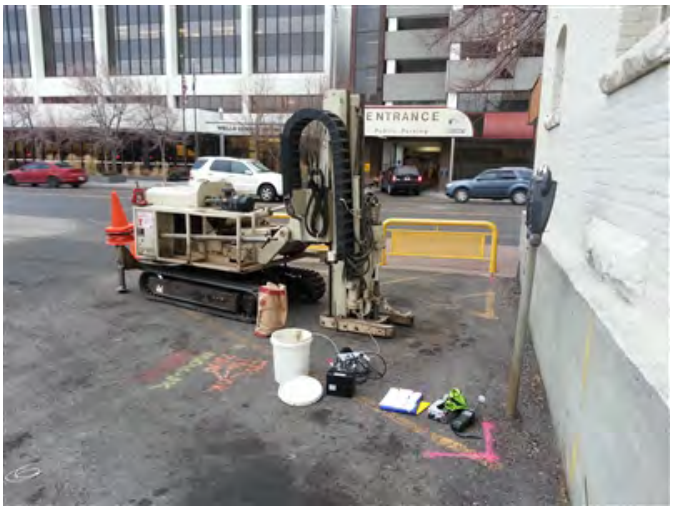


Photo Date:	12/20/2017
Direction:	East
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Purging groundwater from 22 feet at 6B-GW-01.

Photo Date:	12/20/2017
Direction:	Northeast
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Collecting MIP data at REX-MIP-3.

Photo Date:	12/20/2017
Direction:	Northeast
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Collecting MIP data at REX-MIP-1

Photo Date:	12/20/2017
Direction:	Southeast
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Collecting MIP data at REX-MIP-6.

Photo Date:	12/20/2017
Direction:	Northwest
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Purging groundwater from 5C-GW-02 (next to REX-MIP-3) from 22 feet bgs. A PCE screen water sample was collected.

	Name:	Company:	
Report Created By	Joel Riebli	Trihydro Corporation	
Date	Thursday, December 21, 2017		
Temperature	<32 °F	**Work Day**	
Weather	Clear	**Work Start**	715
Wind	Light (1-10 mph)	**Work Stop**	1700

Onsite Personnel (name/company)	Role
Logan McLonth/ Dakota Technologies Co.	Project Field Staff
Joel Riebli	Project Field Staff
Mike Gipson / MDEQ	Project Manager
Mike Jenson/ Dakota Technologies Co.	Project Field Staff
Jake Scott	Project Field Staff
Luke Darnell	Project Field Staff

Equipment Present Onsite	Count
Geoprobe 6610DT direct push rig	1
GPS Surveying Equipment	1
ppbRae PID	1

Health and Safety Comments	Tailgate safety meeting focused on wind chills 10-15 F, bad driving conditions, snow/ice work surfaces.
Record of Samples Collected	Collected soil samples from six intervals at REX-MIP-08; samples were dropped off at Pace Analytical at the end of the day. Yesterdays groundwater samples were also dropped off at Pace Analytical.
Work Activities Conducted	Using the Geoprobe 6610DT direct push drill rig attempted to log subsurface soils down to bedrock at REX-MIP-08. However due to drill rig issues soil could only be logged down to 25 feet bgs. Soil samples were collected from the 0-0.5', 1-2', 5-5.5', 9.5-10', 17-17.5', and 23-23.5' intervals. IDW soils and decon fluids were placed in the IDW area.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

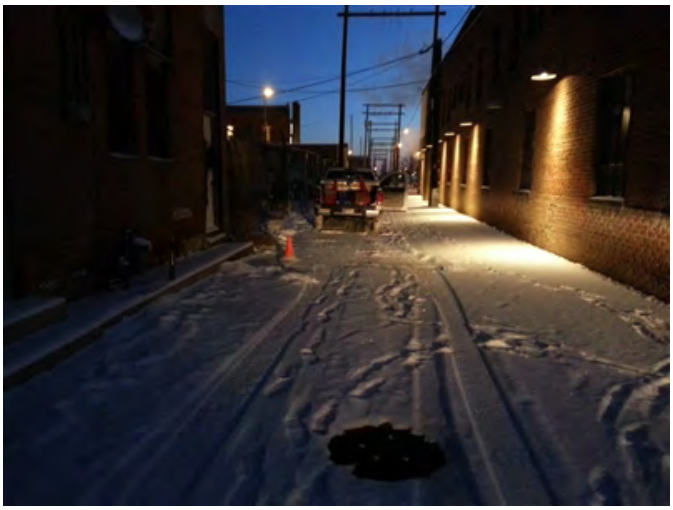


Photo Date:	12/21/2017
Direction:	East
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	The cone is the REX-MIP-08 location. Next to the Western Bar building eastern door.

Photo Date:	12/21/2017
Direction:	Unknown
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	REX-MIP-08 soil recovery from 5-25'; shallow soils on the left and deeper soils on the right. Missing the 0-5' soils in the photo. Soil samples were collected from 0-0.5', 1-2', 5-5.5', 9.5-10', 17-17.5', and 23-23.5' intervals. Higher hydrocarbon PID readings noted in the 17-18' interval.

Photo Date:	12/21/2017
Direction:	Northwest
Taken By:	Joel Riebli
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Asphalt cold patch at four borehole locations at REX-MIP-08 near the eastern door on the former Western Bar building.

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Sunday, February 4, 2018	
Temperature	<32 °F	**Work Day**
Weather	Rain	**Work Start**
Wind	Light (1-10 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Joel Riebli	Project Field Staff
Mitch Olson	Project Field Staff
Syris Trahan	Project Field Staff
Sarah Seitz	Field Task Manager
Charles VanHeuvelen	Project Field Staff

Health and Safety Comments	Freezing rain conditions delayed arrival of Mitch Olson's flight, which was sent back to Denver. Charles stopped in Hardin due to poor road conditions.
Record of Samples Collected	None.
Work Activities Conducted	Project Staff mobilized to Billings.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Monday, February 5, 2018	
Temperature	<32 °F	**Work Day**
Weather	Snow	**Work Start**
Wind	Light (1-10 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Joel Riebli	Project Field Staff
Mitch Olson	Project Field Staff
Syris Trahan	Project Field Staff
Sarah Seitz	Field Task Manager
Charles VanHeuvelen	Project Field Staff

Health and Safety Comments	
Record of Samples Collected	Indoor air samples collected at 308 Miles Avenue, 44 6th Street West, 1246 Central Avenue, 146 Terry, 317 Terry, and 237 Wyoming. Ambient Air samples collected upgradient of sample locations.
Work Activities Conducted	Charles VanHeuvelen completes mobilization. IME subcontractors mobilize and stage field equipment for well installation. Vapor Intrusion sampling conducted at various residential and commercial properties. Subslab sample ports installed at select properties. Pictures at each location are kept in project file.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Tuesday, February 6, 2018	
Temperature	<32 °F	**Work Day**
Weather	Snow	**Work Start**
Wind	Light (1-10 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Joel Riebli	Project Field Staff
Mitch Olson	Project Field Staff
Syris Trahan	Project Field Staff
Sarah Seitz	Field Task Manager
Charles VanHeuvelen	Project Field Staff
Cameron Brown	Project Field Staff

Health and Safety Comments	H&S onboarding for Inberg-Miller Engineers, familiarization with stop-work authority.
Record of Samples Collected	Vapor Intrusion samples collected at 308 Miles, 44 6th Street West, 1246 Central Avenue, 146 Terry, 317 Terry, and 237 Wyoming. Ambient Air samples collected upgradient of sample locations. Groundwater screening samples collected at 4D-GW-02 and 4B-GW-03
Work Activities Conducted	Cameron Brown mobilizes to Billings. Vapor Intrusion sampling conducted at various residential and commercial properties. Subslab sample ports installed at select properties. Pictures at each location are kept in project file. Locations 4D-GW-02 and 4B-GW-03 were sampled using hydroexcavation for the first five feet to facilitate safe sample collection.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Wednesday, February 7, 2018	
Temperature	<32 °F	**Work Day**
Weather	Snow	**Work Start**
Wind	Light (1-10 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Joel Riebli	Project Field Staff
Mitch Olson	Project Field Staff
Syris Trahan	Project Field Staff
Sarah Seitz	Field Task Manager
Charles VanHeuvelen	Project Field Staff
Cameron Brown	Project Field Staff

Health and Safety Comments	
Record of Samples Collected	Vapor intrusion samples collected at 518 Cook, 28 7th Street West, and 711 Central. Ambient air samples collected upgradient of sample locations. Collect groundwater screening samples at; 5D-GW-01 and 2C-GW-05.
Work Activities Conducted	Vapor Intrusion sampling conducted at various residential and commercial properties. Subslab sample ports installed at select properties. Pictures at each location are kept in project file. During groundwater screening sample collection, the temporary well screen did not open correctly, resulting in very turbid water in the groundwater samples.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Thursday, February 8, 2018	
Temperature	<32 °F	**Work Day**
Weather	Overcast	**Work Start**
Wind	Light (1-10 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Joel Riebli	Project Field Staff
Mitch Olson	Project Field Staff
Syris Trahan	Project Field Staff
Sarah Seitz	Field Task Manager
Charles VanHeuvelen	Project Field Staff
Cameron Brown	Project Field Staff

Health and Safety Comments	
Record of Samples Collected	Vapor Intrusion samples collected at 104 Custer Avenue, 1020 Cook Avenue, 28 7th Street West, 527 St. John's Avenue, 708 St. John's Avenue, and 708 1/2 St. John's Avenue. Ambient air samples collected upgradient of sample locations. Groundwater samples collected at 2C-GW-05, 2C-GW-04 and 2C-GW-01
Work Activities Conducted	Cameron Brown demobilizes to Sheridan, WY. Vapor Intrusion sampling conducted at various residential and commercial properties. Subslab sample ports installed at select properties. Pictures at each location are kept in project file. Sample location 2C-GW-05 was re-sampled to attempt to get a less turbid samples. Subzero temperatures resulted in water freezing at surface, difficulty sampling.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Friday, February 9, 2018	
Temperature	<32 °F	**Work Day**
Weather	Snow	**Work Start**
Wind	Light (1-10 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Joel Riebli	Project Field Staff
Mitch Olson	Project Field Staff
Syris Trahan	Project Field Staff
Sarah Seitz	Field Task Manager
Charles VanHeuvelen	Project Field Staff

Health and Safety Comments	
Record of Samples Collected	Vapor Intrusion samples collected at 104 Custer Avenue, 527 St. John's Avenue, 708 St. John's Avenue, 209 Miles Avenue, 319 Custer Avenue,and 117 Custer Avenue. Ambient air samples collected upgradient of sample locations.
Work Activities Conducted	Drilling conditions deteriorated due to heavy snowfall. Drilling discontinued due to unsafe drilling conditions. Charles VanHeuvelen demobilizes to CO. Drilling subcontractor demobilizes to WY. Vapor Intrusion sampling conducted at various residential and commercial properties. Subslab sample ports installed at select properties. Pictures at each location are kept in project file. Groundwater samples collected 2/8/18 froze in vehicle overnight. Drilling setup at 5D-GW-03, and advanced ~1'. Stop work due to severe temperatures, 1 degree F, light occasional wind, and (-11) windchill. Drilling team demobilized.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Saturday, February 10, 2018	
Temperature	<32 °F	**Work Day**
Weather	Overcast	**Work Start**
Wind	Light (1-10 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Joel Riebli	Project Field Staff
Mitch Olson	Project Field Staff
Syris Trahan	Project Field Staff
Sarah Seitz	Field Task Manager

Health and Safety Comments	
Record of Samples Collected	Vapor intrusion samples collected at 209 Miles Avenue, 319 Custer Avenue, and 117 Custer Avenue. Ambient air samples collected upgradient of sample locations.
Work Activities Conducted	Vapor Intrusion sampling conducted at various residential and commercial properties. Subslab sample ports installed at select properties. Pictures at each location are kept in project file. Joel Reibli demobilizes to Helena, MT. Photos stored in Project File.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Sunday, February 11, 2018	
Temperature	<32 °F	**Work Day**
Weather	Overcast	**Work Start**
Wind	Light (1-10 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Mitch Olson	Project Field Staff
Syris Trahan	Project Field Staff
Sarah Seitz	Field Task Manager

Health and Safety Comments	
Record of Samples Collected	Vapor intrusion samples collected at 1044 Cook. Ambient air samples collected upgradient of sample locations.
Work Activities Conducted	Vapor Intrusion sampling conducted at 1044 Cook (Washington Elementary). Pictures at each location are kept in project file

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Monday, February 12, 2018	
Temperature	<32 °F	**Work Day**
Weather	Clear	**Work Start**
Wind	Light (1-10 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Mitch Olson	Project Field Staff
Syris Trahan	Project Field Staff
Sarah Seitz	Field Task Manager

Health and Safety Comments	
Record of Samples Collected	Vapor intrusion samples collected at 1044 Cook Avenue, 820 Division Street, and 715 Central Avenue. Ambient air samples collected upgradient of sample locations.
Work Activities Conducted	Vapor Intrusion sampling conducted at various residential and commercial properties. Subslab sample ports installed at select properties. Pictures at each location are kept in project file.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Monday, February 26, 2018	
Temperature	<32 °F	**Work Day**
Weather	Partly Cloudy	**Work Start**
Wind	Light (1-10 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Joel Riebli	Project Field Staff
Brandt Schiche	Project Field Staff
Syris Trahan	Project Field Staff
Sarah Seitz	Field Task Manager
Jake Scott	Project Field Staff

Equipment Present Onsite	Count
ppbRae PID	1

Health and Safety Comments	Beginning project phase II - highlighted major safety concerns. Review drilling excavation checklist.
Record of Samples Collected	None.
Work Activities Conducted	Install subslab ports at 4011 2nd Avenue South, 4211 1st Avenue South, 201 S 37th Street, 312 N 33rd Street. Verify that subslab system is non-functional at 342 Miles. Photos are stored in project files.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	No

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Tuesday, February 27, 2018	
Temperature	<32 °F	**Work Day**
Weather	Clear	**Work Start**
Wind	Light (1-10 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Joel Riebli	Project Field Staff
Brandt Schiche	Project Field Staff
Syris Trahan	Project Field Staff
Sarah Seitz	Field Task Manager
Jake Scott	Project Field Staff

Equipment Present Onsite	Count
ppbRae PID	1

Health and Safety Comments	Driving in traffic with suboptimal road conditions. Drive slowly, don't rush to sample locations.
Record of Samples Collected	Samples collected at 1140 Lynn (indoor air and crawlspace), 323 Miles (indoor air and crawlspace), 11 Custer Ave (indoor air), 611 St. Johns (indoor air), and 4011 2nd Avenue South (indoor air).
Work Activities Conducted	VI samples collected. Subslab ports installed at 109 S 38th Street, and 19 S. Broadway. Photos are stored in project folder.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Wednesday, February 28, 2018	
Temperature	<32 °F	**Work Day**
Weather	Clear	**Work Start**
Wind	Light (1-10 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Joel Riebli	Project Field Staff
Brandt Schiche	Project Field Staff
Syris Trahan	Project Field Staff
Sarah Seitz	Field Task Manager
Jake Scott	Project Field Staff

Equipment Present Onsite	Count
ppbRae PID	1

Health and Safety Comments	Warming/cooling cycles result in melting/freezing ice and snow on sidewalks, driving surfaces and other thoroughfares. Use caution when transporting equipment to and from vehicles.
Record of Samples Collected	Vapor intrusion samples collected from 201 S. 37th Street (indoor air), 311 Howard Avenue (indoor air), 202 S. 38th Street (indoor air), 312 N 33rd Street (indoor air), 611 St. Johns Avenue (subslab), 11 Custer Avenue (subslab), 4011 2nd Avenue S. (subslab), 26 S. 24th Street (indoor air and subslab), and 4211 1st Avenue S. (indoor air).
Work Activities Conducted	Collect VI samples. Project photos are stored in the project folder.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	No.

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Thursday, March 1, 2018	
Temperature	<32 °F	**Work Day**
Weather	Overcast	**Work Start**
Wind	Calm (<1 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Joel Riebli	Project Field Staff
Brandt Schiche	Project Field Staff
Syris Trahan	Project Field Staff
Sarah Seitz	Field Task Manager
Jake Scott	Project Field Staff

Equipment Present Onsite	Count
ppbRae PID	1

Health and Safety Comments	Warming/cooling cycles result in melting/freezing ice and snow on sidewalks, driving surfaces and other thoroughfares. Use caution when transporting equipment to and from vehicles.
Record of Samples Collected	Vapor intrusion samples collected from 425 Howard Avenue (indoor air), 311 Howard Avenue (subslab), 202 S. 38th Street (subslab), 312 N 33rd Street (subslab), 125 Broadwater Avenue (Indoor Air), 201 S. 37th Street (subslab), 3 7th Street West (indoor Air), 342 Miles Avenue (Indoor Air), and 4211 1st Avenue South (re-collect incorrectly sampled subslab sample).
Work Activities Conducted	Collect VI samples. Project photos are stored in the project folder.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Friday, March 2, 2018	
Temperature	<32 °F	**Work Day**
Weather	Partly Cloudy	**Work Start**
Wind	Light (1-10 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Joel Riebli	Project Field Staff
Brandt Schiche	Project Field Staff
Syris Trahan	Project Field Staff
Sarah Seitz	Field Task Manager
Jake Scott	Project Field Staff

Equipment Present Onsite	Count
ppbRae PID	1

Health and Safety Comments	Snowfall makes driving conditions more difficult. Drive slowly between sampling locations.
Record of Samples Collected	Vapor intrusion samples collected from 3 7th Street W. (subslab), 109 S. 38th Street (indoor air), 522 Howard Avenue (indoor air), 19 S. Broadway (indoor and subslab air), and 342 Miles Avenue (subslab).
Work Activities Conducted	Collect VI samples. Subslab sample port installed at 120 S. 35th Street. Project photos are stored in the project folder. Joel Riebli, Sarah Seitz, and Jake Scott demobilize to Helena. Photos stored in project folder.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Saturday, March 3, 2018	
Temperature		**Work Day**
Weather	Overcast	**Work Start**
Wind	Light (1-10 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Brandt Schiche	Project Field Staff
Syris Trahan	Project Field Staff

Equipment Present Onsite	Count
ppbRae PID	1

Health and Safety Comments	Continued snowfall and icy conditions.
Record of Samples Collected	Vapor intrusion samples collected at 109 S. 38th Street (subslab), 408 Howard Avenue (indoor air), 120 S. 35th Street (indoor air), and 522 Howard Avenue (subslab).
Work Activities Conducted	Collect VI samples. Unable to sample 237 Custer Avenue due to accumulated ice and snow preventing access to the crawlspace. Photos stored in project folder.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Sunday, March 4, 2018	
Temperature	<32 °F	**Work Day**
Weather	Snow	**Work Start**
Wind	Moderate (11-25 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Brandt Schiche	Project Field Staff
Syris Trahan	Project Field Staff

Equipment Present Onsite	Count
ppbRae PID	1

Health and Safety Comments	Heavy snow and blowing conditions.
Record of Samples Collected	Vapor intrusion samples collected at 120 S. 35th Street (subslab) and 408 Howard Avenue (subslab).
Work Activities Conducted	Collect VI samples. Photos stored in project folder.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Monday, March 5, 2018	
Temperature		**Work Day**
Weather		**Work Start**
Wind		**Work Stop**

Onsite Personnel (name/company)	Role
Brandt Schiche	Project Field Staff
Syris Trahan	Project Field Staff

Equipment Present Onsite	Count
ppbRae PID	1

Health and Safety Comments	
Record of Samples Collected	Vapor intrusion samples collected at 1307 Concord Drive (indoor air), and 112 Wyoming Avenue (indoor air).
Work Activities Conducted	Collect VI Samples. Install subslab sample port at 202 9th Street West. Visit additional locations around Billings to identify possible replacement sampling locations. Identify sample locations at Riverstone Health Clinic. Photos stored in project folder.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Tuesday, March 6, 2018	
Temperature	<32 °F	**Work Day**
Weather	Clear	**Work Start**
Wind	Calm (<1 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Brandt Schiche	Project Field Staff
Syris Trahan	Project Field Staff
Luke Darnell	Project Field Staff

Equipment Present Onsite	Count
ppbRae PID	1

Health and Safety Comments	
Record of Samples Collected	Vapor intrusion samples collected at 202 9th Street West (indoor air), 112 Wyoming Avenue (subslab), and 120 Wyoming Avenue.
Work Activities Conducted	Vapor Intrusion sampling. Install subslab sample port at 632 St. Johns Avenue #6. Photos stored in project folder.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Wednesday, March 7, 2018	
Temperature		**Work Day**
Weather		**Work Start**
Wind		**Work Stop**

Onsite Personnel (name/company)	Role
Brandt Schiche	Project Field Staff
Syris Trahan	Project Field Staff

Equipment Present Onsite	Count
ppbRae PID	1

Health and Safety Comments	
Record of Samples Collected	Vapor intrusion samples collected at 202 9th Street West (subslab), 632 St. Johns Avenue #6 (indoor air), and 120 Wyoming Avenue (Subslab).
Work Activities Conducted	Vapor intrusion sampling. Install subslab sample port at 306 N. 30th Street. Photos are stored in project folder.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Thursday, March 8, 2018	
Temperature	<32 °F	**Work Day**
Weather	Clear	**Work Start**
Wind	Light (1-10 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Brandt Schiche	Project Field Staff
Syris Trahan	Project Field Staff
Luke Darnell	Project Field Staff

Equipment Present Onsite	Count
ppbRae PID	1

Health and Safety Comments	
Record of Samples Collected	Vapor Intrusion samples collected at 306 N. 30th Street (indoor air) and 632 St. Johns Avenue #6 (subslab).
Work Activities Conducted	Vapor intrusion sampling. Brandt Schiche and Syris Trahan demobilize. Photos stored in project folder.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Friday, March 9, 2018	
Temperature	<32 °F	**Work Day**
Weather	Overcast	**Work Start**
Wind	Light (1-10 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Luke Darnell	Project Field Staff

Equipment Present Onsite	Count
ppbRae PID	1

Health and Safety Comments	
Record of Samples Collected	Vapor intrusion sample collected at 306 N. 30th Street (subslab).
Work Activities Conducted	Vapor intrusion sample collected. Completion of phase II sampling activities.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Monday, March 19, 2018		
Temperature	32-50 °F	**Work Day**	40
Weather	Clear	**Work Start**	730
Wind	Calm (<1 mph)	**Work Stop**	1945

Onsite Personnel (name/company)	Role
Charles VanHeuvelen	Field Task Manager
Luke Darnell	Project Field Staff
Jose Pereda / IME	Project Field Staff
Duane Leary / IME	Project Field Staff

Equipment Present Onsite	Count
ppbRae PID	1
3/8" fluid level probe	1
Mobile B-57 HSA drill rig	1
Support truck and trailer	1

Health and Safety Comments	Tailgate topics discussed included a brief H &S re-fresher, hospital route, site orientation.
Record of Samples Collected	N/A
Work Activities Conducted	Trihydro logged wells and performed oversight for tasks completed by Inberg Miller Engineers; 1. Well installation, MW-103 2. Well installation, MW-100

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

Photo Date:	3/19/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Core logged from well MW-103.

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Tuesday, March 20, 2018		
Temperature	32-50 °F	**Work Day**	45
Weather	Clear	**Work Start**	730
Wind	Calm (<1 mph)	**Work Stop**	1900

Onsite Personnel (name/company)	Role
Charles VanHeuvelen	Field Task Manager
Luke Darnell	Project Field Staff
Jose Pereda / IME	Project Field Staff
Duane Leary / IME	Project Field Staff

Equipment Present Onsite	Count
ppbRae PID	1
3/8" fluid level probe	1
Mobile B-57 HSA drill rig	1
Support truck and trailer	1

Health and Safety Comments	Tailgate topics discussed; site security and locking up equipment due to thievery from IME truck and summa canister.
Record of Samples Collected	N/A
Work Activities Conducted	Trihydro performed well logging and drilling oversight with Imberg Miller Engineering at the following locations; 1. Well installation, MW-115 2. Well installation, MW-112

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

Photo Date:	3/20/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Drilling at MW-115.

Photo Date:	3/20/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Core logged at MW-115.

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Wednesday, March 21, 2018		
Temperature	32-50 °F	**Work Day**	50
Weather	Clear	**Work Start**	730
Wind	Calm (<1 mph)	**Work Stop**	1800

Onsite Personnel (name/company)	Role
Charles VanHeuvelen	Field Task Manager
Luke Darnell	Project Field Staff
Jose Pereda / IME	Project Field Staff
Duane Leary / IME	Project Field Staff

Equipment Present Onsite	Count
ppbRae PID	1
3/8" fluid level probe	1
Mobile B-57 HSA drill rig	1
Support truck and trailer	1

Health and Safety Comments	Tailgate topic discussed was slowdown approach and proper lifting (bags of concrete, sand and chips).
Record of Samples Collected	N/A
Work Activities Conducted	Trihydro performed oversight for well development and well surface completions at the following locations; 1. MW-115 2. MW-112 3. MW-103

4. MW-100

Deviation from approved plans:

Work conducted in accordance with approved plans?

Photo Date:	3/21/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Well completion at MW-112.

Photo Date:	3/21/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Well competion at MW-115

Photo Date:	3/21/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Well completion at MW-103.

Photo Date:	3/21/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Well completion at MW-103.

Photo Date:	3/21/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Well completion at MW-100.

Photo Date:	3/22/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Core logged from MW-104.

Photo Date:	3/22/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Sanding well at MW-125.

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Thursday, March 22, 2018		
Temperature	32-50 °F	**Work Day**	47
Weather	Clear	**Work Start**	730
Wind	Calm (<1 mph)	**Work Stop**	1615

Onsite Personnel (name/company)	Role
Charles VanHeuvelen	Field Task Manager
Luke Darnell	Project Field Staff
Jose Pereda / IME	Project Field Staff
Duane Leary / IME	Project Field Staff

Equipment Present Onsite	Count
ppbRae PID	1
3/8" fluid level probe	1
Mobile B-57 HSA drill rig	1
Support truck and trailer	1

Health and Safety Comments	Tailgate topic discussed - site access due to mud around Hospital Laundry site.
Record of Samples Collected	N/A
Work Activities Conducted	Trihydro performed drilling and well construction oversight at the following locations: 1. MW-125 2. MW-104

Deviation from approved plans:

Work conducted in accordance with approved plans?	No

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Friday, March 23, 2018		
Temperature	32-50 °F	**Work Day**	45
Weather	Partly Cloudy	**Work Start**	730
Wind	Calm (<1 mph)	**Work Stop**	1840

Onsite Personnel (name/company)	Role
Charles VanHeuvelen	Field Task Manager
Luke Darnell	Project Field Staff
Jose Pereda / IME	Project Field Staff
Duane Leary / IME	Project Field Staff

Equipment Present Onsite	Count
ppbRae PID	1
3/8" fluid level probe	1
Mobile B-57 HSA drill rig	1
Support truck and trailer	1

Health and Safety Comments	Tailgate topics discussed - WSSA's for every task due to tiredness of crew.
Record of Samples Collected	N/A
Work Activities Conducted	Trihydro performed drilling and well construction oversight at the following locations; 1. MW-113 2. MW-114 3. MW-116

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

Photo Date:	3/23/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Drilling at MW-113.

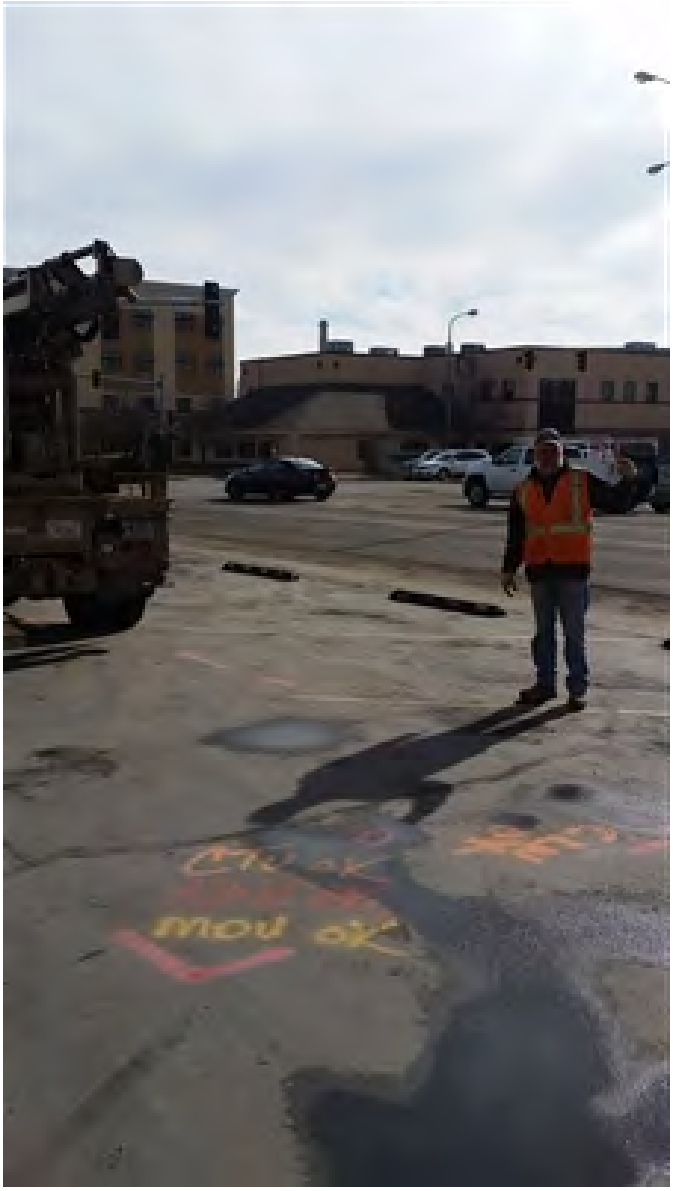


Photo Date:	3/23/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Use of spotter at MW-114.

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Saturday, March 24, 2018		
Temperature	32-50 °F	**Work Day**	46
Weather	Partly Cloudy	**Work Start**	815
Wind	Light (1-10 mph)	**Work Stop**	1640

Onsite Personnel (name/company)	Role
Charles VanHeuvelen	Field Task Manager
Jose Pereda / IME	Project Field Staff
Duane Leary / IME	Project Field Staff

Equipment Present Onsite	Count
ppbRae PID	1
3/8" fluid level probe	1
Mobile B-57 HSA drill rig	1
Support truck and trailer	1

Health and Safety Comments	Tailgate topic discussed - proper lifting for mixing cement bags.
Record of Samples Collected	N/A
Work Activities Conducted	Trihydro performed well completion and development oversight at the following locations; 1. MW-125 2. MW-104 3. MW-113

4. MW-114

5. MW-116

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

Photo Date:	3/24/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Well development at MW-125.

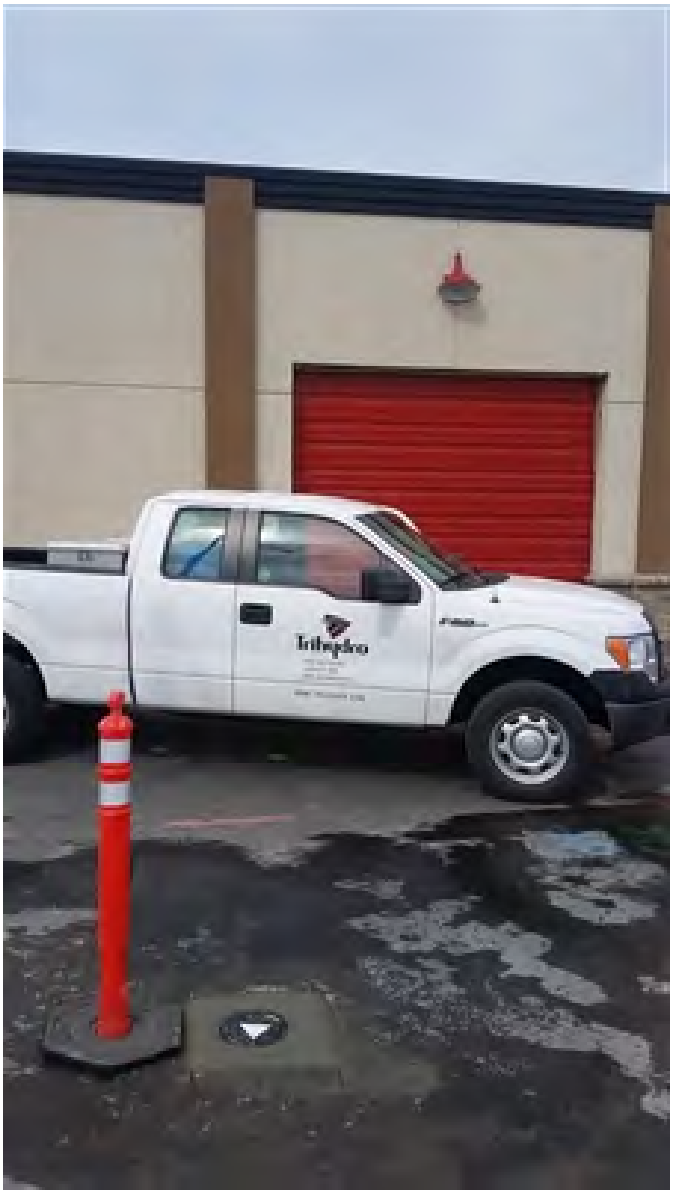


Photo Date:	3/24/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Well completion at MW-114.

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Sunday, March 25, 2018		
Temperature	32-50 °F	**Work Day**	43
Weather	Partly Cloudy	**Work Start**	815
Wind	Calm (<1 mph)	**Work Stop**	1420

Onsite Personnel (name/company)	Role
Charles VanHeuvelen	Field Task Manager
Jose Pereda / IME	Project Field Staff
Duane Leary / IME	Project Field Staff

Equipment Present Onsite	Count
ppbRae PID	1
3/8" fluid level probe	1
Mobile B-57 HSA drill rig	1
Support truck and trailer	1

Health and Safety Comments	Tailgate topic discussed - continued utility checklist diligence.
Record of Samples Collected	N/A
Work Activities Conducted	Trihydro performed well completion and drilling oversight at the following locations; 1. Well completion, MW-113 2. Drilling and well completion, MW-119

		Deviation from approved plans:
Work conducted in accordance	Yes	

Deviation from approved plans:

with approved plans?

Photo Date:	3/25/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Drilling at MW-119.

Photo Date:	3/25/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Well completion at MW-113.

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Monday, March 26, 2018		
Temperature	32-50 °F	**Work Day**	45
Weather	Partly Cloudy	**Work Start**	715
Wind	Light (1-10 mph)	**Work Stop**	1630

Onsite Personnel (name/company)	Role
Charles VanHeuvelen	Field Task Manager
Jose Pereda / IME	Project Field Staff
Duane Leary / IME	Project Field Staff
Luke Darnell	Project Field Staff
Wallace Coles	Project Field Staff
Mark Taggart / Earth Probe	Project Field Staff
Kenny Larson / Earth Probe	Project Field Staff

Equipment Present Onsite	Count
ppbRae PID	1
3/8" fluid level probe	1
Mobile B-57 HSA drill rig	1
Support truck and trailer	2
Geoprobe 7720DT	1
Peristaltic pump	1
Trimble GPS	

Health and Safety Comments	Tailgate topics discussed - site security due to breakout wrench stolen from rig and Earth Probe onboarding/HASP review.
Record of Samples Collected	Lab Samples
Work Activities Conducted	Trihydro performed drilling, well construction, and direct push sampling with the

following subcontractors at the locations below;

IME

1. MW-109, drill and well installation

2. MW-110, drill and well installation

Earth Probe

1. MW-101, drill and well installation

2. PCE screening at; 2C-GW-05, 2C-GW-04, 2C-GW-01

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

Photo Date:	3/26/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Well completion at REX that someone drove over.

Photo Date:	3/26/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Core logged at MW-109.

Photo Date:	3/26/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Drilling at MW-110.

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Tuesday, March 27, 2018		
Temperature	32-50 °F	**Work Day**	47
Weather	Partly Cloudy	**Work Start**	715
Wind	Light (1-10 mph)	**Work Stop**	1600

Onsite Personnel (name/company)	Role
Charles VanHeuvelen	Field Task Manager
Jose Pereda / IME	Project Field Staff
Duane Leary / IME	Project Field Staff
Luke Darnell	Project Field Staff
Wallace Coles	Project Field Staff
Mark Taggart / Earth Probe	Project Field Staff
Kenny Larson / Earth Probe	Project Field Staff

Equipment Present Onsite	Count
ppbRae PID	1
3/8" fluid level probe	1
Mobile B-57 HSA drill rig	1
Support truck and trailer	2
Geoprobe 7720DT	1
Peristaltic pump	1
Trimble GPS	

Health and Safety Comments	Tailgate topics discusssed - hand safety.
Record of Samples Collected	Lab Samples
Work Activities Conducted	Trihydro performed oversight during drilling, well installation, and DP groundwater

and soil sample collection at the following locations;

IME;

1. MW-108, drill and well installation
2. MW-102, drill and well installation

Earth Probe;

1. WETZ-GW-02
2. WETZ-GW-01
3. 5C-GW-01, PCE screen
4. 5D-GW-02, PCE screen
5. 2B-GW-04, PCE screen
6. 2B-GW-03, PCE screen

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

Photo Date:	3/27/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Setting up at MW-108.

Photo Date:	3/27/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Core logged at MW-108

Photo Date:	3/27/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Duane w/ IME decon augers at laydown area over portable decon station.

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Wednesday, March 28, 2018		
Temperature	32-50 °F	**Work Day**	47
Weather	Rain	**Work Start**	800
Wind	Light (1-10 mph)	**Work Stop**	1520

Onsite Personnel (name/company)	Role
Charles VanHeuvelen	Field Task Manager
Jose Pereda / IME	Project Field Staff
Duane Leary / IME	Project Field Staff
Luke Darnell	Project Field Staff
Wallace Coles	Project Field Staff
Mark Taggart / Earth Probe	Project Field Staff
Kenny Larson / Earth Probe	Project Field Staff

Equipment Present Onsite	Count
ppbRae PID	1
3/8" fluid level probe	1
Mobile B-57 HSA drill rig	1
Support truck and trailer	2
Geoprobe 7720DT	1
Peristaltic pump	1
Trimble GPS	1

Health and Safety Comments	Tailgate topic discussed; heavy lifting/ team lifts mixing concrete and loading and unloading the wheel barrow.
Record of Samples Collected	Lab samples
Work Activities Conducted	Trihydro performed oversight with the IME crew at the following locations;

1. MW-109, well development and concrete flush mount vault
2. MW-110, well development and concrete flush mount vault
3. MW-102, well development and concrete flush mount vault
4. MW-108, well development and concrete flush mount vault

HSA crew de-mob for 2 weeks.

Trihydro performed oversight with the Earth Probe crew at the following locations;

1. REX-MIP-03, soil sample
2. REX-MIP-07, soil sample
3. REX-MIP-04, soil sample
4. REX-MIP-08, soil sample
5. BSL-MIP-T18, soil sample

Deviation from approved plans:

Work conducted in accordance with approved plans? Yes

Photo Date:	3/28/2018
Direction:	Southwest
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Well development at MW-110.

Photo Date:	3/28/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Well completion at MW-108.

Photo Date:	3/28/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Well completion at MW-102.

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Monday, April 16, 2018		
Temperature	50-70 °F	**Work Day**	70
Weather	Clear	**Work Start**	730
Wind	Light (1-10 mph)	**Work Stop**	1945

Onsite Personnel (name/company)	Role
Charles VanHeuvelen	Field Task Manager
Jose Pereda / IME	Project Field Staff
Duane Leary / IME	Project Field Staff

Equipment Present Onsite	Count
ppbRae PID	1
Mobile B-57 HSA drill rig	1
Support truck and trailer	2
Grout plant	1

Health and Safety Comments	Tailgate topic discussed; site re-orientation and walk deep locations with crew.
Record of Samples Collected	N/A
Work Activities Conducted	Trihydro performed oversight of IME drilling 12" HSA borehole and setting conductor casing at MW-126.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

Photo Date:	4/16/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Drilling MW-127

Photo Date:	4/16/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Mixing cement grout to install conductor casing.

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Tuesday, April 17, 2018		
Temperature	50-70 °F	**Work Day**	52
Weather	Partly Cloudy	**Work Start**	730
Wind	Light (1-10 mph)	**Work Stop**	1500

Onsite Personnel (name/company)	Role
Charles VanHeuvelen	Field Task Manager
Jose Pereda / IME	Project Field Staff
Duane Leary / IME	Project Field Staff

Equipment Present Onsite	Count
ppbRae PID	1
Mobile B-57 HSA drill rig	1
Support truck and trailer	2
Grout plant	1

Health and Safety Comments	Tailgate topic discussed; proper lifting large (12") augers - team lift.
Record of Samples Collected	N/A
Work Activities Conducted	Trihydro performed oversight of IME beginning to drill MW-127. Drive head nut sheared and required re-welding repairs.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

Photo Date:	4/17/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Equipment setup to drill at BSL, MW-127.

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Wednesday, April 18, 2018		
Temperature	50-70 °F	**Work Day**	56
Weather	Partly Cloudy	**Work Start**	730
Wind	Light (1-10 mph)	**Work Stop**	1600

Onsite Personnel (name/company)	Role
Charles VanHeuvelen	Field Task Manager
Jose Pereda / IME	Project Field Staff
Duane Leary / IME	Project Field Staff

Equipment Present Onsite	Count
ppbRae PID	1
Mobile B-57 HSA drill rig	1
Support truck and trailer	2
Grout plant	1

Health and Safety Comments	Tailgate topic discussed; air compressor connections, the use of whiplocks and pins.
Record of Samples Collected	N/A
Work Activities Conducted	Trihydro performed oversight of IME completing drilling and installing conductor at MW-127.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Thursday, April 19, 2018		
Temperature	50-70 °F	**Work Day**	62
Weather	Clear	**Work Start**	730
Wind	Light (1-10 mph)	**Work Stop**	1700

Onsite Personnel (name/company)	Role
Charles VanHeuvelen	Field Task Manager
Jose Pereda / IME	Project Field Staff
Duane Leary / IME	Project Field Staff

Equipment Present Onsite	Count
ppbRae PID	1
Mobile B-57 HSA drill rig	1
Support truck and trailer	2
Grout plant	1

Health and Safety Comments	Tailgate topic discussed; railyard safety
Record of Samples Collected	N/A
Work Activities Conducted	Trihydro performed oversight and logged core while IME drilled and installed; •MW-105 •MW-106

	Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes

Photo Date:	4/19/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Setting up to drill MW-105.

Photo Date:	4/19/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Core logged at MW-105.

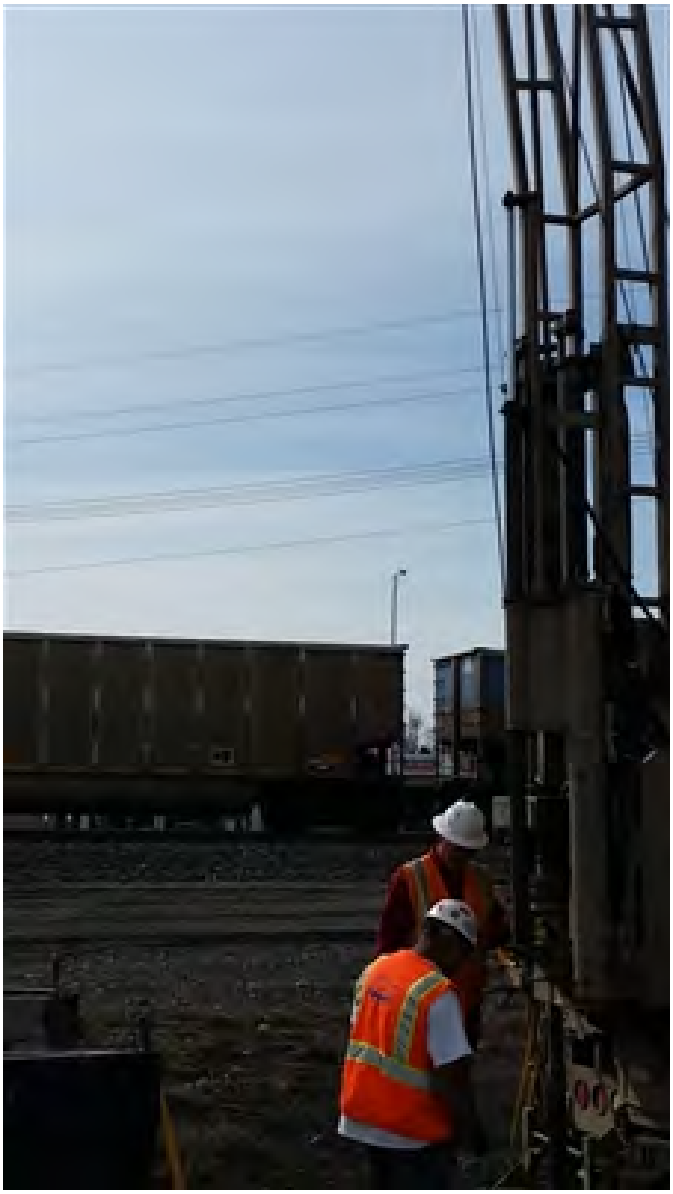


Photo Date:	4/19/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Drilling MW-105.

Photo Date:	4/19/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Core logged at MW-106.

Photo Date:	4/19/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Completion at MW-106.

Photo Date:	4/19/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Completion at MW-105.

	Name:	Company:	
Report Created By	Charles VanHeuvelen	Trihydro Corporation	
Date	Friday, April 20, 2018		
Temperature	50-70 °F	**Work Day**	64
Weather	Partly Cloudy	**Work Start**	730
Wind	Light (1-10 mph)	**Work Stop**	1600

Onsite Personnel (name/company)	Role
Charles VanHeuvelen	Field Task Manager
Jose Pereda / IME	Project Field Staff
Duane Leary / IME	Project Field Staff
Luke Darnell	Project Field Staff

Equipment Present Onsite	Count
ppbRae PID	1
Mobile B-57 HSA drill rig	1
Support truck and trailer	2
Grout plant	1

Health and Safety Comments	Tailgate topic discussed; slow down approach, check all air connections.
Record of Samples Collected	N/A
Work Activities Conducted	Trihydro logged core and performed oversight while IME drilled and installed MW-126.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

Photo Date:	4/20/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Setting up at MW-126.

Photo Date:	4/20/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Tricone bit from MW-126.

Photo Date:	4/20/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	3 core runs logged from MW-126.

Photo Date:	4/20/2018
Direction:	Unknown
Taken By:	Charles VanHeuvelen
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Completion at MW-126.

	Name:	Company:	
Report Created By	Sarah Seitz	Trihydro Corporation	
Date	Tuesday, April 24, 2018		
Temperature	50-70 °F	**Work Day**	65
Weather	Clear	**Work Start**	730
Wind	Calm (<1 mph)	**Work Stop**	1715

Onsite Personnel (name/company)	Role
Sarah Seitz	Project Technical Oversight
Vicki Bierwirth	Field Task Manager
Jose Pereda / IME	Driller
Duane Leary / IME	Driller

Equipment Present Onsite	Count
Oil/water interface probe	1
ppbRae PID	1
Mobile B-57 HSA drill rig	1
Support truck and trailer	1
Sullair 900 Compressor and Truck	1

Health and Safety Comments	8:00 TSM - Unexpected conditions was specific topic and how to deal with those as they occur in the field in a safe manner. We also discussed route to hospital and general site conditions since Vicki is new to site.
Record of Samples Collected	No samples collected - drilling and coordination activities only.
Work Activities Conducted	8:15 Drill equipment Mob to MW-117 S Seitz talked with Carey in Big Sky Linen to let her know finishing today and starting sampling of wells again May 7th. Set auger around 6” casing in well - 5’ auger. Outer 6” casing at about 30’ bgs -

Charles log says 30.4'. Water in casing - pump out about 15-18 gallons.

9:30 Set up compressor assembly. Started drilling 30-35'.

10:00 No recovery 30-35' bgs. Gray dust in barrel - does not appear wet. Set up drill 35-40' bgs.

10:30 Partial recovery silt and primarily shale (gray) for 35-40' bgs. Dry, so going another 5'.

11:00 Partial recovery of shale from 40-45' bgs - more competent at top half of recovery and more fractured or easily fractured below. Dry. PID reads 0 ppb.

11:30 setting well at 45' bgs - stainless steel screen 5'. Another 10' ss casing above - plan to have about 10-ft of sand pack, and seal to surface above.

12:30 - Sarah off to check potential well/source areas near installed well MW-115 on NE edge of plume. Looked at Midland machine, Former Flippins, and Former Pacific Hide and Steel.

Remarked Clocktower well area so Jose can call in for power/gas.

1-3 Vicki with Inberg Miller - oversight install MW-127 at Big Sky Linen (715 Central).

2:00 - Sarah to Sysco - meet with Chuck Kelly and Cliff (maintenance). Found four wells associated with UST SVE system. Sarah will come back tomorrow to gauge. Found one possible well north on Sysco/City ROW that is potentially able to be PCE screened.

Stopped by Ponderosa Acres - talked with Jenna in management. She allowed me to walk site and look for wells. Found about 5 with help of Jose - maintenance manager. They agreed to PCE screen tomorrow. Will coordinate with Jose (406-671-4080).

3:30 - Checked marks at corner Broadway and 2nd Ave S at Meadowgold area. Remarked.

3:45 - stopped by 4017 1/2 1st Ave South - potential new well to install at Hudson Hagstrom property along back of fence toward railroad property. Talked with Hagstrom on phone and took pictures.

4:15 Sarah back to work on plan at Solar. Vicki and Inberg Miller finish MW-127. Check MW-126 (bedrock well NE 711 Central) - only 2” water in well. No development.

5:15 Vicki and drillers demob for day.

Note: Photos included for MW-127 installation. Additional photos of potential monitoring well locations in field file.

Deviation from approved plans:

Work conducted in accordance with approved plans? Yes

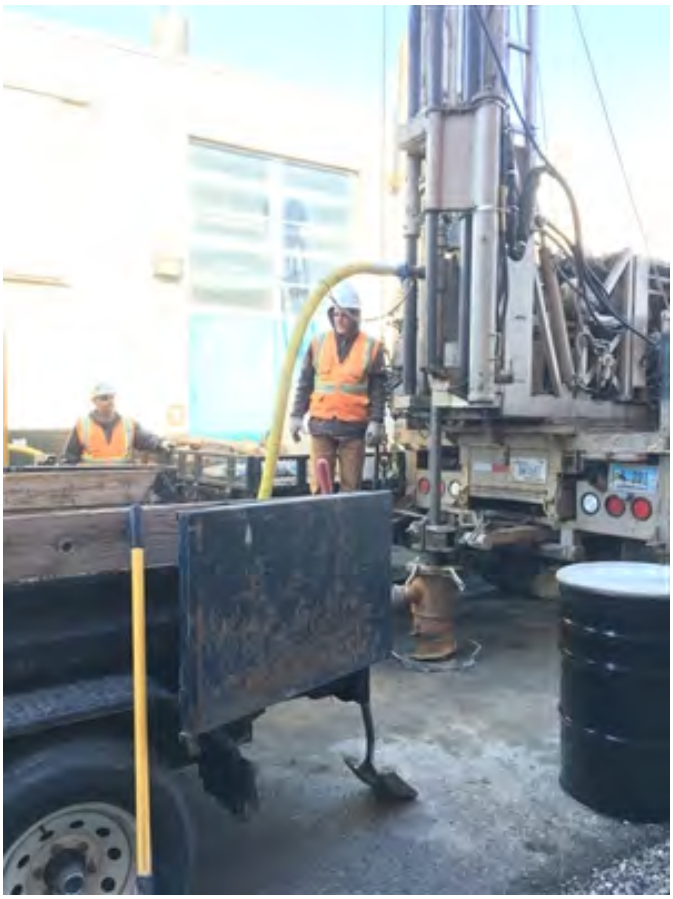


Photo Date:	4/24/2018
Direction:	Northwest
Taken By:	Sarah Seitz
X Coordinate:	-108.53388888
Y Coordinate:	45.77
Location:	
Description:	Drilling MW-127 between Big Sky Linen and 711 Central in alley.

Photo Date:	4/24/2018
Direction:	Northwest
Taken By:	Sarah Seitz
X Coordinate:	-108.53388888
Y Coordinate:	45.77
Location:	
Description:	MW-127 drilling activities - dust from exhaust of bedrock compressed air

Photo Date:	4/24/2018
Direction:	Unknown
Taken By:	Sarah Seitz
X Coordinate:	0
Y Coordinate:	0
Location:	
Description:	Recovery from MW-127 core from 35 to 40 feet bgs

Photo Date:	4/24/2018
Direction:	Unknown
Taken By:	Sarah Seitz
X Coordinate:	-108.53083333
Y Coordinate:	45.76555555
Location:	
Description:	Recovery from MW-127 installation - 40 to 45 ft bgs

	Name:	Company:	
Report Created By	Vicki Bierwirth	Trihydro Corporation	
Date	Wednesday, April 25, 2018		
Temperature	50-70 °F	**Work Day**	
Weather	Partly Cloudy	**Work Start**	730
Wind	Light (1-10 mph)	**Work Stop**	1800

Onsite Personnel (name/company)	Role
Sarah Seitz	Project Technical Oversight
Vicki Bierwirth	Field Task Manager
Jose Pereda / IME	Driller
Duane Leary / IME	Driller
Luke Darnell	Project Field Staff

Equipment Present Onsite	Count
Oil/water interface probe	1
ppbRae PID	1
Mobile B-57 HSA drill rig	1
Support truck and trailer	1
Sullair 900 Compressor and Truck	1
Peristaltic pump/Tubing/Battery	1

Health and Safety Comments	Conduct TSM - Safety moment- Be sure to use the right tools for the job. If a straight slot screwdriver is needed and we only have a quarter to fit the slot, let's stop work and get the tool to make the work more efficient.
Record of Samples Collected	PAI-EAST samples for VOCs 8260 PCE Screen at 14:25. PAI-WEST samples for VOCs 8260 PCE Screen at 14:00
Work Activities Conducted	0730 Vicki Bierwirth (VB) met with Inberg Miller (drillers). Conduct TSM. Using right tools on the job.

0750 Sarah Seitz (SS) on-site. Go over TSM.

0800 Drillers, SS and VB mobilize to MW-123. Not comfortable with utilities underground and overhead. Will wait for more information on where previous location was.

0815 Drillers, SS, and VB mobilize to MW-122 and set up for drilling

8:30 S. Seitz to Sysco to check all wells and potentially open. Diagram of well and potential SVE systems. Able to open one well - do not have right tools for the job for larger potential SVE wells.

S. Seitz back to Solar. Check for tools and take Business Unit/meeting call.

0955 Drillers and VB finish drilling MW122. Begin preparations to set well.

1045 SS on drilling site to check on drilling and SS participates in Billings PCE weekly meeting. Drillers and VB cleanup work area

1100 SS offsite to fix water level recorder. Check locates and coordinate with Charles and Luke.

1120 Drillers and VB mobilize to MW-121

1130 Drillers and VB set up over MW-121

1150 Begin drilling. SS on-site

1210 SS departs drilling site for Solar for more equipment and to try to fix water level recorder again.

1300 SS picks up Luke Darenell (LD) and check locates/well locations

1306 Drillers set the well

13:30 SS and LD start sampling PCE screening for Ponderosa Acres at 1301 Industrial Ave., Billings, MT. Sample western most well near fence prior to Tire

Rama location - PAI-WEST at 14:00. Sample eastern most well closer to Plainview Ave - PAI-EAST at 14:25. Deliver samples to Pace lab in Billings. Samples for VOCs 8260 PCE Screen only.

SS and LD check additional potential alluvial well/investigation locations along Minnesota near former Pacific Hide and Fur and along S 25th St. Mark potential locations to discuss internally.

1400 Drillers and VB mobilize to drum staging area to dispose of well refuse and decon equipment

1516 VB mob to Solar to retrieve water level meter. SS and LD Check in at Solar with Vicki. Drop Luke. Pack up at Solar, field paperwork, and SS is out of town by around 18:00.

1545 VB return to staging area. Drillers and VB mob to MW-105

1600 Arrive at MW-105 GW at approx 11.9 bgs. and begin development of MW-105. Approximately 50 gallons of groundwater was purged

1655 VB and drillers mobilize to MW-106

1710 VB and drillers arrive at MW-106. GW at approx 12.3 bgs. Begin development of MW-106. Approximately 35 gallons removed

1800 VB and drillers depart field. E.O.D.

Deviation from approved plans:

Work conducted in accordance with approved plans? Yes

Photo Date:	4/25/2018
Direction:	Northeast
Taken By:	Vicki Bierwirth
X Coordinate:	-108.53055555
Y Coordinate:	45.77194444
Location:	
Description:	MW-122 installation

Photo Date:	4/25/2018
Direction:	South
Taken By:	Vicki Bierwirth
X Coordinate:	-108.52694444
Y Coordinate:	45.77388888
Location:	
Description:	MW-121 installation

Photo Date:	4/25/2018
Direction:	Unknown
Taken By:	Vicki Bierwirth
X Coordinate:	-108.52611111
Y Coordinate:	45.77027777
Location:	
Description:	MW-105 well development

Photo Date:	4/25/2018
Direction:	South
Taken By:	Vicki Bierwirth
X Coordinate:	-108.52805555
Y Coordinate:	45.77
Location:	
Description:	MW-106 well development

Photo Date:	4/25/2018
Direction:	Unknown
Taken By:	Vicki Bierwirth
X Coordinate:	-108.55027777
Y Coordinate:	45.76638888
Location:	
Description:	PAI-WEST samples for VOCs 8260 PCE Screen at 14:00

Photo Date:	4/25/2018
Direction:	Unknown
Taken By:	Vicki Bierwirth
X Coordinate:	-108.54777777
Y Coordinate:	45.76694444
Location:	
Description:	PAI-EAST samples for VOCs 8260 PCE Screen at 14:25.

	Name:	Company:	
Report Created By	Vicki Bierwirth	Trihydro Corporation	
Date	Thursday, April 26, 2018		
Temperature	50-70 °F	**Work Day**	
Weather	Clear	**Work Start**	730
Wind	Calm (<1 mph)	**Work Stop**	1915

Onsite Personnel (name/company)	Role
Vicki Bierwirth	Field Task Manager
Jose Pereda / IME	Driller
Duane Leary / IME	Driller

Equipment Present Onsite	Count
Oil/water interface probe	1
ppbRae PID	1
Mobile B-57 HSA drill rig	1
Support truck and trailer	1
Transfer pump	1

Health and Safety Comments	Conduct TSM- Days are getting warmer, be aware of heat stress. Be sure to hydrate and take adequate breaks.
Record of Samples Collected	No samples collected
Work Activities Conducted	0730 Vicki Bierwirth (VB) met with IME (drillers) at drum staging area to conduct TSM 0750 Crew mobilizes to MW-123 location and set up 0820 Begin drilling MW-123. 1000 MW-123 in place. Begin to set well and remove tooling

1100 Mobilize to MW-120. Vehicle in the drilling area.

1115 VB mobilize to MW-107 and MW-111. No markups. VB talk with Charles Vanheulvin and Sarah Seitz about location for MW-107

1215 Mobilize to MW-118. Drillers collect concrete.

1315 VB decides drilling on weekday is not safe for MW-118. It would be better and safer to make 29th Street a one lane road while working there

1320 Mobilize to MW-123 to finish surface well completion.

1415 Mobilize to MW-121 begin surface completion

1500 GW @ approximately 10.5ft bgs begin well development of MW-121

1630 Purge complete. 28 gallons removed.

1645 Drillers complete surface activities at MW-121. VB mob to MW-122 to begin well development

1700 Begin purge of MW-122. GW@ 11.2ft bgs

1730 Purge complete. Begin surface completion of MW-122

1800 Mobilize to drum storage area. Driller unload drill cuttings and waste water. VB Check GW at MW-127. GW @ approx. 29 ft bgs

1815 VB mobilize to drum storage area to assist in unloading and decontamination.

1915 Drillers offsite and VB checks to see if MW-124 and MW-128 are cleared for utilities. Utilities are cleared. E.O.D.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

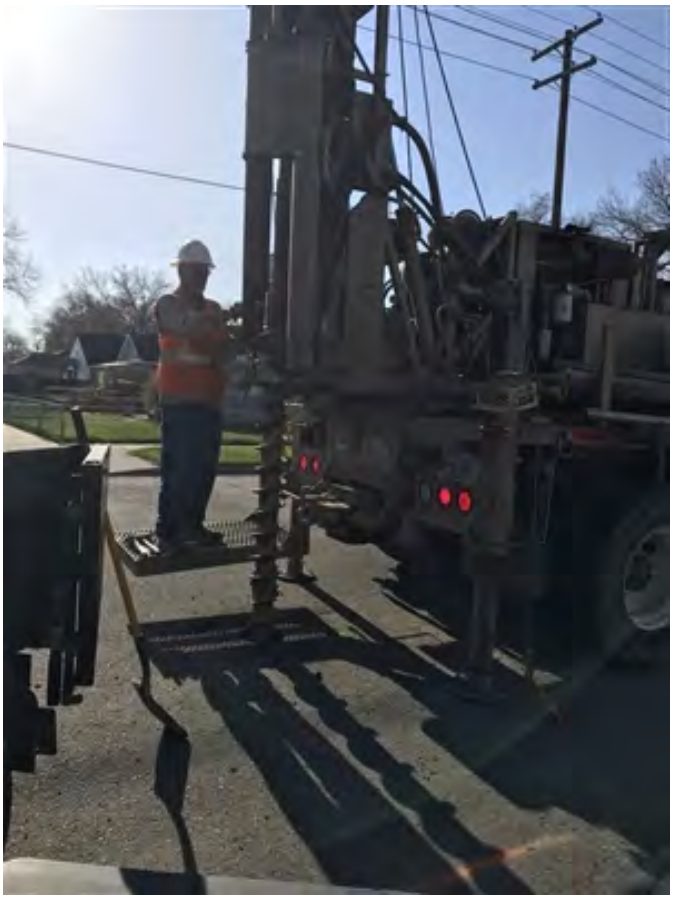


Photo Date:	4/26/2018
Direction:	East
Taken By:	Vicki Bierwirth
X Coordinate:	-108.53861111
Y Coordinate:	45.77388888
Location:	
Description:	MW-123 installation

Photo Date:	4/26/2018
Direction:	West
Taken By:	Vicki Bierwirth
X Coordinate:	-108.53833333
Y Coordinate:	45.77388888
Location:	
Description:	MW-123 surface completion

Photo Date:	4/26/2018
Direction:	West
Taken By:	Vicki Bierwirth
X Coordinate:	-108.52694444
Y Coordinate:	45.77416666
Location:	
Description:	MW-121 well development

Photo Date:	4/26/2018
Direction:	South
Taken By:	Vicki Bierwirth
X Coordinate:	-108.53083333
Y Coordinate:	45.77194444
Location:	
Description:	MW-122 surface completion

	Name:	Company:	
Report Created By	Vicki Bierwirth	Trihydro Corporation	
Date	Saturday, April 28, 2018		
Temperature	50-70 °F	**Work Day**	
Weather	Clear	**Work Start**	730
Wind	Light (1-10 mph)	**Work Stop**	1900

Onsite Personnel (name/company)	Role
Vicki Bierwirth	Field Task Manager
Jose Pereda / IME	Driller
Duane Leary / IME	Driller

Equipment Present Onsite	Count
Oil/water interface probe	1
ppbRae PID	1
Mobile B-57 HSA drill rig	1
Support truck and trailer	1
Transfer pump	1

Health and Safety Comments	TSM conducted with drillers. Topic was traffic and pedestrian safety around the workplace specifically because we will be working in downtown Billings, MT.
Record of Samples Collected	No samples collected
Work Activities Conducted	0730 Vicki Bierwirth (VB) headed to MW-120, MW-121 and MW-123 to collect safety cones. 0750 Arrive at MW-117 and speak with Brycen of Mountain West Holding Company. Drillers and VB will work at MW-118 to wait for guests of Best Western to vacate parking spaces at MW-117 0815 VB met with drillers at the containment area. TSM conducted. Topic was traffic

and pedestrian around the workplace. Crew mobilizes to MW –118

0850 Drilling begins at MW –118

1130 Well is set and auger tooling is removed. Begin surface completion activities

1210 VB make a phone call to Brycen to remove traffic cones and signage in 30-45 minutes.

1245 Complete MW-118 and mobilize to MW-117

1300 Set up over MW-117 and begin drilling

1600 Well is set and auger tooling is removed. Begin surface completion activities.

1730 Finished at MW-117. Mobilize to the drum containment area to decontaminate auger rods and unload drill cuttings.

1900 Field activities complete. Drillers and VB offsite. E.O.D.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

Photo Date:	4/28/2018
Direction:	Southwest
Taken By:	Vicki Bierwirth
X Coordinate:	-108.50916666
Y Coordinate:	45.78388888
Location:	
Description:	MW-118 installation

Photo Date:	4/28/2018
Direction:	South
Taken By:	Vicki Bierwirth
X Coordinate:	-108.50361111
Y Coordinate:	45.78361111
Location:	
Description:	MW-117 Installation

	Name:	Company:	
Report Created By	Vicki Bierwirth	Trihydro Corporation	
Date	Sunday, April 29, 2018		
Temperature	50-70 °F	**Work Day**	
Weather	Overcast	**Work Start**	800
Wind	Light (1-10 mph)	**Work Stop**	1700

Onsite Personnel (name/company)	Role
Vicki Bierwirth	Field Task Manager
Jose Pereda / IME	Driller
Duane Leary / IME	Driller

Equipment Present Onsite	Count
Oil/water interface probe	1
Support truck and trailer	1
Transfer pump	1
Submersible pump	1

Health and Safety Comments	TSM conducted. Topic was heavy lifting and proper lifting techniques.
Record of Samples Collected	No samples were collected.
Work Activities Conducted	0800 Vicki Bierwirth (VB) met with Inberg Miller Engineering, José and Duane, (Drillers) at the drum containment area. TSM conducted. Topic was heavy lifting 0830 Arrive at MW- 119. GW at 14.19 ft bgs. Begin development activities. 0945 Purge of MW- 119 complete. 25 gallons removed. Pack up equipment and mob to MW-118. 1000 Arrive at MW-118. GW at 15.53 ft bgs. Begin development activities. Well

recharges very slowly.

1245 Purge of MW-118 complete. 25 gallons removed. Pack up equipment and mob to drum containment area to pick up a drum and mob to MW-117.

1330 Arrive at MW-117. GW at 11.89 ft bgs. Begin development activities.

1520 Purge of MW-117 complete. Developed by bailer. 20 gallons removed. Pack up equipment and mob to MW-123.

1530 Arrive at MW-123. GW at 11.28ft bgs. Begin development activities.

1640 Purge of MW-123 complete. 30 gallons removed. Pack up equipment. Drillers depart the field. VB mob to MW-120 to set up cones for tomorrow's drilling activities

1700 VB finished with field activities. E.O.D.

	Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes

Photo Date:	4/29/2018
Direction:	West
Taken By:	Vicki Bierwirth
X Coordinate:	-108.50361111
Y Coordinate:	45.78361111
Location:	
Description:	MW-117 well development

Photo Date:	4/29/2018
Direction:	Unknown
Taken By:	Vicki Bierwirth
X Coordinate:	-108.53833333
Y Coordinate:	45.77388888
Location:	
Description:	MW-123 development

	Name:	Company:	
Report Created By	Vicki Bierwirth	Trihydro Corporation	
Date	Monday, April 30, 2018		
Temperature	32-50 °F	**Work Day**	
Weather	Rain	**Work Start**	715
Wind	Calm (<1 mph)	**Work Stop**	1715

Onsite Personnel (name/company)	Role
Vicki Bierwirth	Field Task Manager
Jose Pereda / IME	Driller
Duane Leary / IME	Driller

Equipment Present Onsite	Count
Oil/water interface probe	1
Support truck and trailer	1
Transfer pump	1
Submersible pump	1
Mobile B-57 HSA drill rig	1
Circular Saw	1

Health and Safety Comments	TSM conducted. Topic was inclement weather due to the rainy forecast for the next few days. We should all be observant for lightning and incoming weather patterns.
Record of Samples Collected	No samples collected.
Work Activities Conducted	0715 Vicki Bierwirth (VB) arrives at drum containment area. Inberg Miller Engineering (drillers) were unloading waste development water into drums. TSM conducted. Topic was inclement weather. Mobilize to MW-120 0800 Arrive at MW-120. Set up for drilling activities. 1030 Drilling complete. Auger tooling removed. Surface completions begin.

1100 Complete activities at MW-120. Mobilize to MW-128.

1130 Arrive at MW-128. Begin development. GW at 8.04 ft bgs.

1220 Purge complete. 30 gallons removed. Begin surface completion.

1300 Finish work at MW-128. Mobilize to MW-124. Begin development activities. GW at 8.85 ft bgs.

1350 Purge complete. 65 gallons removed.

1400 Drillers offsite to collect quickcrete.

1420 Drillers return to MW-124. Surface completion activities begin.

1510 Surface completions of MW-124 finished. Drillers offsite to collect flush mount well covers and additional drums for waste storage.

1620 Drillers return to drum containment area. Additional drums and well covers will be delivered tomorrow. VB and Duane Leary head to MW-127 to develop. José Pereda remains at drum containment area to unload drill cuttings.

1630 Purge of MW-127 begins. GW at 27.40ft bgs. Tubing to purge is short and cannot get the pump to the bottom of the well. The well will be revisited at a later date. GW at 38.55ft bgs. 2.5 gallons removed from the well. After waiting 10 mins, no recharge of GW. At 1653 the GW remains at 38.55 ft bgs.

1700 VB and Duane return to drum containment area to unload drill cuttings

1715 VB and drillers complete field activities. E.O.D.

Deviation from approved plans:

Work conducted in accordance with approved plans? Yes

Photo Date:	4/30/2018
Direction:	North
Taken By:	Vicki Bierwirth
X Coordinate:	-108.51666666
Y Coordinate:	45.77944444
Location:	
Description:	Installation of MW-120

Photo Date:	4/30/2018
Direction:	North
Taken By:	Vicki Bierwirth
X Coordinate:	-108.54611111
Y Coordinate:	45.77194444
Location:	
Description:	Surface completion of MW-124

Photo Date:	4/30/2018
Direction:	Southeast
Taken By:	Vicki Bierwirth
X Coordinate:	-108.53833333
Y Coordinate:	45.77194444
Location:	
Description:	Development of MW-128

	Name:	Company:	
Report Created By	Vicki Bierwirth	Trihydro Corporation	
Date	Tuesday, May 1, 2018		
Temperature	32-50 °F	**Work Day**	
Weather	Rain	**Work Start**	730
Wind	Light (1-10 mph)	**Work Stop**	1930

Onsite Personnel (name/company)	Role
Vicki Bierwirth	Field Task Manager
Jose Pereda / IME	Driller
Duane Leary / IME	Driller

Equipment Present Onsite	Count
Support truck and trailer	1
Transfer pump	1
Mobile B-57 HSA drill rig	1

Health and Safety Comments	TSM conducted- Topic was slips, trips, and falls. Make sure work area is clear of tools and be cautious of work area and slipping due to rain.
Record of Samples Collected	No samples collected.
Work Activities Conducted	0730 Vicki Bierwirth (VB) met with Inberg-Miller Engineering (drillers) at the drum containment area. TSM conducted. 0750 Cross Petroleum Service onsite to deliver twenty 55-gallon drums. 0800 Cross Petroleum Service offsite. VB and drillers mobilize to MW-107. 0815 Arrive at MW-107. Talk to Charles VanHeuvelen to obtain previous log. Receive the ok from Sarah Seitz to use the previous log and only sample 0-8' interval.

0900 Begin drilling activities at MW-107.

1030 Flowing sands caused complications in removing the auger rods and setting the well. Had to redrill twice to get the well set.

1245 MW-107 well is set. Begin to remove tooling.

1330 Finish at MW-107. Mobilize to MW-111. Set up and begin drilling.

1700 Well MW-111 is set. Auger rods are removed.

1730 Finish at MW-111. Mobilize to drum staging area to decontaminate equipment and unload drill cuttings and waste water.

1930 Disposal of drill cuttings and waste water complete. Crew is offsite. E.O.D.

Deviation from approved plans:

Work conducted in accordance with approved plans? Yes

Photo Date:	5/1/2018
Direction:	North
Taken By:	Vicki Bierwirth
X Coordinate:	-108.52277777
Y Coordinate:	45.76916666
Location:	
Description:	Install MW-107

Photo Date:	5/1/2018
Direction:	Northwest
Taken By:	Vicki Bierwirth
X Coordinate:	-108.50194444
Y Coordinate:	45.77861111
Location:	
Description:	Install MW-111

	Name:	Company:	
Report Created By	Vicki Bierwirth	Trihydro Corporation	
Date	Wednesday, May 2, 2018		
Temperature	50-70 °F	**Work Day**	
Weather	Partly Cloudy	**Work Start**	730
Wind	Light (1-10 mph)	**Work Stop**	1700

Onsite Personnel (name/company)	Role
Vicki Bierwirth	Field Task Manager
Jose Pereda / IME	Driller
Duane Leary / IME	Driller

Equipment Present Onsite	Count
Support truck and trailer	1
Transfer pump	1
Circular Saw	1
Oil/water interface probe	1
Submersible pump	1

Health and Safety Comments	TSM conducted- Topic was working smart and taking your time especially with today being last day of field work for the drillers.
Record of Samples Collected	No samples were collected.
Work Activities Conducted	0730 Vicki Bierwirth (VB) met with Inberg Miller Engineering (drillers) at drum containment area. TSM conducted. Mobilize to MW-120. 0750 Arrive at MW-120. Begin development activities. GW at 9.46 ft bgs. 0815 Purge complete. 40 gallons removed. Pack up equipment and mobilize to MW-107.

0830 Arrive at MW-107. Begin development activities. GW at 15.09 ft bgs.

0910 Purge complete. 50 gallons removed. Begin surface completion activities.

0930 Activities at MW-107 complete. Mobilize to MW-111.

0940 Arrive at MW-111. Begin development activities. GW at 13.40 ft bgs.

1050 Purge complete. 25 gallons removed. Begin surface completions activities.

1130 Surface completion activities finished. Pack up equipment and mobilize to drum containment area to dispose of waste water.

1145 Arrive at drum containment area. Dispose of waste water into drums and unload equipment and supplies.

1245 Work completed at the drum containment area. Drillers offsite. VB mobilize to Solar to retrieve peristaltic pump to develop MW-127.

1300 Return to MW-127 and begin development activities. GW at 37.95 ft bgs. Peristaltic pump unable to retrieve all water within well. VB mobilize to hardware store to retrieve tubing.

1500 GW at 40.80ft bgs. Begin to develop well with submersible pump. MW-127 was pumped dry. Begin to pack up equipment and materials.

1700 VB leave equipment and materials at drum containment area. E.O.D.

Deviation from approved plans:

Work conducted in accordance with approved plans? Yes

Photo Date:	5/2/2018
Direction:	Northwest
Taken By:	Vicki Bierwirth
X Coordinate:	-108.52277777
Y Coordinate:	45.76944444
Location:	
Description:	MW-107 completion

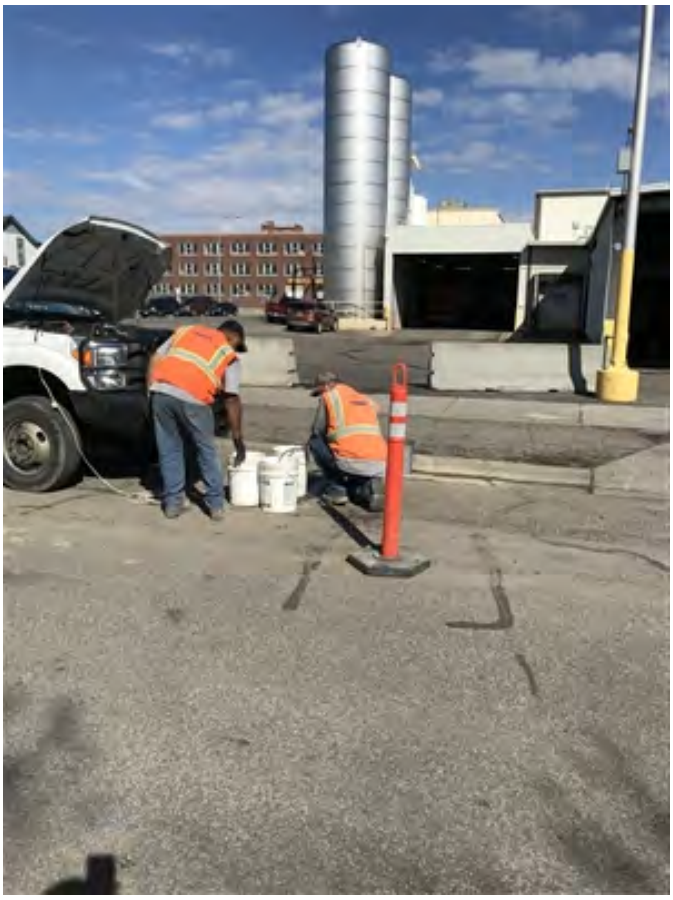


Photo Date:	5/2/2018
Direction:	North
Taken By:	Vicki Bierwirth
X Coordinate:	-108.50194444
Y Coordinate:	45.77888888
Location:	
Description:	MW-111 well development

Photo Date:	5/2/2018
Direction:	West
Taken By:	Vicki Bierwirth
X Coordinate:	-108.51694444
Y Coordinate:	45.77972222
Location:	
Description:	MW-120 well development

Photo Date:	5/2/2018
Direction:	North
Taken By:	Vicki Bierwirth
X Coordinate:	-108.53361111
Y Coordinate:	45.77
Location:	
Description:	MW-127 well development

	Name:	Company:	
Report Created By	Vicki Bierwirth	Trihydro Corporation	
Date	Thursday, May 3, 2018		
Temperature	50-70 °F	**Work Day**	
Weather	Partly Cloudy	**Work Start**	900
Wind	Light (1-10 mph)	**Work Stop**	1700

Onsite Personnel (name/company)	Role
Vicki Bierwirth	Field Task Manager

Equipment Present Onsite	Count
Oil/water interface probe	1
GPS Surveying Equipment	1

Health and Safety Comments	Perform work site self assessments at each monitoring well location.
Record of Samples Collected	No samples collected.
Work Activities Conducted	A series of activities were conducted at each installed well locations: (1) Conduct a Work Site Self Assessment. (2) Gather a GPS location of the well. (3) Label the well with the well name/number outside and inside the flush mount well cover. (4) Collect a Depth to Water. 0850 Arrive at MW-100. Site activities conducted. 0940 Arrive at MW-102. Site activities conducted. 1000 Arrive at MW-101. Site activities conducted. 1025 Arrive at MW-124. Site activities conducted. 1040 Arrive at MW-128. Site activities conducted.

1050 Arrive at MW-123. Site activities conducted.

1110 Arrive at MW-103. Site activities conducted.

1120 Arrive at MW-122. Site activities conducted.

1140 Arrive at MW-120. Site activities conducted.

1150 Arrive at MW-119. Site activities conducted.

1200 Arrive at MW-118. Site activities conducted.

1220 Arrive at MW-114. Site activities conducted.

1230 Arrive at MW-115. Site activities conducted.

1240 Arrive at MW-116. Site activities conducted.

1250 Arrive at MW-112. Site activities conducted.

1305 Arrive at MW-111. Site activities conducted.

1330 Arrive at MW-110. Site activities conducted.

1345 Arrive at MW-109. Site activities conducted.

1400 Arrive at MW-113. Site activities conducted.

1415 Arrive at MW-108. Site activities conducted.

1435 Arrive at MW-107. Site activities conducted.

1450 Arrive at MW-106. Site activities conducted.

1505 Arrive at MW-104. Site activities conducted.

1520 Arrive at MW-121. Site activities conducted.

1520 Arrive at MW-121. Site activities conducted.

1540 Arrive at MW-117. Site activities conducted.

1600 Arrive at MW-125. Site activities conducted.

1620 Arrive at MW-126. Site activities conducted.

1630 Arrive at MW-127. Site activities conducted.

1700 Arrive at drum containment area. Unload equipment. E.O.D.

Deviation from approved plans:

Work conducted in accordance with approved plans? Yes

Photo Date:	5/7/2018
Direction:	Unknown
Taken By:	Vicki Bierwirth
X Coordinate:	-108.5025
Y Coordinate:	45.77972222
Location:	
Description:	Identified MW-114

Photo Date:	5/7/2018
Direction:	Unknown
Taken By:	Vicki Bierwirth
X Coordinate:	-108.49777777
Y Coordinate:	45.77833333
Location:	
Description:	Marked MW-112 on well cap and DTW indicator mark on north side (on the right on the photo) of well

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Monday, May 7, 2018	
Temperature	70-85 °F	**Work Day**
Weather	Clear	**Work Start**
Wind	Light (1-10 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager
Brandt Schiche	Project Field Staff
Joel Riebli	Project Field Staff
Jake Scott	Project Field Staff
Ryan Miller	Project Field Staff
Brandon Wehrle	Project Field Staff

Equipment Present Onsite	Count
Oil/water interface probe	2
GPS Surveying Equipment	1
InSitu Groundwater Meter	4
QED Bladder Pump	2
Peristaltic pump/Tubing/Battery	2
3/8" fluid level probe	2

Health and Safety Comments	Thunder and lightning storm during day. SWA used. Site safety orientation for employees new to the site, or new to the task.
Record of Samples Collected	Groundwater samples collected at: BPGP48, BPGP29, BPGP25 (& MS/MSD), BPGP27, BPGP86, BPGP47, BPGP31, MW-120, MW-102, MW-124, EMW-03, MW-101, MW-100, BPGP41, FIELD BLANK, EQUIPMENT BLANK
Work Activities Conducted	Groundwater sampling.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Tuesday, May 8, 2018	
Temperature	70-85 °F	**Work Day**
Weather	Partly Cloudy	**Work Start**
Wind	Light (1-10 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager
Brandt Schiche	Project Field Staff
Joel Riebli	Project Field Staff
Jake Scott	Project Field Staff
Ryan Miller	Project Field Staff
Brandon Wehrle	Project Field Staff

Equipment Present Onsite	Count
Oil/water interface probe	2
GPS Surveying Equipment	1
InSitu Groundwater Meter	4
QED Bladder Pump	2
Peristaltic pump/Tubing/Battery	2
3/8" fluid level probe	2

Health and Safety Comments	High temperatures and heavy traffic areas.
Record of Samples Collected	BPGP15, BPGP85, BPGP92, BPGP17, BPGP22 (DUP), BPGP16, BPGP89, BPGP42, BPGP44, BNMW-9, MW-123, BNMW-21, BNMW-20, BNMW-8, BNMW-17, MW-106, MW-105, MW-116, BNMW-23, SD-I-02, SD-I-01, FIELD BLANK, EQUIPMENT BLANK,
Work Activities Conducted	Groundwater sampling. Sampling conducted on BNSF railyard. MW-105 appears to have been installed 1200 ft. NE of originally planned location.

have been installed 1200 ft. NE of originally planned location.

Deviation from approved plans:

Work conducted in accordance with approved plans?

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Wednesday, May 9, 2018	
Temperature	70-85 °F	**Work Day**
Weather	Clear	**Work Start**
Wind	Light (1-10 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager
Brandt Schiche	Project Field Staff
Joel Riebli	Project Field Staff
Jake Scott	Project Field Staff
Ryan Miller	Project Field Staff
Brandon Wehrle	Project Field Staff

Equipment Present Onsite	Count
Oil/water interface probe	2
GPS Surveying Equipment	1
InSitu Groundwater Meter	4
QED Bladder Pump	2
Peristaltic pump/Tubing/Battery	2
3/8" fluid level probe	2

Health and Safety Comments	Working in area with high transient population. High traffic areas as well.
Record of Samples Collected	
Work Activities Conducted	Groundwater sampling. BPGP05 has been destroyed due to excavation and replacement of the disabled access ramp. During sampling at MW-114, cold patches over direct push locations have shown signs of frost heaving.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Thursday, May 10, 2018	
Temperature	70-85 °F	**Work Day**
Weather	Partly Cloudy	**Work Start**
Wind	Light (1-10 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager
Brandt Schiche	Project Field Staff
Joel Riebli	Project Field Staff
Jake Scott	Project Field Staff
Ryan Miller	Project Field Staff
Brandon Wehrle	Project Field Staff

Equipment Present Onsite	Count
Oil/water interface probe	2
GPS Surveying Equipment	1
InSitu Groundwater Meter	4
QED Bladder Pump	2
Peristaltic pump/Tubing/Battery	2
3/8" fluid level probe	2

Health and Safety Comments	
Record of Samples Collected	BPGP65B, BPGP60, BPGP47, BPGP59, BPGP53, BPGP87, BPGP80, BPGP08, MW-121, BMW-1, EMW-18, MW-117, MW-118, MW-119, MW-108, MW-125, MW-104, MW-107, BMW-4 (ms/msd), BMW07-1, EMW-32, MW-111.
Work Activities Conducted	Groundwater sampling.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Friday, May 11, 2018	
Temperature	70-85 °F	**Work Day**
Weather	Partly Cloudy	**Work Start**
Wind	Light (1-10 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager
Brandt Schiche	Project Field Staff
Joel Riebli	Project Field Staff
Jake Scott	Project Field Staff

Equipment Present Onsite	Count
Oil/water interface probe	2
GPS Surveying Equipment	1
InSitu Groundwater Meter	4
QED Bladder Pump	2
Peristaltic pump/Tubing/Battery	2
3/8" fluid level probe	2

Health and Safety Comments	
Record of Samples Collected	BPGP63, BPGW-01, MW-103, SMW-12, EMW-08, BPGW-04, MW-122, PEP07, BPGP76, BPGP51B, BPGP46, BPGP74, BPGP51, BPGP46B, BPGP61 (ms/msd), BPGP78, BPGP02, BPGP49.
Work Activities Conducted	Ryan and Brandon Demobilize from Billings.

Deviation from approved plans:

Work conducted in accordance with approved plans?

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Saturday, May 12, 2018	
Temperature		**Work Day**
Weather		**Work Start**
Wind		**Work Stop**

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager
Brandt Schiche	Project Field Staff
Joel Riebli	Project Field Staff
Jake Scott	Project Field Staff

Equipment Present Onsite	Count
Oil/water interface probe	2
GPS Surveying Equipment	1
InSitu Groundwater Meter	4
QED Bladder Pump	2
Peristaltic pump/Tubing/Battery	2
3/8" fluid level probe	2

Health and Safety Comments	
Record of Samples Collected	BPGP65, MW-126.
Work Activities Conducted	Sampling concluded. Bedrock wells sampled as possible, however, low production resulted in both wells being mostly pumped dry. Sample collected from 126 only. Jake and Joel demobilize from Billings. Prep and return sampling equipment. Demob equipment from apartment.

Deviation from approved plans:

Work conducted in accordance with approved plans?

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Monday, May 21, 2018	
Temperature	70-85 °F	**Work Day**
Weather	Partly Cloudy	**Work Start**
Wind	Light (1-10 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager
Sarah Seitz	Project Field Staff

Equipment Present Onsite	Count
Oil/water interface probe	2
GPS Surveying Equipment	1
InSitu Groundwater Meter	2
QED Bladder Pump	2
Peristaltic pump/Tubing/Battery	1
3/8" fluid level probe	1

Health and Safety Comments	
Record of Samples Collected	REGAL-I-01, EMW-28, BPGP81, BPGP93, BPGP83, BPGP84, BPGP12, BPGP94, BPGP91, BPGP50 (DUP) and field QC samples (FB, EQ, TB)
Work Activities Conducted	Re-sample out of temp wells for VOCs. Develop two newly installed wells.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Tuesday, May 22, 2018	
Temperature		**Work Day**
Weather		**Work Start**
Wind		**Work Stop**

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager
Sarah Seitz	Project Field Staff

Equipment Present Onsite	Count
Oil/water interface probe	2
GPS Surveying Equipment	1
InSitu Groundwater Meter	2
QED Bladder Pump	2
Peristaltic pump/Tubing/Battery	1
3/8" fluid level probe	1

Health and Safety Comments	Rain and wind increase chances of slips, trips, and falls. Caution used when exiting and entering vehicles and working around wells.
Record of Samples Collected	MW-109, MW-110, MW-112, RH-MW-1, RH-MW-3, ZPMW-1, MW-115, MW-113, MW-114 (DUP), RH-MW-7, MW-128, SYS-EMW-3 and field QC samples (FB, EB, FD)
Work Activities Conducted	Resample out of temperature wells for VOCs only.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	Yes	

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Wednesday, May 23, 2018	
Temperature	50-70 °F	**Work Day**
Weather	Rain	**Work Start**
Wind	Strong (26 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager
Sarah Seitz	Project Field Staff

Equipment Present Onsite	Count
Oil/water interface probe	2
GPS Surveying Equipment	1
InSitu Groundwater Meter	2
QED Bladder Pump	2
Peristaltic pump/Tubing/Battery	1
3/8" fluid level probe	1

Health and Safety Comments	Significant thunderstorm events. Heavy hail and rain. Wait out storms in vehicles until safe work conditions resume.
Record of Samples Collected	MW-135 (MS/MSD), MW-133 (MS/MSD), MW-129, MW-130, MW-134, MW-132 and field QC samples (EB, FB, TB)
Work Activities Conducted	Conduct sampling at remaining 6 newly installed wells. Well MW-135 located at low point near rail tracks, resulting in significant standing water in and around well vault during sampling attempts. Secondary pump and sandbags set up to keep pump vault clear of surface water during sampling activities. Submersible pump trapped in MW-127 bedrock well during development efforts on 5/15/18. Pump tubing became trapped between pump and steel casing. Pump and tubing successfully recovered. 6 gallons of DI water added to well to aid in pump

removal. Clear Solar Blvd. apartment of sampling equipment.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Monday, September 10, 2018	
Temperature	32-50 °F	**Work Day**
Weather	Partly Cloudy	**Work Start**
Wind	Calm (<1 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager
Joel Riebli	Project Field Staff
Jake Scott	Project Field Staff
Ryan Miller	Project Field Staff
Pak Landers	Project Field Staff
Brandon Wehrle	Project Field Staff

Equipment Present Onsite	Count
Oil/water interface probe	2
3/8" fluid level probe	1
InSitu Groundwater Meter	3
QED Bladder Pump	2
Peristaltic pump/Tubing/Battery	1

Health and Safety Comments	First day of sampling event - Major hazards are working near traffic.
Record of Samples Collected	Groundwater monitoring samples collected from BPGP50, BPGP91, BPGP44, BPGP89, BPGP41 (DUP), BPGP42, and BPGP47.
Work Activities Conducted	Groundwater sampling in NE end of plume. Rental company failed to ship pumps on time. Pumps arrived in Helena and had to be transported to Billings during first day of sampling. One water quality meter failed to record DO, and also had to be replaced. Attempt sampling at MW-126 and MW-127. Fluid level falls rapidly in both wells. Some low-flow parameters stabilize just prior to purging the well dry.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	No	Equipment and field blanks not collected due to missing equipment (only peristaltic pump on site; field staff deployed to recover equipment delivered to wrong location).

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Tuesday, September 11, 2018	
Temperature	50-70 °F	**Work Day**
Weather	Partly Cloudy	**Work Start**
Wind	Calm (<1 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager
Joel Riebli	Project Field Staff
Jake Scott	Project Field Staff
Ryan Miller	Project Field Staff
Pak Landers	Project Field Staff
Brandon Wehrle	Project Field Staff

Equipment Present Onsite	Count
Oil/water interface probe	2
3/8" fluid level probe	1
InSitu Groundwater Meter	3
QED Bladder Pump	2
Peristaltic pump/Tubing/Battery	1

Health and Safety Comments	None.
Record of Samples Collected	BPGP94, BPGP86, BPGP48, BPGP25, BPGP27, BPGP16 (DUP), BPGP31, BPGP17, BPGP92, BPGP15, BPGP29, BPGW04, EMW09, SMW-12, MW-104, MW-128 (DUP), MW-126, MW-127, MW-103, MW-125, MW-123, MW-102, equipment blank and field blank.
Work Activities Conducted	Continue groundwater sampling along plume body towards BSL source area. Samples collected at bedrock wells MW-126 and MW-127, followed by purging wells to dryness as a slug out test. Wells purged to depth achievable with bladder

pump.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Wednesday, September 12, 2018	
Temperature	50-70 °F	**Work Day**
Weather	Clear	**Work Start**
Wind	Light (1-10 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager
Joel Riebli	Project Field Staff
Jake Scott	Project Field Staff
Ryan Miller	Project Field Staff
Pak Landers	Project Field Staff
Brandon Wehrle	Project Field Staff

Equipment Present Onsite	Count
Oil/water interface probe	2
3/8" fluid level probe	1
InSitu Groundwater Meter	3
QED Bladder Pump	2
Peristaltic pump/Tubing/Battery	1

Health and Safety Comments	
Record of Samples Collected	RH-MW-3, MW-114, RH-MW-7, RH-MW-1, MW-111, MW-116 (DUP), MW-112, BPGP84, BPGP12, BPGP08, BPGP85 (DUP), SD-I-01, SYS-EMW-03, SD-I-02 (MS/MSD), MW-101, EMW-03, MW-124 (MS/MSD), MW-130 (DUP), ZPMW-1, MW-107, MW-108, field blank and equipment blank.
Work Activities Conducted	Continue groundwater monitoring. ZPMW-1 has a seized bolt in the lid, but the vault cover itself is no longer attached to the casing, and can be removed to access the well. Area near RH-MW-1 has been regraded but well is still intact. Bentonite had

hydrated and filled vault of MW-101, but did not appear to have infiltrated the well.

		Deviation from approved plans:
Work conducted in accordance with approved plans?	No	SYS-EMW-03 was sampled with a peristaltic pump, as the well casing is fractured several feet below ground surface, and the sampling team was concerned that the bladder pump may not be able to be recovered from the well if inserted beyond the fracture.

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Thursday, September 13, 2018	
Temperature	50-70 °F	**Work Day**
Weather	Overcast	**Work Start**
Wind	Light (1-10 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager
Joel Riebli	Project Field Staff
Jake Scott	Project Field Staff
Ryan Miller	Project Field Staff
Pak Landers	Project Field Staff
Brandon Wehrle	Project Field Staff
Mark Engdahl	BNSF Project Manager

Equipment Present Onsite	Count
Oil/water interface probe	2
3/8" fluid level probe	1
InSitu Groundwater Meter	3
QED Bladder Pump	2
Peristaltic pump/Tubing/Battery	1

Health and Safety Comments	Working on BNSF railyard for the morning. Special safety concerns addressed in tailgate safety, including working near tracks, crossing railroad tracks on foot and in vehicles, and site security.
Record of Samples Collected	BNMW-17, BNMW-9, MW-106, MW-133, MW-132, MW-134, MW-113 (DUP), MW-115, BNMW-23, REGAL-I-01, BPGP93, BPGP87 (MS/MSD), BPGP81 (BD), BPGP80, BNMW-8, BNMW-21, BNMW-20, MW-105, EMW-32 (MS/MSD), EMW-28 (DUP), MW-110, equipment blank and field blank.

Work Activities Conducted	MRL staff confirm that BNMW-20 is the only well that requires active track protection during sampling. MW-106 and MW-105 are far enough from tracks that sampling could be coordinated with MRL without protection, if needed. BNMW-21 located in former tow truck yard. Vehicles have largely been removed from premesis but significant debris remains.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Friday, September 14, 2018	
Temperature	32-50 °F	**Work Day**
Weather	Partly Cloudy	**Work Start**
Wind	Light (1-10 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager
Joel Riebli	Project Field Staff
Jake Scott	Project Field Staff
Ryan Miller	Project Field Staff
Pak Landers	Project Field Staff
Brandon Wehrle	Project Field Staff

Equipment Present Onsite	Count
Oil/water interface probe	2
3/8" fluid level probe	1
InSitu Groundwater Meter	3
QED Bladder Pump	2
Peristaltic pump/Tubing/Battery	1

Health and Safety Comments	Sample collected at MW-135 at grain terminal. Hard hat and steel toe boots required for sampling. Sample collected at BMW-4, which is adjacent to 1st Avenue South, and has no shoulder. Sampling location protected by parking truck upstream of traffic, along boulevard.
Record of Samples Collected	MW-135 (BD), MW-129, MW-119, MW-120, MW-121, MW-122, MW-128 (MNA parameters only, missed on previous sample collection), MW-100, BPGP65, BPGP63, BPGP51B, BPGP22, BPGP83, BPGP02, BPGP61, BPGP49, BPGP53, BPGP59, BPGP65B, BPGP60, BPGP67, BPGP78, MW-117, MW-118, EMW-18, BMW-1, BMW-4, MW-109, PEP07 (MS/MSD), field blank and equipment blank.

Work Activities Conducted Continued groundwater sampling sitewide.

Deviation from approved plans:

Work conducted in accordance with approved plans? Yes

	Name:	Company:
Report Created By	Syris Trahan	Trihydro Corporation
Date	Saturday, September 15, 2018	
Temperature	50-70 °F	**Work Day**
Weather	Clear	**Work Start**
Wind	Calm (<1 mph)	**Work Stop**

Onsite Personnel (name/company)	Role
Syris Trahan	Field Task Manager
Joel Riebli	Project Field Staff
Jake Scott	Project Field Staff
Ryan Miller	Project Field Staff
Pak Landers	Project Field Staff
Brandon Wehrle	Project Field Staff

Equipment Present Onsite	Count
Oil/water interface probe	2
3/8" fluid level probe	1
InSitu Groundwater Meter	3
QED Bladder Pump	2
Peristaltic pump/Tubing/Battery	1

Health and Safety Comments	
Record of Samples Collected	BPGP74, BPGP76, BPGP51, BPGP46, PAI-WEST, BPGW01, and IDW sample from purgewater stored in secondary containment.
Work Activities Conducted	Complete groundwater sampling. Field staff demobilize from Billings. IDW sample collected and submitted.

Deviation from approved plans:

Work conducted in accordance with approved plans?	Yes

APPENDIX E-2

GROUNDWATER SAMPLING FIELD FORMS

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 2C-GW-05 **WELL DIAMETER:** 3/4" 010 slot
SAMPLER(S): JAG
DATE: 2/7/18

WEATHER CONDITIONS: 34°F, gray

Sampling Device: Peri Pump
Make/Model: Geotech Geopump
Serial Number: 5641

Water Quality Inst.: /
Make/Model: /
Serial Number: /

Tubing Type: O Teflon Ø Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 15.5 **Total Well Depth (ft-bpm):** ~~25~~ 23 **Depth to Pump Inlet(ft-bmp):** 22

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L		--
1.	1723	st. pump., inconsistent flow, screen didn't open 1st time								
2.		brn, turbid, muddy								
3.	1750	sample, v. turbid								
4.										
5.		re-collect sample 2/8/17								
6.	0942	st. pump, turbid/muddy/brn, line freezing, ~500/min								
7.	1035	sample, purge ~2 gal								
8.										
9.										
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: 2C-GW-05 **SampleClarity/Color/Odor:** H tan-muddy
Sample Time: 2/8/17 1035 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: PCE Screen

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: AB-GW-03 **WELL DIAMETER:** 1.25"
SAMPLER(S): [illegible]
DATE: 2/6/18

WEATHER CONDITIONS: 20°F, hvy snow

Sampling Device: Peri Pump	**Water Quality Inst.:**
Make/Model: Grotech Geo pump	**Make/Model:**
Serial Number: 5841	**Serial Number:**

Tubing Type: O Teflon Ø Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** _____ **Depth to Pump Inlet(ft-bmp):** _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1. 1702	st. pump, brn/silty, @ 5 oz/min								
2. 1730	sample, purge n/ gal								
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: AB-GW-03 **SampleClarity/Color/Odor:** clr-no odor
Sample Time: 1730 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: PCE Screen

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 4D-GW-02 **WELL DIAMETER:** 1.25"
SAMPLER(S): [illegible]
DATE: 2/4/18
WEATHER CONDITIONS: 20°F, lt. snow, cloudy

Sampling Device:	Pump Pump	**Water Quality Inst.:**	/
Make/Model:	Grundfos Gro pump	**Make/Model:**	
Serial Number:	5041	**Serial Number:**	

Tubing Type: O Teflon ∅ Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 15 **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	–	±10% or less than 0.2 mg/L	-	--
1. 1343	st. purge, brn/silty ~ 5 oz/min								
2. 1405	sample, purge w/ gal								
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 4D-GW-02 **SampleClarity/Color/Odor:** clr - no odor
Sample Time: 1405 **QAQC Samples Collected:** ∅ No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: PCE Screen

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: SD-GW-01 **WELL DIAMETER:** 1.25"
SAMPLER(S): [illegible]
DATE: 2/7/18

WEATHER CONDITIONS: 30s, clr

Sampling Device: Peri Pump
Make/Model: Geotech Geo Pump
Serial Number: [illegible]

Water Quality Inst.:
Make/Model:
Serial Number:

Tubing Type: O Teflon ☒ Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11' **Total Well Depth (ft-bpm):** 14 **Depth to Pump Inlet(ft-bmp):** 13

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	-	-
1. 1213	st. pump, lt tan, ~ 5oz / min								
2. 1233	sample, well dewatering ~ 1/2 gal								
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: SD-GW-01 **SampleClarity/Color/Odor:** lt tan - no odor
Sample Time: 1233 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC:
Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 2C-GW-01 **WELL DIAMETER:** 0.50/.010/5'
SAMPLER(S): [illegible]
DATE: 2/8/18

WEATHER CONDITIONS: 22°F, snow/sleet/ice

Sampling Device:	Peri Pump	**Water Quality Inst.:**	/
Make/Model:	Geotech Geo Pump	**Make/Model:**	/
Serial Number:	5841	**Serial Number:**	/

Tubing Type: O Teflon ϕ Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 10.5 **Total Well Depth (ft-bpm):** 23.5 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	-	--
1. 1708	st. pump / turbid-brn, line freezing/closing								
2. 1730	sample, turbid								
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 2C-GW-01 **SampleClarity/Color/Odor:** turbidy/silty
Sample Time: 1730 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC:

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 2C-GW-04 **WELL DIAMETER:** 0.50
SAMPLER(S): [illegible]
DATE: 7/8/19

WEATHER CONDITIONS: 27°F, scatt. clouds/gry

Sampling Device: Peri Pump
Make/Model: Geotech Geo pump
Serial Number: 5841

Water Quality Inst.: /
Make/Model:
Serial Number:

Tubing Type: O Teflon ϕ Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 10' **Total Well Depth (ft-bpm):** 13 **Depth to Pump Inlet(ft-bmp):** 12

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	-	--
1.	1254	st. pump, brn/muddy/turbid, ~.5 oz/min								
2.	1320	Sample, purge ~1 gal								
3.										
4.										
5.										
6.										
7.										
8.										
9.										
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: 2C-GW-04 **SampleClarity/Color/Odor:** clr - lt brn - none
Sample Time: 1320 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: PCE Screen

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: / **WELL DIAMETER:** /
SAMPLER(S): LD WC
DATE: 3/29/2018, 3/30/8 *

WEATHER CONDITIONS:

Sampling Device:	**Water Quality Inst.:**
Make/Model:	**Make/Model:**
Serial Number:	**Serial Number:**

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** _____ **Depth to Pump Inlet(ft-bmp):** _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTUs	--	±10% or less than 0.2 mg/L		
1.									
2.	20180329-A - Equipment blank								
3.									
4.									
5.	20180330-A - Equipment blank								
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: **SampleClarity/Color/Odor:**

Sample Time: **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs** _____

Analytical methods requested on COC:

Comments: * Form completed after field collection

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: ALSCO-GW-01 **WELL DIAMETER:** ~~5"~~ 1¼"
SAMPLER(S): ST / JS
DATE: 11/29/17

WEATHER CONDITIONS: 30's, windy

Sampling Device: Peri pump
Make/Model: Geo Tech Geopump
Serial Number: 5967

Water Quality Inst.:
Make/Model:
Serial Number:

Tubing Type: O Teflon ☒ Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 15 **Total Well Depth (ft-bpm):** 25 **Depth to Pump Inlet(ft-bmp):** 23

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	–	±10% or less than 0.2 mg/L	–	–
1.	Water @ ~ 15'								
2.	Sample @ ~ 20'								
3.									
4.		5' of 0.5" Screen			0.05 gallons well volume				
5.					~ 3 = 0.15 gal				
6.									
7.	GW initially loaded w/ sediment. Begin purge at 0907								
8. 0910	~~Sw~~ Sample point purged dry. Pump speed reduced to ~4.5 oz/min,								
9.	well recovers								
10. 0925	Turbidity largely cleared, ~ 1 gallon purged								
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: ALSCO_GW-01 **SampleClarity/Color/Odor:** clear
Sample Time: 0925 **QAQC Samples Collected:** ☒ No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: PCE Screen
Comments: ALSCO representative collected split sample.

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: ALSCO-GW-02 **WELL DIAMETER:** 1.25in
SAMPLER(S): JS/CV
DATE: 11/29/17

WEATHER CONDITIONS: COLD, OVERCAST, WINDY

Sampling Device:	PERI PUMP	**Water Quality Inst.:**	
Make/Model:	GEO TECH / GEO PUMP	**Make/Model:**	
Serial Number:	5967	**Serial Number:**	

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 18 **Total Well Depth (ft-bpm):** 25 **Depth to Pump Inlet(ft-bmp):** 23

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	–	±10% or less than 0.2 mg/L	–	–
1.	1033	Begin purge. Highly silty water. well volume similar to ALSCO-GW-01								
2.		will purge 1 gallon.								
3.		purge rate @ 7 oz/min.								
4.										
5.	1050	Sample collected,			spl'd sample		collected by ALSCO			
6.		~1 gal purged.								
7.										
8.										
9.										
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: ALSCO-GW-02 **SampleClarity/Color/Odor:** Clear / no odor
Sample Time: 1050 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: PCE Screening
Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: ALSCO-GW-04 **WELL DIAMETER:** 1.25 in
SAMPLER(S): CV/JS
DATE: 11/29/17

WEATHER CONDITIONS: partly cloudy / windy

Sampling Device: Peri Pump
Make/Model: Geotech / Geo pump
Serial Number: 5967

Water Quality Inst.:
Make/Model:
Serial Number:

Tubing Type: O Teflon ⊗ Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 15 **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	–	±10% or less than 0.2 mg/L	–	–
1. 1415	st. purge, brn/silty water, 7oz/min								
2.									
3. 1435	sample collected / split (ALSCO / Vince D.)								
4.									
5.	~ 1 gallon purged.								
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: ALSCO-GW-04 **SampleClarity/Color/Odor:** lt brn / turbid
Sample Time: 1435 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: PCE SCREEN
Comments: Split sample collected by ALSCO

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: ALSCO-GW-05 **WELL DIAMETER:** 1.25 in.
SAMPLER(S): CV/JS
DATE: 11/29/17

WEATHER CONDITIONS: Clear Windy 30°F

Sampling Device:	Peri Pump	**Water Quality Inst.:**	
Make/Model:	GeoTech/GeoPump	**Make/Model:**	
Serial Number:	5967	**Serial Number:**	

Tubing Type: O Teflon ☒ Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 16 **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	–	±10% or less than 0.2 mg/L	–	–
1. ~~1031~~ 1237	st. purge, brn/silty water, purge 8 oz/min, dial back flow to 1 oz/min								
2.	due to air in line								
3. 1255	pull sample/split collected ~ 1 gal purged.								
4.	Vince collect 3 VOA's as split for ALSCO								
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: ALSCO-GW-05 **SampleClarity/Color/Odor:** v.lt. turbidity
Sample Time: 1255 **QAQC Samples Collected:** ☒ No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: PCE Screen
Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: ALSCO - GW - 03 **WELL DIAMETER:** 1.25
SAMPLER(S): CV / JS
DATE: 11/30/17

WEATHER CONDITIONS: Partly Cloudy

Sampling Device: Peri pump	**Water Quality Inst.:**
Make/Model: Geotech / Geopump	**Make/Model:**
Serial Number: 5967	**Serial Number:**

Tubing Type: O Teflon ☒ Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 15 **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria.			±0.5	±10%	±10% or less than 10 NTUs	–	±10% or less than 0.2 mg/l		–
1. 1335	4oz/min	Start purge, Silty, turbid water							
2. 1415	Sample collected across from ALSCO (corner of Vaughn and Caulkon)								
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: ALSCO - GW - 03 **SampleClarity/Color/Odor:** Brown, turbid, no odor
Sample Time: 1415 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: PCE Screen
Comments: 3 VOAs collected

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 4C-GW-01 **WELL DIAMETER:** 1.25
SAMPLER(S): CV/JS
DATE: 11/30/17

WEATHER CONDITIONS: Partly Cloudy

Sampling Device: Peri Pump
Make/Model: Geotech/Geopump
Serial Number: 5967

Water Quality Inst.:
Make/Model:
Serial Number:

Tubing Type: O Teflon ☒ Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): – **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	–	±10% or less than 0.2 mg/L		
1.	~18' bags inner rods to open screen have hydrocarbon odor								
2. 1540	st. pump, gry/silty water, hydrocarbon odor, lt. sheen								
3.	7oz/min								
4. 1600	sample, lt. turbidity								
5.	purge ~1 gal								
6.	screen 6404 ppb @ surface, open borehole 6000 ppb / 2nd screen 6157 ppb								
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 4C-GW-01 **SampleClarity/Color/Odor:** HC odor
Sample Time: 1600 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC:

Comments: Grey, silty water with a hydrocarbon odor.

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 4D-GW-01 **WELL DIAMETER:** 1.25
SAMPLER(S): CV / JS
DATE: 11/30/17

WEATHER CONDITIONS: Partly Cloudy

Sampling Device: Peri Pump
Make/Model: Geotech / Geopump
Serial Number: 5967

Water Quality Inst.:
Make/Model:
Serial Number:

Tubing Type: O Teflon Ø Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): – **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	–	±10% or less than 0.2 mg/L	–	–
1. 1650	.5oz/min	Brown, silty water							
2. 1715	Stop purge. Purged 1 gallon. sample								
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 4D-GW-01 **SampleClarity/Color/Odor:** Brown / ~~grey~~ No odor
Sample Time: 1715 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC:

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: HLS-GW-04 **WELL DIAMETER:** 1.25"
SAMPLER(S): ~~AK~~ / JS
DATE: 12-1-17

WEATHER CONDITIONS: 35°F, clr, sunny, calm

Sampling Device: Peristaltic pump	**Water Quality Inst.:**
Make/Model: Geopump	**Make/Model:**
Serial Number: 53167	**Serial Number:**

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 14 **Total Well Depth (ft-bpm):** ~~25~~ ~~AK~~ 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	–	±10% or less than 0.2 mg/L	–	–
1. 0915	st. pump, brn/silty/turbid				5.5oz/min				
2. 0945	sample, purge 1 gal								
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: HLS-GW-04 **SampleClarity/Color/Odor:** clr
Sample Time: 0945 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: PCE screen

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: HLS-GW-03 **WELL DIAMETER:** 1.25"
SAMPLER(S): ~~LK~~ /VS
DATE: 12-1-17

WEATHER CONDITIONS: 45°F, calm, sunny, dr

Sampling Device: Peristaltic pump
Make/Model: Geopump
Serial Number: 5967

Water Quality Inst.:
Make/Model:
Serial Number:

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 15 **Total Well Depth (ft-bmp):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	–	±10% or less than 0.2 mg/L		
1. 1107	st. pump, brn/silty/turbid, 5oz/min								
2. 1130	sample, purge 1 gal								
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: HLS-GW-03 **SampleClarity/Color/Odor:** VH gry-clr
Sample Time: 1130 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: PCE screen

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 5B-GW-01 **WELL DIAMETER:** 1.25
SAMPLER(S): CV/JS
DATE: 12/1/17

WEATHER CONDITIONS: Sunny, 48°F

Sampling Device: Peri Pump
Make/Model: Geopump / Geotech
Serial Number: 5967

Quality Inst.:
Model:
Number:

Tubing Type: O Teflon ⊗ Poly O Other **Decontamin** Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): **Total Well Depth (ft-bpm:** **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	ity	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%			±10% or less than 0.2 mg/L		
1. 1312	st. pump, brn/slty/turbid, h.c. odor on inner rods used to								
2.	open screen, lt. sheen, 7 oz/min								
3.									
4. 1330	Stop Pump.								
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 5B-GW-01 **SampleClarity/Color/Odor:** h.c. odor
Sample Time: ~~1305~~ 1330 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: PCE Screen
Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: GA-GW-01 **WELL DIAMETER:** 1.25
SAMPLER(S): CV/JS
DATE: 12/1/17

WEATHER CONDITIONS: Partly Cloudy, breezy

Sampling Device: GA Peri Pump
Make/Model: Geopump
Serial Number: 5967

Water Quality Inst.:
Make/Model:
Serial Number:

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTUs	–	±10% or less than 0.2 mg/L	–	–
1. 1428	Start pump. Grey, silty, no odor. 6 oz/min								
2. 1450	Sample, purge 1 gal								
3.	1660 ppb borehole after vid pulled out								
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: GA-GW-01 **SampleClarity/Color/Odor:** Cloudy / grey / no odor
Sample Time: 1450 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: PCE Screen

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 5A-GW-01 **WELL DIAMETER:** 1.25
SAMPLER(S): CV/JS
DATE: 12/1/17

WEATHER CONDITIONS: Partly Cloudy

Sampling Device: Per. Pump
Make/Model: Geotech
Serial Number: 5967

Water Quality Inst.:
Make/Model:
Serial Number:

Tubing Type: O Teflon Ø Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): — **Total Well Depth (ft-bpm):** 20 **Depth to Pump Inlet(ft-bmp):** ~~22~~ 19

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTUs		±10% or less than 0.2 mg/L		
1.	* Difficult driving @ 9 ft								
2.	* @ 21.5 ft hit refusal								
3.									
4.	* Start pump at 1605. 5 oz/min								
5.	* Stop pump at 1631. Purged 1 gallon.								
6.	bomb hole 105 ppb								
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 5A-GW-01 **SampleClarity/Color/Odor:** Silty / Brown / no odor
Sample Time: 1631 **QAQC Samples Collected:** Ø No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC:
Comments: ~~* Difficult~~

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 3E-GW-01 **WELL DIAMETER:** 1.25"
SAMPLER(S): CVH / JS
DATE: 12-2-17

WEATHER CONDITIONS: 35°, clr, sunny, v lt. wind 1 mph

Sampling Device: Peristaltic Pump
Make/Model: Geopump / Geotech
Serial Number: 5916

Water Quality Inst.:
Make/Model:
Serial Number:

Tubing Type: O Teflon ⊘ Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.15' **Total Well Depth (ft-bpm):** 23.21 **Depth to Pump Inlet(ft-bmp):** 20

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.5	±10%	±10% or less than 10 NTU's	—	±10% or less than 0.2 mg/L	—	—
1. 1125	st. pump, brn/silty/turbid								
2.									
3.									
4.	Refusal @ 22 fbg								
5.	Pull up screen at 21 to 17 fbg.								
6. 1155									
7. ~~1150~~	sample, purge 1 gal								
8.	3497 ppb @ borehole after rod pulled								
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 3E-GW-01 **SampleClarity/Color/Odor:** clr

Sample Time: **QAQC Samples Collected:** ⊘ No O Yes: **If yes, QAQC IDs**

Analytical methods requested on COC: PCE Screen

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 3A-GW-01 **WELL DIAMETER:** 1.25
SAMPLER(S): ~~[illegible]~~ CV/JS
DATE: 12/2/17

WEATHER CONDITIONS: Cloudy, 38°

Sampling Device: Peri Pump
Make/Model: Geotech
Serial Number: 5967

Water Quality Inst.:
Make/Model:
Serial Number:

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): — **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1317	Stabilization Criteria		±0.5	±10%	±10% or less than 10 NTU's	—	±10% or less than 0.2 mg/L		
1. ~~1321~~	st. pump,		brn/silty/turbid, 7oz/min						
2. 1323	Air in line, reduce pump rate to 5oz/min								
3. 1340	sample, purge all gal								
4.	228 ppb @ borehole after rod pulled.								
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 3A-GW-01 **SampleClarity/Color/Odor:** Clr
Sample Time: 1340 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: PCE Screen
Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 1A-GW-01 **WELL DIAMETER:** 1.25
SAMPLER(S): CV/JS
DATE: 12/2/17

WEATHER CONDITIONS: Cloudy, 40°F

Sampling Device: Peri Pump
Make/Model: Geotech
Serial Number: 5967

Water Quality Inst.:
Make/Model:
Serial Number:

Tubing Type: O Teflon ⊗ Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.5	±10%	±10% or less than 10 NTU's	—	±10% or less than 0.2 mg/L	—	
1. 1420	st. pump, brn/turbid/silty, 5oz/min								
2. 1450	sample, purge 1 gal								
3.	688 ppb @ borehole after rod pulled.								
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 1A-GW-01 **SampleClarity/Color/Odor:** lt. cloudy
Sample Time: 1450 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: PCE Screen
Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 1B-GW-01 **WELL DIAMETER:** 1.25
SAMPLER(S): CV/JS
DATE: 12/2/17

WEATHER CONDITIONS: Cloudy, 36°F

Sampling Device: Peri Pump
Make/Model: Geotech
Serial Number: 5967

Water Quality Inst.:
Make/Model:
Serial Number:

Tubing Type: O Teflon ⊗ Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	–	±10% or less than 0.2 mg/L	–	–
1. 1535	st. pump, brn/slty, 5oz/gal								
2. 1600	Sample, purge 4 gal								
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 1B-GW-01 **SampleClarity/Color/Odor:** slt cloudy/brn
Sample Time: 1600 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: PCE Screen
Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 2A-GW-01 **WELL DIAMETER:** 1.25"
SAMPLER(S): CAA/ST/JS
DATE: 12-2-17

WEATHER CONDITIONS: 40's, cloudy

Sampling Device: Peristaltic
Make/Model: Geotech/Geopump
Serial Number: 59169

Water Quality Inst.: /
Make/Model:
Serial Number:

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** _____ **Depth to Pump Inlet(ft-bmp):** _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTUs		±10% or less than 0.2 mg/L		
1. 1643	st. pump, brn/slty/ 8oz/min								
2. 1710	sample, purge ~1 gal								
3.									
4.	borehole 497 ppb / screen 211 ppb								
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 2A-GW-01 **SampleClarity/Color/Odor:** H. brn

Sample Time: 1710 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs** _____

Analytical methods requested on COC:

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: HLS-GW-05 **WELL DIAMETER:** 1.25"
SAMPLER(S): CMS / JS
DATE: 12-2-17

WEATHER CONDITIONS: ~~Partly Cloudy~~ ~~60~~ clr, 25°F

Sampling Device: Geopump / Peristaltic
Make/Model: GeoTech
Serial Number: 5467

Water Quality Inst.:
Make/Model:
Serial Number:

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 15 **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTUs		±10% or less than 0.2 mg/L		
1. 0833	sl. pump	@	50z/min		water is	heavily	silted.		
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: HLS-GW-05 **SampleClarity/Color/Odor:** cloudy
Sample Time: 0855 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: PCE SCREEN

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 3B-GW-01 **WELL DIAMETER:** 1.25
SAMPLER(S): CV/JS
DATE: 12/2/17

WEATHER CONDITIONS: Partly Cloudy, 42°

Sampling Device: Peri Pump
Make/Model: Geotech
Serial Number: 5967

Water Quality Inst.:
Make/Model:
Serial Number:

Tubing Type: O Teflon Ø Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 15 **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.5	±10%	±10% or less than 10 NTU's	–	±10% or less than 0.2 mg/L	–	–
1. 1005	Start pump, Pumping 5 oz/min.								
2. 1030	Sample, purge algae								
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 3B-GW-01 **SampleClarity/Color/Odor:** Silty / brown / no odor
Sample Time: **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: PCE Screen
Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 2A-GW-02 **WELL DIAMETER:** 1.25"
SAMPLER(S): S.T / [illegible]
DATE: 12-3-17

WEATHER CONDITIONS: cold, 36°F, dry/humid

Sampling Device: Peristaltic	**Water Quality Inst.:**
Make/Model: Geotech / Geopump	**Make/Model:**
Serial Number: 5967	**Serial Number:**

Tubing Type: O Teflon ⊗ Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	–	±10% or less than 0.2 mg/L	–	–
1. 0801	pump started		brn	/ silty	602/min				
2. 0830	purge 1 gal								
3.									
4.	PID reading in borehole				545 ppb				
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 2A-GW-02 **SampleClarity/Color/Odor:** brn, cloudy turbid
Sample Time: 0830 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: PCE 5 GREEN

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 1A-GW-02 **WELL DIAMETER:** 1.25"
SAMPLER(S): CV/JT
DATE: 12/4/17

WEATHER CONDITIONS: overcast, light breeze 30s

Sampling Device:	Geo Tech Peristaltic Pump	**Water Quality Inst.:**	
Make/Model:	Geopump	**Make/Model:**	
Serial Number:	596	**Serial Number:**	

Tubing Type: O Teflon ● Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 (NTU's)		±10% or less than 0.2 mg/L		
1. 1630	Begin well purge.			Purging @ 5.2 /min.					
2. 1455	sample, purge 4 1/gal, pid borehole							154 ppb	
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 1A-GW-02 **SampleClarity/Color/Odor:** Cloudy, light gray
Sample Time: 1655 **QAQC Samples Collected:** ● No O Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: PCE SCREEN

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: IB-GW-02 **WELL DIAMETER:** 1.25"
SAMPLER(S): CAF
DATE: 12-4-17

WEATHER CONDITIONS: 27°F, gry, snow

Sampling Device: Peri.
Make/Model: Geo pump
Serial Number: SLOF 5967

Water Quality Inst.:
Make/Model:
Serial Number:

Tubing Type: O Teflon ☒ Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** _____ **Depth to Pump Inlet(ft-bmp):** _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's		±10% or less than 0.2 mg/L		
1. 1523	st pump, low sty, 5 oz/min								
2. 1550	sample, purge ~1 gal, pid borehole = 254 ppb								
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: IB-GW-02 **SampleClarity/Color/Odor:**
Sample Time: 1550 **QAQC Samples Collected:** ☒ No O Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: PCE SCREEN

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 4B-GW-01 **WELL DIAMETER:** 1.25"
SAMPLER(S): [illegible]
DATE: 12-4-17

WEATHER CONDITIONS: 28°F, gry, snow

Sampling Device: Peri
Make/Model: Geopump
Serial Number: 5967

Water Quality Inst.:
Make/Model:
Serial Number:

Tubing Type: O Teflon ✓ Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** _____ **Depth to Pump Inlet(ft-bmp):** _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	—	±10% or less than 0.2 mg/L	—	—
1. 1305	st. pump, brn/silty								
2. 1330	sample, 4 gal, pid 319ppb								
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 4B-GW-01 **SampleClarity/Color/Odor:**
Sample Time: 1330 **QAQC Samples Collected:** ✓ No O Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: PCE SCREEN

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 4B-GW-02 **WELL DIAMETER:** 1.25"
SAMPLER(S): [illegible]
DATE: 12-4-17

WEATHER CONDITIONS: 28°F, snow, gray

Sampling Device: Peristaltic	**Water Quality Inst.:**
Make/Model: Geopump	**Make/Model:**
Serial Number: 5967	**Serial Number:**

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 1.15 **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	–	±10% or less than 0.2 mg/l	–	–
1. 1202	st. pump, 500/min, brn/silty								
2. 1230	sampling, purge 1 gal, pid borehole 322 ppb								
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 4B-GW-02 **SampleClarity/Color/Odor:** clr
Sample Time: 1230 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: PCE SCREEN

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: SC-GW-01 **WELL DIAMETER:** 1.25"
SAMPLER(S): [illegible]
DATE: 12-4-17

WEATHER CONDITIONS: 29°F, cloudy/overcast, snow flurries

Sampling Device: Peristaltic Pump
Make/Model: Geopump
Serial Number: 54187

Water Quality Inst.:
Make/Model:
Serial Number:

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 21.5 **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.5	±10%	±10% or less than 10 NTU's	–	±10% or less than 0.2 mg/L	–	
1.									
2. 1022	st pump, 5oz/min, brn/silty/turbid								
3. 1050	sample, purge 1 gal								
4.	pid above hole = 130 ppb								
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: SC-GW-01 **SampleClarity/Color/Odor:** v/lt cloudy
Sample Time: 1050 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: PCE SCREEN

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 2B-GW-02 **WELL DIAMETER:** 1.25"
SAMPLER(S): LAM/ST
DATE: 12-5-17

WEATHER CONDITIONS: 30°F, gray/overcast, windy ~20+mph

Sampling Device: Peri
Make/Model: Geopump
Serial Number: ~~5067~~ 5767

Water Quality Inst.:
Make/Model:
Serial Number:

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** _____ **Depth to Pump Inlet(ft-bmp):** _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.1	±10%	±10% or less than 10 NTU's		±10% or less than 0.2 mg/L		
1. 1052	st pump,		brn/silty, 5oz/min						
2. 1115	sample,		purge ~1 gal, pid borehole 113 ppb						
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 2B-GW-02 **SampleClarity/Color/Odor:** v lt. cloudy
Sample Time: 1115 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC:

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 2A-GW-03 **WELL DIAMETER:** 1.25"
SAMPLER(S): ST/CV
DATE: 12/5/17

WEATHER CONDITIONS: Overcast 30°F, Windy

Sampling Device:	Peristaltic Pump	**Water Quality Inst.:**	
Make/Model:	GeoTech / Geopump	**Make/Model:**	
Serial Number:	~~5697~~ 5967	**Serial Number:**	

Tubing Type: O Teflon ✓ Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.5	±10%	±10% or less than 10 NTU's	–	±10% or less than 0.2 mg/L		
1. 1210	SCREENED		from 22-19 ft bgs			begin pumping.			
2. 1240	sample, purge ~1 gal, pid 375 ppb								
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 2A-GW-03 **SampleClarity/Color/Odor:** lt brn

Sample Time: 1246 **QAQC Samples Collected:** ✓ No O Yes: **If yes, QAQC IDs** _____

Analytical methods requested on COC: PCE SCREEN

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 3D-GW-01 **WELL DIAMETER:** 1.25
SAMPLER(S): [illegible]
DATE: 12-5-17

WEATHER CONDITIONS: 38° clr, lt. wind

Sampling Device:	Peri.	**Water Quality Inst.:**	/
Make/Model:	Geopump	**Make/Model:**	
Serial Number:	5910	**Serial Number:**	

Tubing Type: O Teflon Ø Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.5	±10%	±10% or less than 10 NTU's	–	±10% or less than 0.2 mg/l	–	
1. 1415	st pump, brn/silty, 5oz/min								
2. 1440	sample, purge +1 gal, pid 546 ppb								
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 3D-GW-01 **SampleClarity/Color/Odor:** lt brn
Sample Time: 1440 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs**_____
Analytical methods requested on COC: PCE Screen

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 3B-GW-02 **WELL DIAMETER:** 1.25"
SAMPLER(S): CA/ST
DATE: 12-5-17

WEATHER CONDITIONS: 40°, overcast, lt wind

Sampling Device: Peri	**Water Quality Inst.:**
Make/Model: Geopump	**Make/Model:**
Serial Number: 159107	**Serial Number:**

Tubing Type: O Teflon ✓ Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.5	±10%	±10% or less than 10 NTUs		±10% or less than 0.2 mg/l		
1. 1530	st. pump, brn/silty, 5oz/min								
2. ~~1630~~ 1600	Sample, 1 gall purge					pid 134 ppb			
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 3B-GW-02 **SampleClarity/Color/Odor:** lt cloudy
Sample Time: 1600 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: PCE Screen

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 4D-GW-02 **WELL DIAMETER:** 1.25"
SAMPLER(S): [illegible]
DATE: 12-6-17

WEATHER CONDITIONS: 35°F, gry/overcast, lt wind

Sampling Device: Peri	**Water Quality Inst.:**
Make/Model: Geopump	**Make/Model:**
Serial Number: 99167	**Serial Number:**

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.5	±10%	±10% or less than 10 NTU's	–	±10% or less than 0.2 mg/L	–	–
1. 0745	st. pump, silty/brn, 5 oz/min								
2. 0815	sample, purge 2 gal, pid borehole = 42 ppb								
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 4D-GW-02 **SampleClarity/Color/Odor:** lt. cloudy
Sample Time: 0815 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: PCE Screen

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: GB-GW-02 **WELL DIAMETER:** 1.25"
SAMPLER(S): KA/ST
DATE: 12-6-17

WEATHER CONDITIONS: 40's, partly cloudy, windy

Sampling Device: Peri.
Make/Model: Geotpump
Serial Number: 59607

Water Quality Inst.: /
Make/Model:
Serial Number:

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	–	±10% or less than 0.2 mg/L	–	–
1. 1453	st. pump, brn/slty, 7oz/min, reduce flow								
2.	dvlr note: Lizard dvlg 5-18' bgs								
3. 1520	sample, purge 4 1/2 gal, pid 194 ppb								
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: GB-GW-02 **SampleClarity/Color/Odor:** lt. cloudy
Sample Time: 1520 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: PCE Screen

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: LC-GW-02 **WELL DIAMETER:** 1.25"
SAMPLER(S): [illegible]/ST
DATE: 12-6-17

WEATHER CONDITIONS: 40°F, sunny, windy

Sampling Device: Peri
Make/Model: Geopump
Serial Number: 59181

Water Quality Inst.: /
Make/Model:
Serial Number:

Tubing Type: O Teflon Ø Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.5	±10%	±10% or less than 10 NTUs		±10% or less than 0.2 mg/L		
1. 1350	st. pump, brown/silty, 5oz/min								
2. 1415	sample, ~1 gal, pid = 127 ppb								
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: LC-GW-02 **SampleClarity/Color/Odor:** H brown
Sample Time: 1415 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: PCE Screen

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 4C-GW-03 **WELL DIAMETER:** 1.25"
SAMPLER(S): [illegible]
DATE: 12-6-17
WEATHER CONDITIONS: 37°, sunny/clr, windy

Sampling Device: Peri.
Make/Model: Geopump
Serial Number: 65987

Water Quality Inst.:
Make/Model:
Serial Number:

Tubing Type: O Teflon Ø Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.5	±10%	±10% or less than 10 NTU's		±10% or less than 0.2 mg/L		
1. 1111	st. pump, brn/turbid/silty, 5oz/min								
2. 1140	sample, purge 2 gal, pid = 172 ppb								
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 4C-GW-03 **SampleClarity/Color/Odor:** v/f. cloudy
Sample Time: 1040 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: PCE Screen

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 2PE-GW-01 **WELL DIAMETER:** 1.25"
SAMPLER(S): [illegible]
DATE: 12-6-17

WEATHER CONDITIONS: 35°F, gray/overcast, lt winds

Sampling Device: Peri.
Make/Model: Geopump
Serial Number: 59187

Water Quality Inst.: /
Make/Model:
Serial Number:

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): / **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU		±10% or less than 0.2 mg/L		
1. 0952	st. pump, brn/silty, 2oz/min								
2. 1020	sample, purge ~1 gal, 419 ppb								
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 2PE-GW-01 **SampleClarity/Color/Odor:** lt. cloudy
Sample Time: 1020 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: PCE Screen

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 4E-GW-02 **WELL DIAMETER:** 1.25"
SAMPLER(S): ST
DATE: 12/6/17

WEATHER CONDITIONS: Overcast, 38°F, windy

Sampling Device:	Peristaltic Pump	**Water Quality Inst.:**	
Make/Model:	Geo Tech / Geo Pump	**Make/Model:**	
Serial Number:	5967	**Serial Number:**	

Tubing Type: O Teflon ☒ Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's		±10% or less than 0.2 mg/L		
1. 0847	Begin pumping @ 5oz./min, silty/brown								
2. 0915	sample, purge ~1.9gal, pid borehole = 706 ppb								
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 4E-GW-02 **SampleClarity/Color/Odor:** Clear

Sample Time: 0915 **QAQC Samples Collected:** ☒ No O Yes: **If yes, QAQC IDs** _____

Analytical methods requested on COC: PCE SCREEN

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 3E-GW-02 **WELL DIAMETER:** 1.25"
SAMPLER(S): ST
DATE: 12-7-17
WEATHER CONDITIONS: 45°F, sunny, calm

Sampling Device:	Peristaltic Pump	**Water Quality Inst.:**	
Make/Model:	Geotech / Geopump	**Make/Model:**	
Serial Number:	5967	**Serial Number:**	

Tubing Type: O Teflon ☒ Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTUs	—	±10% or less than 0.2 mg/l	—	
1. 1252	st pump								
2. 1320	Collect sample								
3.									
4.	PID - 968 ppb in borehole								
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 3E-GW-02 **SampleClarity/Color/Odor:** Clear
Sample Time: 1320 **QAQC Samples Collected:** ☒ No O Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: PCE SCREEN

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 3D-GW-02 **WELL DIAMETER:** 1.25"
SAMPLER(S): [illegible]/SI
DATE: 12-7-19

WEATHER CONDITIONS: 45°F, partly cloudy

Sampling Device:	Peri	**Water Quality Inst.:**	/
Make/Model:	Geopump	**Make/Model:**	
Serial Number:	5467	**Serial Number:**	

Tubing Type: O Teflon ✓ Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's		±10% or less than 0.2 mg/L		
1. 1140	st. pump, ~5oz/min, brn/silty								
2. 1205	sample, purge w/ gal								
3.									
4.	3ppm on PID in borehole								
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 3D-GW-02 **SampleClarity/Color/Odor:** lt. cloudy
Sample Time: 1205 **QAQC Samples Collected:** ~~O~~ No O Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: PCE SCREEN

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: GC-GW-01 **WELL DIAMETER:** 1.25"
SAMPLER(S): ~~CAT~~/ST
DATE: 12-7-17

WEATHER CONDITIONS: 40's F, partly cloudy

Sampling Device: Peri.
Make/Model: Geopump
Serial Number: 57807

Water Quality Inst.:
Make/Model:
Serial Number:

Tubing Type: O Teflon Ø Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTUs		±10% or less than 0.2 mg/l		
1. 1037	st pump, brn/slty, 4oz/min								
2. 1105	sample, purge ml gal, pid = 3406 ppb								
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: GC-GW-01 **SampleClarity/Color/Odor:** lt. cloudy
Sample Time: 1105 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: PCE SCREEN

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 3C-GW-02 **WELL DIAMETER:** 1.25
SAMPLER(S): Joel Riebli
DATE: 12/18/2017

WEATHER CONDITIONS: 35°F, Cloudy, winds less than 5mph

Sampling Device: Peristaltic Pump
Make/Model: Geotech / Grundfos
Serial Number: 5967

Water Quality Inst.:
Make/Model: NA
Serial Number:

Tubing Type: O Teflon ☒ Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** 24 **Depth to Pump Inlet(ft-bmp):** 23

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	
1.	1037	Start	pursing	3C-GW-02						
2.		0.5L/12sec	purge	rate						
3.	1100	Sample	3C-GW-02							
4.										
5.										
6.										
7.										
8.										
9.										
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: 3C-GW-02 **SampleClarity/Color/Odor:** Clear
Sample Time: 1100 **QAQC Samples Collected:** ☒ No O Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: PCE SCREEN
Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 2A-GW-Ø4 **WELL DIAMETER:** 1.25
SAMPLER(S): Joel Riebli
DATE: 12/18/2017

WEATHER CONDITIONS: 40°F, Cloudy, winds less than 5mph

Sampling Device:	Peristaltic Pump	**Water Quality Inst.:**	N/A
Make/Model:	Geotech / Geopump	**Make/Model:**	
Serial Number:	5967	**Serial Number:**	

Tubing Type: O Teflon ☒ Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria			± 0.5	±10%	±10% or less than 10 NTU's		±10% or less than 0.2 mg/L		
1	1302	Begin	purging	2A-GW-Ø4						
2		0.5L/81 secs								
3	1325	Sampled	2A	-GW-Ø4						
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										

Sample ID: 2A-GW-Ø4 **SampleClarity/Color/Odor:** slight turbid / clear / none
Sample Time: 1325 **QAQC Samples Collected:** ☒ No O Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: RE SCREEN
Comments: 174 ppb in borehole

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 2A-GW-05 **WELL DIAMETER:** 1.25
SAMPLER(S): Joel Riebli
DATE: 12/18/2017

WEATHER CONDITIONS: 40°F, Cloudy, winds ~ 3-8 mph

Sampling Device:	Peristaltic Pump	**Water Quality Inst.:**	
Make/Model:	Geotech / Geopump	**Make/Model:**	NA
Serial Number:	5967	**Serial Number:**	

Tubing Type: O Teflon ☒ Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	–	±10% or less than 0.2 mg/L		
1. 1407	Begin	purging	2A-GW-05						
2.	0.5L/145 sec's								
3. 1430	Sample	2A-GW-05							
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 2A-GW-05 **SampleClarity/Color/Odor:** slight, cloudy, tan, none
Sample Time: 1430 **QAQC Samples Collected:** ☒ No O Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: PCE SCREEN

Comments: 86 ppb in borehole

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: ~~4A-GW-Ø2~~ 5A-GW-Ø2 WELL DIAMETER: 1.25
SAMPLER(S): Joel Riebli
DATE: 12/18/2017

WEATHER CONDITIONS: Cloudy, ~40°F, Wind ~5mph

Sampling Device:	Peristaltic Pump	Water Quality Inst.:	
Make/Model:	Geotech / Geopump	Make/Model:	NA
Serial Number:	5967	Serial Number:	

Tubing Type: O Teflon ☒ Poly O Other Decontamination: O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ Total Well Depth (ft-bpm): 23 Depth to Pump Inlet(ft-bmp): 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTUs	--	±10% or less than 0.2 mg/L	--	
1. 1610	Begin	purging	5A-GW-Ø2						
2.	0.5L/125 Secs								
3. 1633	Sample	5A-GW-Ø2							
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 5A-GW-Ø2 SampleClarity/Color/Odor: turbid / Brown / none
Sample Time: 1633 QAQC Samples Collected: ☒ No O Yes: If yes, QAQC IDs_____
Analytical methods requested on COC: PCE Screen

Comments: 74 ppb in borehole

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 6B-GW-01 **WELL DIAMETER:** 1.25
SAMPLER(S): Joel Richli
DATE: 12/20/2017

WEATHER CONDITIONS: ~28°F, Cloudy, winds ~2 mph

Sampling Device: Peristaltic Pump
Make/Model: Geotech / Geopump
Serial Number: 5967

Water Quality Inst.:
Make/Model: NA
Serial Number:

Tubing Type: O Teflon ☒ Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** 23 **Depth to Pump Inlet(ft-bmp):** 22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTUs	--	±10% or less than 0.2 mg/L	--	
1. 0831	Start	purge	6B-GW-01						
2.	0.5L/200 secs	0.5							
3. 0855	Sample	6B-GW-01							
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 6B-GW-01 **SampleClarity/Color/Odor:** turbid / light brown / none
Sample Time: 0855 **QAQC Samples Collected:** ☒ No O Yes: **If yes, QAQC IDs** _____

Analytical methods requested on COC:

Comments: 131 ppb PID reading from borehole

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: 5C-GW-02 **WELL DIAMETER:** 1.25
SAMPLER(S): Joel & Jake
DATE: 12/20/2017

WEATHER CONDITIONS: overcast, ~26°F, winds 2-5mph

Sampling Device: Peristaltic Pump
Make/Model: Geotech / Geopump
Serial Number: 5967

Water Quality Inst.:
Make/Model: NA
Serial Number:

Tubing Type: O Teflon ☒ Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** _____ **Depth to Pump Inlet(ft-bmp):** _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	
1. 1654	Begin	purge	5C-GW-02						
2.	0.50 / 190 secs								
3. 1720	Sample	5C-GW-02							
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 5C-GW-02 **SampleClarity/Color/Odor:** slight turbid / light tan / none
Sample Time: 1720 **QAQC Samples Collected:** ☒ No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC:

Comments: 2853 ppbr

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP60 **WELL DIAMETER:** 1/2
SAMPLER(S): LD AL
DATE: 7/26/17

WEATHER CONDITIONS: Sunny light breeze 60°

Sampling Device:	GeoTech GeoPump	**Water Quality Inst.:**	Aqua Troll 600
Make/Model:		**Make/Model:**	
Serial Number:	2493	**Serial Number:**	49 6339

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.61 **Total Well Depth (ft-bpm):** 22.33 **Depth to Pump Inlet(ft-bmp):** _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. ~~(mg/L)~~ uS/cm	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	± 10%	--
1. 1006			6.87	1743.8	46.7	22.20	4.55	219.7	—
2. 1009			6.88	1729	12.95	18.71	4.16	224.7	—
3. 1012			6.89	1762	4.63	17.79	3.72	231.8	
4. 1015			6.90	1770	1.92	17.79	3.48	234.1	
5. 1015			6.90	1777	2.71	17.48	3.26	234.2	
6. 1021			6.90	1780	4.05	17.58	3.16	232.1	
7. 1024		1.5 gal	6.91	1774	7.66	17.58	3.23	230.1	
8. 1030	Collected 6 VOA								
9. 1035									13.62
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP60 **SampleClarity/Color/Odor:** Clear
Sample Time: 1030 **QAQC Samples Collected:** O No ☒ Yes: **If yes, QAQC IDs** BD-20170706-01
Analytical methods requested on COC: VOC

Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP 66 **WELL DIAMETER:** 0.5 ID
SAMPLER(S): S. Trahan, D. Schiche, J. Simons
DATE: 7/26/17

WEATHER CONDITIONS: Sunny

Sampling Device: Geo-tech Peristaltic
Make/Model: Geopump
Serial Number: 2496

Water Quality Inst.: In Situ Aqua Troll 600
Make/Model: Aqua Troll 600
Serial Number: 509387

Tubing Type: ⊙ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 12.89 **Total Well Depth (ft-bpm):** _____ **Depth to Pump Inlet(ft-bmp):** _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	–	±10% or less than 0.2 mg/L	±10%	–
1. 1006	0.175		7.38	1.10	13.94	20.87	1.45	126.5	
2. 1009	0.3		7.45	0.99	98.62	18.19	0.68	118.1	
3. 1012	0.3		7.46	0.40	797.36	17.58	0.79	117.5	
4. 1015	0.3		7.46	0.16	117.9	17.59	0.69	130.6	
5. 1018	0.3		7.46	0.05	28.86	17.99	1.90	115.6	
6. 1021	0.3		7.45	2.58	1,120.8	18.18	0.47	122.9	
7. 1024	0.3		7.48	0.37	8.15	17.38	0.60	107.3	
8. 1027	0.3		7.47	0.06	4.57	17.73	0.69	104.8	
9. 1030	0.3		7.47	0.09	22.94	17.56	0.66	97.9	
10. 1033	0.3		7.47	0.59	188.8	17.53	0.76	122.2	
11. 1036	0.3		7.47	0.04	4.78	17.52	0.99	104.4	
12. 1039	0.3		7.47	0.63	90.66	17.20	0.71	103.4	
13. 1042	0.3		7.47	0.01	199.85	17.82	0.59	99.9	
14. 1045	0.3		7.47	0.28	17.65	17.32	0.75	109.4	
15. 1048	0.3		7.47	0.19	32.22	17.17	0.90	100.5	
16. 1050	Collect Sample.								
17.		4.5 gal							
18.									

Sample ID: BPGP66 **SampleClarity/Color/Odor:** Sour chemical odor
Sample Time: 1050 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: Suite A

Comments: Purged for 45 minutes. Purge approx. 4.5 gallons, more than 3 well casing volumes. Turbidity unstable.

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Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP54 **WELL DIAMETER:**
SAMPLER(S): LD AC
DATE: 2/26/17

WEATHER CONDITIONS: Sunny 65°

Sampling Device:	GeoTech	**Water Quality Inst.:**	In Situ
Make/Model:	Geopump	**Make/Model:**	Aqua Troll 600
Serial Number:	2493	**Serial Number:**	496379

Tubing Type: ⊕ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.19 **Total Well Depth (ft-bpm):** 27.30 **Depth to Pump Inlet(ft-bmp):** ~23

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. ~~(mS/m)~~	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	uS/cm	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	±10%	--
1. 10:56			6.85	1907.7	227.52	20.93	4.17	219.5	
2. 10:59			6.88	1912.1	55.84	19.39	4.03	218.6	
3. 11:02			6.89	1903.4	17.09	18.81	3.81	218.1	
4. 11:05			6.90	1889.2	5.16	18.58	3.71	221.8	
5. 11:08			6.90	1858.7	3.05	18.45	3.87	225.2	
6. 11:11			6.91	1837.9	2.19	18.30	3.57	224.1	
7. 11:14			6.91	1818.9	2.36	18.39	3.45	227.6	
8. 1115	Collect	9 VOA							
9.									
10. MS	1120								
11. MSD	1125								
12.									
13. 1130									13.21
14.									
15.									
16.									
17.									
18.									

Sample ID: DTGP54 **SampleClarity/Color/Odor:** Clear No odor
Sample Time: 1115 **QAQC Samples Collected:** O No ⊕ Yes: **If yes, QAQC IDs** MS/MSD
Analytical methods requested on COC: VOC

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP 59 **WELL DIAMETER:** 0.5
SAMPLER(S): S.T., J.S., D.S.
DATE: 7/26/17

WEATHER CONDITIONS:
Sunny

Sampling Device: Peristaltic Pump
Make/Model: GeoTech Geopump
Serial Number: 2496

Water Quality Inst.: In Situ
Make/Model: Aqua Trol 600
Serial Number: 509387

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.20 **Total Well Depth (ft-bpm):** 22.25 **Depth to Pump Inlet(ft-bmp):** _____

Time	Purge Rate (mlpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1130	200	~~7.19~~ 5.1	7.19	1.17	151.88	23.52	1.48	117.4	
2. 1133	300		7.30	0.05	434.8	21.35	1.18	114.5	
3. 1136	300		7.31	1.47	8.52	18.97	1.15	115.3	
4. 1139	300		7.32	0.83	37.2	18.88	1.45	112.8	
5. 1142	300		7.32	1.02	183.84	18.72	1.87	121.7	
6. 1146	300		7.32	0.49	74.89	18.34	2.29	132.7	
7. 1149	300		7.32	0.01	1,502.1	18.53	2.15	120.3	
8. 1152	300		7.32	0.65	199.55	18.57	1.85	108.5	
9. 1155	300		7.32	0.35	872.67	18.35	2.09	114.4	
10. 1158	300		7.32	0.61	253.05	18.56	1.57	109.4	
11. 1201	300		7.32	0.81	387.24	18.52	1.22	111.9	
12. 1204	300		7.32	0.31	800.54	18.45	1.66	105.4	
13. 1207	300		7.32	~~66.1~~ 1.26	710.72	18.44	1.49	102.5	
14. 1210	300		7.32	0.13	20,739	18.66	1.50	101.5	
15. 1213	300		7.32	1.05	174.14	18.73	1.09	105.5	
16. 1215	300		7.32	0.37	5.86	18.52	1.00	99.4	
17. After Sampling		4.5 gal							13.25
18.									

Sample ID: BPGP 59 **SampleClarity/Color/Odor:**
Sample Time: 12 20 **QAQC Samples Collected:** ☒ No ○ Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: Screen

Comments: Turbidity fails to stabilize. Will disassemble & recalibrate Aqua Troll.

Page ____ of ____

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGW01 **WELL DIAMETER:** 2
SAMPLER(S): LD AC
DATE: 7/26/17

WEATHER CONDITIONS: Sunny 77°

Sampling Device:	QED	**Water Quality Inst.:**	In Situ
Make/Model:	MP50	**Make/Model:**	AquaTroll 600
Serial Number:	1814	**Serial Number:**	~~34969~~ 496339

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.13 **Total Well Depth (ft-bpm):** 18.85 **Depth to Pump Inlet(ft-bmp):** 17

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. ~~(mS/m)~~	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±3%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1201			6.82	4475	136	22.81	2.33	222.4	
2. 1204			6.81	4593	69.45	20.33	2.39	197.2	13.38
3. 1208			6.84	4285	20.13	18.18	2.48	192.4	13.39
4. 1211			6.85	4281	268	18.14	2.33	197	
5. 1214		1501	6.85	4269	379.8	17.80	2.24	196	13.41
6. 1217			6.84	4275	8.48	17.70	2.12	198	13.41
7. 1220			6.82	4286	6.02	17.52	2.04	201	13.41
8. 1223			6.80	4271	6.26	17.45	1.96	198	13.
9. 1225	Collected 3 VOA								
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGW01 **SampleClarity/Color/Odor:** Clear No Odor
Sample Time: 1225 **QAQC Samples Collected:** ☒ No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: VOC

Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP 32 **WELL DIAMETER:** 0.5"
SAMPLER(S): S.T., S.S., B.S.
DATE: 7/26/17

WEATHER CONDITIONS: Sunny, 87°F

Sampling Device: Peristaltic Pump
Make/Model: Geotech Geopump
Serial Number: 2496

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 509 387

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.39 **Total Well Depth (ft-bpm):** 19.41 **Depth to Pump Inlet(ft-bmp):** 17

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1313	300		7.00	1.91	91.38	25.57	0.78	140.5	
2. 1316	300		7.24	1.55	148.46	19.35	0.61	130.6	
3. 1319	300		7.26	1.14	9.42	18.46	0.54	146.8	
4. 1321	300		7.27	0.74	23.23	18.15	0.55	158.3	
5. 1324	300		7.28	0.01	980.97	18.85	1.02	135.9	
6. 1327	300		7.28	1.89	1,898.0	18.97	1.05	148.2	
7. 1330	300		7.28	0.00	5649.2	18.75	1.35	159.3	
8. 1333	300		7.28	1.21	4374.3	17.84	1.29	159.0	
9. 1336	300		7.28	1.96	7.00	17.00	0.41	130.7	
10. 1339	300		7.27	1.95	12.37	16.98	0.37	138.6	
11. 1342	300		7.27	1.87	14.13	17.06	0.34	126.6	
12. 1345	300		7.27	1.86	39.83	17.23	0.33	122.6	
13. ~~1346~~	~~300~~								
14. 1348	300		7.25	1.81	66.53	17.16	0.31	128.6	
15. 1350		4.0 gal						Final	13.38
16.									
17.									
18.									

Sample ID: BPGP32 **SampleClarity/Color/Odor:**
Sample Time: 1350 **QAQC Samples Collected:** ☒ No ○ Yes: **If yes, QAQC IDs**
Analytical methods requested on COC:

Comments: Turbidity appears to be affected by air off-gassing as it comes up well. Tilting In-Situ probe helps keep air out of sensors.

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: EMW-11 **WELL DIAMETER:** 4
SAMPLER(S): LD AL
DATE: 7/26/17

WEATHER CONDITIONS: Sunny 80°

Sampling Device: Bladder Pump
Make/Model: QED M750
Serial Number: 1814

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number:

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 12.16 **Total Well Depth (ft-bpm):** 26.07 **Depth to Pump Inlet(ft-bmp):** ~22

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1328			7.08	2253	6.78	24.87	1.07	59.8	
2. 1331			7.09	2260	10.45	20.75	0.43	48.9	12.35
3. 1334			7.06	2129	6.90	19.97	0.41	46.3	
4. 1337			7.10	2192	9.03	17.77	0.22	39.1	12.58
5. 1340			7.11	2206	8.40	~~17.69~~	0.20	31.1	12.68
6. 1343			7.09	2249	5.51	16.87	0.20	25.8	
7. 1346			7.03	2249	1.83	16.37	0.15	24.7	12.81
8. 1349			6.96	2280	3.38	16.40	0.15	23.6	12.84
9. 1352			6.93	2243	2.81	16.34	0.14	21.8	
10. 1355			6.88	2256	2.12	16.13	0.14	20.4	
11. 1400	Collect 3 VOA w/ down well pump								
12. 1405	Collect 3 VOA w/ peristaltic					EMW-11 P			
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: EMW-11 **SampleClarity/Color/Odor:** Clear No Odor
Sample Time: 1400 **QAQC Samples Collected:** ○ No ○ Yes: **If yes, QAQC IDs**
Analytical methods requested on COC:

Comments: Purged w/ bladder pumps samples collected w/ bladder & peri pumps
Small Bubbles in sample bottles

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP80 **WELL DIAMETER:** 0.75
SAMPLER(S): S.T., J.S., B.S
DATE: ~~7/27~~ 7/26/17
WEATHER CONDITIONS: Sunny, hot

Sampling Device: ~~Ge~~ Peristaltic Pump
Make/Model: Geotech Geopump
Serial Number: 2496

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 309 387

Tubing Type: X Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 12.07 **Total Well Depth (ft-bpm):** 20.02 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (Mlpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1438	350		7.09	2.47	37.12	25.63	1.03	130	
2. 1441	300		7.21	2.55	6.59	19.08	0.36	124.6	
3. 1444	300		7.23	2.58	9.81	18.09	0.38	122.2	
4. 1447	300		7.23	2.57	15.64	17.52	0.33	120.6	
5. 1450	300		7.21	2.54	19.45	17.00	0.32	121.2	
6.		~1.2 Gal						Final	12.05
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP80 **SampleClarity/Color/Odor:**
Sample Time: 1455 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC:

Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP08 **WELL DIAMETER:** 1/2
SAMPLER(S): LD AL
DATE: 7/20/12

WEATHER CONDITIONS: Sunny 85°

Sampling Device:	Peristaltic Pump	**Water Quality Inst.:**	In Situ
Make/Model:	Geotech Geopump	**Make/Model:**	Aqua troll 600
Serial Number:	7493	**Serial Number:**	496339

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.80 **Total Well Depth (ft-bpm):** 20.69 **Depth to Pump Inlet(ft-bmp):** ~18

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	µS/cm Cond. ~~(mS/m)~~	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1443			7.48	2029.7	40.62	27.53	1.43	131.5	
2. 1446			7.11	1896.5	9.6	23.59	0.88	140.2	
3. 1449			7.13	1807.0	2.58	21.51	0.84	140.3	
4. 1452			7.16	1756.1	2.93	20.33	0.62	141.3	
5. 1455	0.2		7.16	1729.9	1.50	19.84	0.64	145.3	
6. 1458			7.15	1934.5	1.54	18.98	0.69	160.0	
7. 1501			7.13	1950.5	1.06	18.57	0.63	159.9	
8. 1504			7.07	1958.3	0.91	18.46	0.62	161.9	
9. 1505	Collect 3 VOA								
10. 1515									11.86
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP08 **SampleClarity/Color/Odor:** Clear No Odor
Sample Time: 1505 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: VOC

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPG P05 **WELL DIAMETER:** 0.5"
SAMPLER(S): S.T., B.S., J.S.
DATE: 7/26/17

WEATHER CONDITIONS: Sunny, Hot

Sampling Device:	Peristaltic Pump	**Water Quality Inst.:**	In Situ
Make/Model:	Geo Tech Geopump	**Make/Model:**	Aqua Troll 600
Serial Number:	2496	**Serial Number:**	509837

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.12 **Total Well Depth (ft-bpm):** 21.90 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1541	325		7.41	1.27	212.15	21.20	3.72	118.2	
2. 1544	300		7.44	1.29	55.05	18.10	4.26	115.7	
3. 1547	300		7.45	1.33	24.69	17.11	4.39	113.2	
4. 1550	300		7.43	1.37	15.66	16.58	4.49	112.3	
5. 1553	300		7.34	1.39	10.69	16.34	4.40	116.1	
6. 1556	300		7.21	1.40	8.97	16.23	4.31	121.5	
7. 1559	300		7.15	1.42	8.69	16.16	4.22	122.8	
8.		~30 gal						Final	11.12
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP05 **SampleClarity/Color/Odor:**
Sample Time: 1605 **QAQC Samples Collected:** ⊗ No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC:

Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP 85 **WELL DIAMETER:** ½
SAMPLER(S): LD AL
DATE: 7/26/17

WEATHER CONDITIONS: Sunny 90°

Sampling Device:	Peristaltic pump	**Water Quality Inst.:**	In Situ
Make/Model:	GeoTech Geo pump	**Make/Model:**	Aqua Troll 600
Serial Number:		**Serial Number:**	496339

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.28 **Total Well Depth (ft-bpm):** 19.88 **Depth to Pump Inlet(ft-bmp):** 17

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1540			7.00	3072	66.97	18.75	0.64	157.1	
2. 1543	0.2		7.01	3240	321.3	16.83	0.91	159.9	
3. 1546			7.02	3298	675.21	16.31	0.96	161.4	
4. 1549			7.02	3176	604.97	16.13	1.00	163.3	
5. 1552			7.02	3037	9.44	16.18	0.77	164.6	
6. 1555			6.99	3405	1.19	15.94	0.77	167.7	
7. 1558			6.95	3401	1.18	15.96	0.74	170	
8. 1601		2 gal	6.92	3391.5	0.93	15.97	0.73	171.5	
9. 1605	Collect 3 VOA								
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP 85 **SampleClarity/Color/Odor:** Clear No Odor
Sample Time: 1605 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: VOC

Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP88 **WELL DIAMETER:** ½
SAMPLER(S): LD AL
DATE: 7/26/17

WEATHER CONDITIONS:

Sampling Device:	Peristaltic	**Water Quality Inst.:**	In Situ
Make/Model:	GeoTech Geopump	**Make/Model:**	Aqua Troll 600
Serial Number:		**Serial Number:**	496339

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.30 **Total Well Depth (ft-bpm):** 17.59 **Depth to Pump Inlet(ft-bmp):** 15

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1624			7.55	700.53	3.79	21.04	4.75	138.7	
2. 1628			7.68	620.37	2.18	18.64	5.08	133.7	
3. 1631			7.68	630.13	1.86	18.49	5.14	133.9	
4. 1634			7.68	614.11	1.27	18.13	5.18	134.2	
5. 1637			7.66	647.01	0.89	17.91	5.21	135.6	
6. 1640			7.64	600.33	0.75	17.83	5.24	137.0	
7. 1643			7.61	592.85	0.91	17.89	5.24	139.4	
8. 1645	Sample Collected			3 VOA					
9. 1653									11.30
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP88 **SampleClarity/Color/Odor:** Clear No Odor
Sample Time: 1645 **QAQC Samples Collected:** ~~O~~ No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: VOC

Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP49 **WELL DIAMETER:** 1/2
SAMPLER(S): LD AL
DATE: 7/27/16

WEATHER CONDITIONS: Overcast 71°

Sampling Device: Low Flow Bladder Pump
Make/Model: Geotech Geopump
Serial Number: [illegible]

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number:

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.70 **Total Well Depth (ft-bpm):** **Depth to Pump Inlet(ft-bmp):** 19

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	µS/cm ~~(mS/m)~~ Cond.	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 0702			7.02	3468	140.48	22.11	3.64	84.3	
2. 0705			7.01	3106	108.20	19.22	2.53	93.5	
3. 0708			7.04	2866	58.23	18.35	2.15	100.4	
4. 0711			7.05	2700	25.09	18.16	1.89	102.8	
5. 0714			7.05	2724	7.63	17.95	1.83	105.7	
6. 0717			7.05	2725	11.31	17.90	1.76	108.4	
7. 0720			7.04	2533	4.81	17.83	1.80	111.2	
8. 0723			7.03	2500	6.91	17.71	1.69	112.7	
9. 0726			7.01	2277	23.11	17.61	1.55	115.5	
10. 0729			7.00	2227	19.63	17.59	1.50	117.2	
11. 0732			6.98	2222	86.18	17.60	1.51	119.3	
12. 0735			6.97	2196	25.55	17.56	1.61	121.2	
13. 0739			6.96	2254	4.47	17.56	1.51	123.0	
14. 0744		2.5gal	6.95	2106	2.71	17.54	1.53	124.7	
15.	Sample Collected			3 VOA					
16. 0752									13.64
17.									
18.									

Sample ID: BPGP49 **SampleClarity/Color/Odor:**
Sample Time: 0744 **QAQC Samples Collected:** Ø No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC:
Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPAP78 **WELL DIAMETER:**
SAMPLER(S): S. Trahan, B. Schiche, J. Simons
DATE: 7/27/16

WEATHER CONDITIONS: overcast, rainy

Sampling Device:	Geotech Peristaltic Pump	**Water Quality Inst.:**	Instru
Make/Model:	Geo Pump	**Make/Model:**	Aqua Troll 600
Serial Number:	2496	**Serial Number:**	509 387

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.05 **Total Well Depth (ft-bpm):** 22.17 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	± 10%	--
1. 0716	start								
2. 0719	325		6.55	3.03	161.56	21.79	2.36	224.5	
3. 0722	300		6.83	3.15	13.50	18.18	0.55	25.2	
4. 0725	300		6.86	2.76	3.39	17.21	0.38	-27.2	
5. 0728	300		6.87	2.33	6.06	16.92	0.33	-42.9	
6. 0731	300		6.89	2.70	2.99	16.75	0.31	-51.9	
7. 0734	300		6.90	2.10	2.65	16.44	0.3	-58.6	
8. 0745	300		6.91	2.73	5.36	16.08	0.30	-68.3	
9. 0748	300		6.91	2.64	5.84	16.12	0.30	-69.7	
10. 0750	Sample collected							Final	13.02
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPAP78 **SampleClarity/Color/Odor:**
Sample Time: 0750 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC:

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP 61 **WELL DIAMETER:** 1/2
SAMPLER(S): LD AC
DATE: 7/27/17

WEATHER CONDITIONS: Overcast 70°

Sampling Device:	Peristaltic Pump	**Water Quality Inst.:**	In Situ
Make/Model:	Geotech Geopump	**Make/Model:**	Aqua Troll 600
Serial Number:	7814	**Serial Number:**	496339

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.85 **Total Well Depth (ft-bpm):** 17.63 **Depth to Pump Inlet(ft-bmp):** 15

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 0807			6.67	4281.1	523.45	18.68	2.00	139.9	
2. 0810			6.70	4314	11.91	17.16	0.73	102.5	
3. 0813			6.74	4480	6.94	16.77	0.64	85.6	
4. 0816			6.76	4345	63.05	16.77	0.57	66.4	
5. 0819			6.78	4222	24.63	16.67	0.53	54.4	
6. 0822			6.79	4199	24.33	16.62	0.59	50.8	
7. 0825			6.81	4297	38.23	16.55	0.58	43.2	
8. 0829			6.81	4165	91.29	16.45	0.56	35.3	
9. 0832			6.80	4154	68.59	16.42	0.47	31.6	
10. 0835			6.83	4136	64.77	16.43	0.44	27.0	
11. 0838			6.81	4129	68.61	16.43	0.44	23.6	
12. 0840	Collect	3 VOA							
13. 0846									13.85
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP 61 **SampleClarity/Color/Odor:** Clear No Odor
Sample Time: 0840 **QAQC Samples Collected:** ☒ No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC:
Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGW04 WELL DIAMETER: 2"
SAMPLER(S): S. Trahan, B. Schiche
DATE: 7/27/17

WEATHER CONDITIONS: Overcast

Sampling Device: Peristaltic / Bladder
Make/Model: Geopump / Sample Pro
Serial Number: 2496 / 10790

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 309387

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.71 Total Well Depth (ft-bpm): 20.20 Depth to Pump Inlet(ft-bmp): _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	± 10%	--
0901	250		7.11	1.22	15.77	19.70	2.10	74.7	
0904	250		7.17	1.26	180.69	17.14	2.63	70.5	
3. 0907	250		7.23	1.30	181.25	16.51	3.74	63.0	
4. 0910	250		7.27	1.32	130.64	16.21	4.50	59.3	
5. 0913	250		7.29	1.35	252.67	15.88	5.11	59.6	
6. 0917	250		7.29	1.36	292.47	15.69	5.33	62.2	
7. 0920	250		7.27	1.37	434.03	15.61	5.50	65.7	
8. 0924	250		7.25	1.37	546.17	15.65	5.79	68.2	
9. 0927	250		7.24	1.38	598.15	15.68	5.91	71.8	
10. 0930	250		7.23	1.37	659.98	15.88	5.80	73.5	
11. 0933	250		7.22	1.37	702.38	15.83	5.74	74.6	
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGW04 SampleClarity/Color/Odor:
Sample Time: 0940 QAQC Samples Collected: O No O Yes: If yes, QAQC IDs 20170727-A Peristaltic
20170727-B Eq. Blank
Analytical methods requested on COC:

Comments: Check valve does not always seem to seat correctly, allowing GW probe to drain

Page ____ of ____

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP 65 **WELL DIAMETER:** 2
SAMPLER(S): LD AL
DATE: 7/27/17

WEATHER CONDITIONS: Overcast 70°

Sampling Device:	Bladder Pump	**Water Quality Inst.:**	In Situ
Make/Model:	Micro purge MP50	**Make/Model:**	Aqua Troll 600
Serial Number:	MP50L 1814	**Serial Number:**	496339

Tubing Type: Ø Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.12 **Total Well Depth (ft-bpm):** 19.96 **Depth to Pump Inlet(ft-bmp):** 18

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 0917			7.33	1054	260.50	17.56	7.16	92.5	13.18
2. 0920			7.43	1061	208.48	16.27	7.43	102.3	13.18
3. 0923			7.47	1040	120.07	15.95	7.46	108.8	13.18
4. 0926			7.47	1024	94.09	15.75	7.36	110.8	13.18
5. 0929			7.47	820.56	70.09	15.72	7.37	114.2	13.19
6. 0932			7.45	808.64	46.97	15.85	7.30	118.1	13.19
7. 0935			7.44	800.99	32.50	15.85	7.28	121.5	13.19
8. 0938			7.44	792.68	22.88	15.85	7.31	125.3	13.19
9. 0941			7.43	784.92	15.82	15.90	7.26	126.0	13.18
10. 0944			7.46	781.21	11.44	15.87	7.25	127.1	13.18
11. 0947			7.45	772.58	8.31	15.86	7.24	126.3	13.18
12. 0947		Sample	Collected		3 VOA				
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP65 **SampleClarity/Color/Odor:** Clear / No odor
Sample Time: 0947 **QAQC Samples Collected:** Ø No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC:

Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPG863 **WELL DIAMETER:** 2
SAMPLER(S): LD AL
DATE: 7/27/17

WEATHER CONDITIONS: Sunny 76°

Sampling Device: Peristaltic
Make/Model: GeoTech Bladder pump
Serial Number:

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 436335

Tubing Type: ⊘ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 14.11 **Total Well Depth (ft-bpm):** 19.96 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	µS/cm Cond. ~~(mS/m)~~	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1022			7.52	645	243.15	19.45	2.96	119.6	13.98
2. 1025			7.62	434.69	109.65	16.86	4.19	118.5	14.11
3. 1028			7.67	570.83	92.04	15.70	4.62	118.6	
4. 1031			7.68	472.68	81.29	15.28	4.51	118.5	13.99
5. 1034			7.69	458.57	61.15	15.58	4.73	119.6	13.97
6. 1037			7.67	434.67	55.07	14.85	4.66	122.3	13.99
7. 1040			7.66	648	33.66	14.69	4.68	122.0	
8. 1043			7.62	646.98	47.07	14.63	4.59	123.8	14.14
9. 1046			7.55	648.5	33.37	14.72	4.68	128.3	
10. 1049			7.45	647.16	34.44	14.66	4.62	132.0	14.12
11. 1052			7.42	644.8	34.57	14.69	4.69	136.5	
12. 1055	Collect	3 VOA							
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: ~~1055~~ BPGP63 **SampleClarity/Color/Odor:** Clear No odor
Sample Time: 1055 **QAQC Samples Collected:** ⊘ No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: √ VOC

Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP63B WELL DIAMETER: .5
SAMPLER(S): CD AL
DATE: 7/27/17

WEATHER CONDITIONS: Sunny 80°

Sampling Device: Peristaltic Pump
Make/Model: Geopump
Serial Number:

Water Quality Inst.: In situ
Make/Model: Aqua Troll 600
Serial Number: 496339

Tubing Type: O Teflon O Poly O Other Decontamination: O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 14.25 Total Well Depth (ft-bpm): 20.75 Depth to Pump Inlet(ft-bmp):

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 11:14			7.06	658.13	8.56	22.00	3.87	145.6	
2. 11:17			7.37	685.08	0.70	17.99	2.77	140.8	
3. 11:20			7.43	688.00	0.43	17.28	2.77	137.6	
4. 11:23			7.45	696.91	0.57	16.88	2.76	136.7	
5. 11:26			7.45	697.31	583.28	16.58	3.07	136.6	
6. 11:29			7.45	691.41	196.63	16.69	2.79	136.4	
7. 11:32			7.45	701.30	167.64	16.69	2.77	136.7	
8. 11:35			7.45	700.27	20.96	16.62	2.78	136.8	
9. 11:38			7.44	702.54	234.54	16.57	2.96	137.0	
10. 11:41			7.43	704.18	0.40	16.58	2.98	137.0	14.12
11. 11:41		Sample Collected			3 VOA				
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP63B SampleClarity/Color/Odor: Clear no odor
Sample Time: 11:41 QAQC Samples Collected: O No O Yes: If yes, QAQC IDs
Analytical methods requested on COC:
Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: DPGP 46 **WELL DIAMETER:** 0.5
SAMPLER(S): S. Trahan, B. Schiebe
DATE: 7/27/17

WEATHER CONDITIONS: Sunny, 90+°F

Sampling Device: Peristaltic
Make/Model: Geotech Geopump
Serial Number: 2496

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 309 387

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.61 **Total Well Depth (ft-bpm):** 21.58 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	±10%	--
1. 1203	300		7.17	1.74	4.99	19.29	0.20	74.1	
2. 1206	300		7.17	1.66	4.11	18.30	0.16	71.2	
3. 1209	300		7.09	1.60	7.26	18.00	0.13	73.8	
4.								Final	13.62
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: **SampleClarity/Color/Odor:**

Sample Time: 1215 **QAQC Samples Collected:** ○ No ○ Yes: **If yes, QAQC IDs**

Analytical methods requested on COC:

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP46B WELL DIAMETER: 0.5
SAMPLER(S): J. Trahan, B. Schiche
DATE: 7/27/17

WEATHER CONDITIONS: Sunny, 90 +°F

Sampling Device: Peristaltic Pump
Make/Model: GeoTech Geo Pump
Serial Number: 2496

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 509 387

Tubing Type: ☒ Teflon ○ Poly ○ Other Decontamination: ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.62 Total Well Depth (ft-bpm): 34.64 Depth to Pump Inlet(ft-bmp):

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1243	250		7.02	1.61	10.90	27.51	2.67	74.9	
2. 1244	Purged Dry. Lower tubing to 2' from bottom of well								
3.	will attempt to draw down completely.								
4. 1252	250		7.16	2.42	49.88	23.25	3.00	-24.9	
5. 1253	Flow slows to a dribble as we reach practical limit								
6.	for extraction by a peristaltic pump								
7. 1256	min.		7.04	2.94	41.99	22.07	2.65	-32.1	
8. 1259	min.		7.04	2.97	49.89	22.66	2.06	-39.2	
9. 1302	min.		7.05	2.99	53.75	23.07	1.67	-40.3	
10. 1305	min		7.05	2.98	51.37	23.02	1.41	-44	
11.	Purged to practical limits of peristaltic pump. will								
12.	collect VOA analyses only.								
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP46B SampleClarity/Color/Odor:
Sample Time: 1310 QAQC Samples Collected: ○ No ○ Yes: If yes, QAQC IDs
Analytical methods requested on COC:
Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP74 **WELL DIAMETER:** 1/2
SAMPLER(S): LD AL
DATE: 7/27/17

WEATHER CONDITIONS: Sunny

Sampling Device:	Reverse Air Pump	**Water Quality Inst.:**	In Situ
Make/Model:	GeoTech Geopump	**Make/Model:**	Aqua Troll 600
Serial Number:	[illegible]	**Serial Number:**	[illegible] 339

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 10.53 **Total Well Depth (ft-bpm):** 21.56 **Depth to Pump Inlet(ft-bmp):** 20

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1326			7.05	1598.8	121.4	25.11	1.25	194.5	
2. 1329			7.16	1311.8	166.4	21.64	0.40	159.5	
3. 1334			7.20	1277.5	37.64	19.90	0.28	170.4	
4. 1337			7.20	1232.8	31.73	19.12	0.26	166.4	
5. 1340			7.12	1224.9	55.32	18.53	0.28	162.1	
6. 1343			6.99	1245.2	28.79	19.48	0.35	172.5	
7. 1346			6.88	1254.9	9.29	19.87	0.38	176.1	
8. 1349			6.86	1239.9	6.89	19.86	0.35	174.8	
9. 1352		2.0 gal	6.88	1260.7	3.72	19.63	0.35	172.4	10.60
10. 1352		Sample Collected				3 VOA			
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP 74 **SampleClarity/Color/Odor:** Clear No Odor
Sample Time: 1352 **QAQC Samples Collected:** ☒ No ○ Yes: **If yes, QAQC IDs**
Analytical methods requested on COC:
Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP65B **WELL DIAMETER:** 0.5
SAMPLER(S): S. SEITZ
DATE: 7/27/2017

WEATHER CONDITIONS: Sunny, 92+°F, light wind

Sampling Device: Peristaltic
Make/Model: GeoTech Geo Pump
Serial Number: 2496

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 1000
Serial Number: 509 387

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.31 **Total Well Depth (ft-bpm):** 29.89 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (mL/m)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	± 10%	--
1. 1400									13.31
2. 1413	≅200	500mL	7.08	1.79	52.14	24.76	0.71	103.3	NT
3. 1416	≅200mL/min	≅1000mL	7.10	1.92	9.29	20.33	0.74	191.4	NT
4. 1420	≅200mL/m	≅1gal	7.11	1.93	4,315.8	18.53	0.79	186.3	
5. 1425	≅200mL/min	1.25gal	6.99	1.95	78.99	18.41	0.83	196.6	
6. 1430	≅200mL/min	1.5gal	6.88	1.93	67.36	18.03	0.85	192.9	
7. 1435	≅250 mL/min	2gal	6.87	1.93	104.95	17.78	0.85	179.4	
8. 1439	≅250 mL/min	2.5gal	6.87	1.88	179.64	17.88	0.87	172.4	
9. 1442	≅250 mL/min	2.75gal	6.89	1.87	173.87	17.73	0.88	169.4	
10. 1445	≅250 mL/min	~3gal	6.94	1.86	135.15	17.62	0.89	165.5	
11. 1449	≅200 mL/min	≅3.25gal	6.96	1.84	115.61	17.37	0.90	151.7	
12. 1453	≅200 mL/min	≅3.5gal	6.97	1.84	119.61	17.37	0.92	151.4	13.34
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP65B **SampleClarity/Color/Odor:** Clear / no color / no odor
Sample Time: 1455 **QAQC Samples Collected:** Ø No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: Full Suite

Comments:

Hard to get tubing past ≅ 25' bgs - might have well issue @ connection to screen

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP 51 **WELL DIAMETER:** .5
SAMPLER(S): LD AL
DATE: 7/27/17

WEATHER CONDITIONS: Sunny 80°

Sampling Device: Peristaltic Pump
Make/Model: Geotech Geopump
Serial Number:

Water Quality Inst.: In Situ
Make/Model: Hydro Troll 600
Serial Number: 0416 339

Tubing Type: Ø Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 12.94 **Total Well Depth (ft-bpm):** 21.83 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1426			7.33	1574.0	222.68	25.25	3.01	135	
2. 1429			7.24	1458.6	147.76	21.23	2.87	140.2	
3. 1432			7.20	1448.8	199.77	20.15	2.91	143.1	
4. 1435			7.18	1457.5	29.45	19.66	2.88	145.3	
5. 1438			7.17	1439.4	16.70	19.29	2.88	146.5	
6. 1441			7.15	1433.7	67.36	19.25	2.84	148.5	
7. 1444			7.11	1429.2	9.64	18.88	2.89	150.8	
8. 1447			7.05	1418.4	12.93	18.91	2.79	154.5	
9. 1450			6.99	1411.6	19.62	18.63	2.83	157.6	
10. 1453			6.92	1409.1	316.49	18.82	2.80	161.4	
11. 1456			6.88	1401.3	169.14	18.61	2.79	163.9	
12. 1459			6.87	1394.6	9.64	18.57	2.90	164.0	
13. ~~1502~~ 1502			6.86	1466.3	7.10	18.82	2.84	163.8	13.64
14. 1502		Sample Collected			3 VOA				
15.									
16.									
17.									
18.									

Sample ID: BPGP51 **SampleClarity/Color/Odor:**
Sample Time: 1502 **QAQC Samples Collected:** Ø No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC:
Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP51B **WELL DIAMETER:** .5
SAMPLER(S): LD AL
DATE: 7/27/17

WEATHER CONDITIONS: Sunny 80°

Sampling Device: Peristaltic Pump
Make/Model: Geotech Geopump
Serial Number:

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number:

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.70 **Total Well Depth (ft-bpm):** 27.57 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 0320			7.36	495.87	61.96	24.73	0.51	144.0	
2. 0323			7.38	503.89	33.52	22.00	0.29	128.0	
3. 0326			7.40	505.75	42.00	21.61	0.29	122.5	
4. 0329			7.47	504.13	51.86	21.11	0.29	108.9	
5. 1532			7.51	520.51	54.58	20.50	0.39	100.5	
6. 1535			7.54	502.30	70.73	20.73	0.53	94.5	
7. 1538			7.55	497.22	76.43	20.35	0.31	88.2	
8. 1541			7.55	503.05	979.76	20.05	0.27	81.2	
9. 1544			7.54	490.60	62.83	20.20	0.28	76.7	
10. 1547			7.52	485.95	68.91	20.28	0.24	73.1	
11. 1550			7.51	479.43	42.02	19.84	0.24	68.9	
12. 1553			7.46	472.45	27.27	19.51	0.23	64.2	
13. 1556			7.44	473.53	31.54	19.37	0.20	62.8	
14. 1559			7.41	467.93	29.46	19.33	0.23	62.5	
15. 1559		Sample Collected			3 VOA				
16. 1608									13.69
17.									
18.									

Sample ID: BPGP51B **SampleClarity/Color/Odor:** Clear No Odor
Sample Time: 1559 **QAQC Samples Collected:** ☒ No ○ Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: VOC

Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP53 **WELL DIAMETER:** 1/2
SAMPLER(S): LD AL
DATE: 7/27/17

WEATHER CONDITIONS: Sunny 91°

Sampling Device:	Peristaltic Pump	**Water Quality Inst.:**	In Situ
Make/Model:	Geotech Geopump	**Make/Model:**	Aqua Troll 600
Serial Number:		**Serial Number:**	446 339

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.30 **Total Well Depth (ft-bpm):** 27.20 **Depth to Pump Inlet(ft-bmp):** ~24

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1631			7.44	904.23	72.45	21.09	3.92	110.8	
2. 1635			7.49	988.02	21.29	21.29	3.82	113.2	
3. 1638			7.49	890.26	14.91	19.21	3.85	116.3	
4. 1641			7.47	853.46	16.00	19.04	3.87	118.2	
5. 1644			7.47	872.82	10.57	18.50	3.88	120.0	
6. 1647			7.44	857.09	5.92	18.29	3.89	122.4	
7. 1650			7.45	852.76	4.31	18.17	3.89	124.2	
8. 1653			7.39	846.7	3.56	18.11	3.86	126.1	
9. 1655	Collected		3 VOA						
10. 1700									13.50
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP53 **SampleClarity/Color/Odor:** Clear No Odor
Sample Time: 1655 **QAQC Samples Collected:** ☒ No ○ Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: VOC
Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP25 **WELL DIAMETER:** 1/2
SAMPLER(S): LD AC
DATE: 7/28/17

WEATHER CONDITIONS: PC Cloudy 70°

Sampling Device:	Peristaltic	**Water Quality Inst.:**	In Situ
Make/Model:	Geotech Geopump	**Make/Model:**	Aqua Troll 600
Serial Number:		**Serial Number:**	426339

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.97 **Total Well Depth (ft-bpm):** 21.47 **Depth to Pump Inlet(ft-bmp):** 20

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 0717			7.06	2845.9	49.22	19.04	1.62	119.2	
2. 0720			7.06	2873.5	199.93	17.48	1.59	116.2	
3. 0723			7.05	2847	174.93	16.85	1.57	116.3	
4. 0726			7.05	2848	140.94	16.56	1.50	115.6	
5. 0729			7.05	2838	129.60	16.30	1.49	113.1	
6. 0732			7.04	2830	96.2	16.99	~~1.00~~	113.7	
7. 0735			7.02	2857	73.7	16.14	1.48	114.6	
8. 0738			7.01	2860	57.4	16.12	1.82	115.5	
9. 0741			7.00	2868	39.01	16.25	2.24	116.6	
10. 0744			6.97	2875	25.4	16.17	2.28	117.1	
11. 0747			6.96	2883	18.66	16.02	2.20	118.4	
12. 0750			6.96	2854	15.11	15.98	1.95	118.4	
13. 0753			6.95	2862	14.40	16.01	1.92	119.9	
14. 0756		2.5 gal	6.94	2871	13.29	16.08	1.74	119.6	
15. 0800	Collect 9 VOA								
16. MS	0805								
17. MSD	0810								
18. 0800									11.97

Sample ID: BPGP25 **SampleClarity/Color/Odor:** Clear No Odor
Sample Time: 0800 **QAQC Samples Collected:** O No ⊗ Yes: **If yes, QAQC IDs** MS/MSD
Analytical methods requested on COC: VOC

Comments:

Page ____ of ____

20.00
20.22

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: EMW-03 **WELL DIAMETER:** 2"
SAMPLER(S): JS, BS
DATE: 7-28-17

WEATHER CONDITIONS: Sunny 75f

Sampling Device: ~~Insitu 600~~
Make/Model: ~~Grampump~~ Bladder Pump
Serial Number:

Water Quality Inst.: Insitu
Make/Model: Aqua Troll 600
Serial Number: 509337

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ☒ Decontaminated Water Meter ☒ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 12.90 **Total Well Depth (ft-bpm):** 20.00 **Depth to Pump Inlet(ft-bmp):** 19.00

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 745	300	Ø	7.01	1.61	981.23	19.38	0.63	81.5	12.97
2. 750	300		7.01	1.63	580.67	17.19	0.28	83.6	13.00
3. 755	300		7.01	1.62	606.03	16.67	0.22	84.0	13.01
4. 800	300		7.01	1.62	505.61	16.47	0.19	84.7	13.01
5. 805	300		7.03	1.62	473.40	16.44	0.19	85.3	13.00
6. 810	300		7.03	1.60	469.80	16.29	0.17	86.3	13.03
7. 815	300		7.03	1.60	137.48	15.97	0.14	88.1	13.04
8. 820	300		7.05	1.59	321.14	16.09	0.13	89.7	13.04
9. 825	300		7.00	1.59	110.87	15.96	0.11	90.8	13.05
10. 830	300		7.00	1.53	113.71	15.94	0.12	90.3	13.07
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: EMW-03 **SampleClarity/Color/Odor:** SC turbid
Sample Time: 830 **QAQC Samples Collected:** ○ No ○ Yes: **If yes, QAQC IDs** 20170728-A
Analytical methods requested on COC:

Comments: Peristaltic sample 20170728-A Comparison of Bladder pump VOCs to peristaltic pump VOCs @ this well

Geotech - Geo pump Model T # 24916

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP27 **WELL DIAMETER:** 1/2
SAMPLER(S): LD AL
DATE: 7/28/17

WEATHER CONDITIONS: Sunny 70°

Sampling Device:	Peristaltic Pump	**Water Quality Inst.:**	In Situ
Make/Model:	Geotech Geo pump	**Make/Model:**	Aqua Troll 600
Serial Number:		**Serial Number:**	496335

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.36 **Total Well Depth (ft-bpm):** 21.44 **Depth to Pump Inlet(ft-bmp):** 19

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 0830			6.90	3471	327.32	21.61	3.11	229.0	
2. 0833			6.97	3220	406.08	15.14	1.37	235.2	
3. 0836			7.02	3350	431.16	16.55	0.92	225.2	
4. 0840			7.08	3259	502.75	16.49	0.56	227.0	
5. 0843			7.10	3257	505.55	16.41	0.55	227.0	
6. 0846			7.09	3255	502.22	16.29	0.51	222.0	
7. 0849			7.09	3241	497.77	16.60	0.46	216.9	
8. 0852		2 gal	7.10	3250.5	494.9	16.09	0.45	213.5	
9. 0855	Collect	6 VOA							
10. 0900									11.39
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP27 **SampleClarity/Color/Odor:** Clear No odor
Sample Time: 0855 **QAQC Samples Collected:** O No ⊗ Yes: **If yes, QAQC IDs** 20170728-B BD
Analytical methods requested on COC: VOC

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP48 **WELL DIAMETER:** 1/2
SAMPLER(S): LD AC
DATE: 7/28/12

WEATHER CONDITIONS: Sunny 74°

Sampling Device:	**Water Quality Inst.:**
Make/Model:	**Make/Model:**
Serial Number:	**Serial Number:**

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 10.74 **Total Well Depth (ft-bpm):** 21.74 **Depth to Pump Inlet(ft-bmp):** 18

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 0915			7.02	4077.5	94.72	23.34	3.31	194.5	
2. 0918			7.04	3734	40.00	19.23	2.83	203.7	
3. 0921			7.05	3789.9	5.55	17.48	2.27	203.7	
4. 0924			7.02	3581.2	6.54	17.17	2.27	202.7	
5. 0928			7.03	3770	2.50	16.92	2.24	201.8	
6. 0931		1.5 gal	7.05	3627	4.39	16.75	2.19	200.6	
7. 0935	Collect	17							
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP 48 **SampleClarity/Color/Odor:** Clear No Odor
Sample Time: 0935 **QAQC Samples Collected:** ☒ No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: Full suite

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: CENEX-5 **WELL DIAMETER:** 2"
SAMPLER(S): S. Trahan, B. Schiche, J. Simon
DATE: 7/28/17

WEATHER CONDITIONS: Sunny +90°F

Sampling Device: QED Bladder Pump
Make/Model: QED Sample Pro
Serial Number: 11875

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 60
Serial Number:

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** ● Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.87 **Total Well Depth (ft-bpm):** 20.22 **Depth to Pump Inlet(ft-bmp):** 19.00

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 915	250		7.04	1.99	117.38	18.02	0.38	124.1	
2. 918	250		7.04	2.00	134.22	17.03	0.42	123.8	
3. 923	250		6.90	2.01	81.21	16.49	0.52	130.8	12.00
4. 926	250		6.82	2.01	81.12	16.31	0.64	135.2	
5. 929	250		6.76	2.01	76.57	16.27	0.63	137.0	
6. 932	250		6.75	2.01	60.47	15.97	0.61	137.3	
7. 935	250		6.74	2.01	59.84	16.00	0.74	137.7	
8. 0938	250		6.73	2.01	49.90	15.84	0.67	138.1	
9. 0941	250		6.74	2.01	44.61	15.82	0.69	137.2	
10. 0945	Sample Collected								
11.									
12.								end @ 11.85	
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: CENEX-5 **SampleClarity/Color/Odor:** Clear no odor
Sample Time: 0945 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC:

Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP83 **WELL DIAMETER:** <1"
SAMPLER(S): ST, SS
DATE: 7/28/17

WEATHER CONDITIONS: Warm, no clouds, ≈ 90°F

Sampling Device:	~~Insitu 600~~ Geo Tech	**Water Quality Inst.:**	Aqua Troll 600
Make/Model:	Geo pump	**Make/Model:**	Insitu
Serial Number:	2496	**Serial Number:**	509387

Tubing Type: Ø Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 12.64 **Total Well Depth (ft-bpm):** 22.65' **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (mL/min)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 0957	start								
2. 1000	250 mL/min		6.85	1.90	3.34	17.27	1.80	122.9	—
3. 1005	250 mL/min		6.85	1.92	6.28	16.89	1.75	120.7	—
4. 1010	250 mL/min		6.87	1.92	10.72	16.85	1.68	117.6	
5. 1013	250 mL/min		6.87	1.92	12.41	16.82	1.66	116.6	
6. 1018	250 mL/min		6.87	1.91	12.61	16.83	1.52	115.6	
7.								Final	12.65
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP83 **SampleClarity/Color/Odor:** Clear, no odor
Sample Time: 10:30 **QAQC Samples Collected:** Ø No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: Full Suite

Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP47 WELL DIAMETER: 1/2
SAMPLER(S): LD AL
DATE: 7/28/17

WEATHER CONDITIONS: Sunny 79°

Sampling Device:	Peristaltic Pump	Water Quality Inst.:	In Situ
Make/Model:	Geotech Geopumps	Make/Model:	Aqua Troll 600
Serial Number:		Serial Number:	496339

Tubing Type: ⊕ Teflon O Poly O Other Decontamination: O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 10.76 Total Well Depth (ft-bpm): 20.96 Depth to Pump Inlet(ft-bmp): 18

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1030			6.93	3363.6	44.69	28.65	3.09	174.2	
2. 1033			7.00	3143.6	6.97	19.50	2.34	180.0	
3. 1036			7.02	3072.3	6.34	17.92	2.44	179.5	
4. 1039			7.04	3071	1.24	17.03	3.91	178.6	
5. 1042			7.05	3101	3.40	16.76	2.95	178.6	
6. 1045			7.05	2975	1.12	16.37	2.50	178.0	
7. 1048			7.04	3116	0.91	19.79	2.42	179	
8. 1050	Collect 3 VOA								
9. 1057									10.78
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP47 SampleClarity/Color/Odor: Clear No odor
Sample Time: 1050 QAQC Samples Collected: ⊕ No O Yes: If yes, QAQC IDs
Analytical methods requested on COC: ~~VOC~~ VOC

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP 28 **WELL DIAMETER:** 1/2
SAMPLER(S): LD AC
DATE: 7/28/17

WEATHER CONDITIONS: Pt Cloudy 80°

Sampling Device:	Bladder Pump	**Water Quality Inst.:**	In Situ
Make/Model:	Geotech Gro pump	**Make/Model:**	AquaTroll 600
Serial Number:		**Serial Number:**	426339

Tubing Type: ⊘ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.19 **Total Well Depth (ft-bpm):** 20.35 **Depth to Pump Inlet(ft-bmp):** 18

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1110			6.80	3129	5.38	23.18	3.19	186.4	
2. 1113			6.82	3231	0.91	19.58	2.09	188	
3. 1116			6.89	3121.9	0.57	17.91	1.84	187.6	
4. 1119			6.88	3065	0.46	17.07	1.65	187.6	
5. 1122			6.87	3049	0.38	16.67	1.47	187.8	
6. 1125			6.87	3026	0.42	16.27	1.43	187.8	
7. 1128			6.87	2995.5	0.50	16.06	1.41	187.8	
8. 1131			6.88	3026.6	0.45	16.11	1.43	187.8	
9. 1134			6.87	3002.5	0.43	15.82	1.64	187.7	
10. 1135	Collect	3 L	OA						
11. 1141									10.93
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP 28 **SampleClarity/Color/Odor:** Clear No Odor
Sample Time: 1135 **QAQC Samples Collected:** ⊘ No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC:

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: RH-MW-3 **WELL DIAMETER:** 2
SAMPLER(S): JS BS
DATE: 7-28-17

WEATHER CONDITIONS: Sunny 80s

Sampling Device:	Aqua troll 600	**Water Quality Inst.:**	
Make/Model:	600	**Make/Model:**	
Serial Number:	509 387	**Serial Number:**	

Tubing Type: ● Teflon ● Poly ○ Other **Decontamination:** ● Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 14.64 **Total Well Depth (ft-bpm):** 19.90 **Depth to Pump Inlet(ft-bmp):** 18.90

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1130	250		6.99	2.01	693.32	18.72	0.85	115.8	14.75
2. 1135	250		7.02	2.06	601.32	17.99	0.75	115.5	14.81
3. 1140	250		7.06	2.21	535.96	16.15	0.57	115.4	14.75
4. 1145	250		7.04	2.22	326.51	15.88	0.54	116.6	14.75
5. 1150	250		7.03	2.24	284.06	15.98	0.57	117.6	14.80
6. 1155	250		6.88	2.26	130.85	15.58	0.49	124.7	14.80
7. 1200	250		6.84	2.24	108.35	15.65	0.59	125.5	14.80
8. 1205	250		6.84	2.25	46.51	15.42	0.55	125.4	14.80
9. 1210	250		6.84	2.25	47.81	15.51	0.57	124.3	14.80
10. 1215	250		6.87	2.28	45.80	15.61	0.55	124.4	14.80
11. 1220	Sample								
12.									
13.									
14.								End 1300	
15.								Final DTW	14.80
16.									
17.									
18.									

Sample ID: RH-MW-3 **SampleClarity/Color/Odor:** Cloudy
Sample Time: 1220 **QAQC Samples Collected:** ○ No ● Yes: **If yes, QAQC IDs** See below 20170728-C
Analytical methods requested on COC: Full Suite

Comments:

Used peristaltic pump to compare VOCs - VOCs taken for 20170728-C to compare to bladder

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP 86 **WELL DIAMETER:** 1/2
SAMPLER(S): LD AL
DATE: 7/25/17

WEATHER CONDITIONS: Mt Sunny 85

Sampling Device:	Peristaltic	**Water Quality Inst.:**	In Situ
Make/Model:	Geotech Geopump	**Make/Model:**	Aquatrall LOU
Serial Number:	/	**Serial Number:**	926 3399

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.86 **Total Well Depth (ft-bpm):** 22.44 **Depth to Pump Inlet(ft-bmp):** 20

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	mS/cm Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1239			7.05	2890	51.48	25.69	2.47	159.7	
2. 1242			7.09	2834	26.16	20.80	1.72	175.5	
3. 1245			7.10	2743	26.05	19.78	1.54	177.8	
4. 1248			7.12	2718	11.36	19.00	1.31	184.2	
5. 1251			7.13	2727	7.04	18.67	1.23	186.0	
6. 1254			7.13	2284.6	7.04	18.58	1.21	192.7	
7. 1257			7.13	1746.9	4.76	18.47	1.25	186.6	
8. ~~1320~~ 1300			7.12	2512.2	4.97	18.57	1.24	173.7	
9. 1303			7.11	~~2764~~ 2546.9	4.73	18.56	1.26	174.7	
10. 1306			7.11	2573.1	2.16	18.53	1.22	174.6	
11. 1310	Collected	3 VOA							
12. 1315									11.89
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP 86 **SampleClarity/Color/Odor:** Clear No Odor
Sample Time: 1310 **QAQC Samples Collected:** ☒ No ○ Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: VOC

Comments:

Page ____ of ____

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP12 WELL DIAMETER: <1"
SAMPLER(S): JS
DATE: 7/28/17

WEATHER CONDITIONS: Hot

Sampling Device: Peristaltic Pump
Make/Model: Geo Pump
Serial Number: 2496

Water Quality Inst.: In situ
Make/Model: Aqua troll 600
Serial Number: 509337

Tubing Type: O Teflon O Poly O Other Decontamination: O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 12.01 Total Well Depth (ft-bpm): _____ Depth to Pump Inlet(ft-bmp): _____

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1.	1300	Set-up								12.01
2.	1310	250 ml/min	~500ml	7.09	2.90	0.61	19.03	1.03	111.1	—
3.	1313	200-250 ml/min		7.11	2.96	0.00	17.53	0.94	107.7	—
4.	1318	200-250 ml/min		7.10	2.96	0.31	17.11	0.83	105.5	—
5.	1321	200-250 ml/min		7.10	2.98	15.37	17.01	0.82	104.4	
6.	1325	200-250 ml/min		7.09	2.97	9.01	17.04	0.80	103.6	
7.	1328	250 ml/min		7.06	2.96	10.04	17.05	0.77	103.8	
8.	1331	250 ml/min		7.05	2.98	10.27	16.98	0.78	103.9	
9.	1336	250 ml/min	Total ~2.5gal	7.02	2.96	10.29	16.80	0.76	105.3	12.08
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: BPGP12 SampleClarity/Color/Odor: Clear, no odor
Sample Time: 1345 QAQC Samples Collected: O No O Yes: If yes, QAQC IDs _____
Analytical methods requested on COC: Full Suite

Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP29 **WELL DIAMETER:** 1/2
SAMPLER(S): LD AC
DATE: 7/28/17
WEATHER CONDITIONS: Mst Sunny 89°

Sampling Device:	Water Quality Inst.:
Make/Model:	Make/Model:
Serial Number:	Serial Number:

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.92 **Total Well Depth (ft-bpm):** 21.58 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1327			7.11	2586.8	108.46	27.19	1.71	173.5	
2. 1330			7.16	1969.2	59.1	21.31	1.77	186.8	
3. 1333			7.16	1787.1	29.3	19.94	1.67	167.4	
4. 1336			7.17	2144	65.27	18.75	1.24	168.8	
5. 1339			7.18	2524.9	47.77	18.55	1.44	175.2	
6. 1342			7.21	2520.4	3.59	18.27	2.66	171.3	
7. 1345			~~7.18~~ 7.18	2818.0	4.94	18.37	0.55	174.6	
8. 1348			~~7~~ 7.18	2807.2	3.29	17.90	0.51	178.0	
9. 1351			7.18	2801.3	2.45	17.93	0.56	179.5	
10. 1355	Collect	3 VOA							
11. 1357									11.23
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP29 **SampleClarity/Color/Odor:** Clear No odor
Sample Time: 1355 **QAQC Samples Collected:** ~~O~~ No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: VOC

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: EMW-21 **WELL DIAMETER:** 2
SAMPLER(S): JS BS
DATE: 7-28-17

WEATHER CONDITIONS: Sunny 90°+ Hot

Sampling Device:	Aqua troll 600	**Water Quality Inst.:**	
Make/Model:	Aqua troll 600	**Make/Model:**	
Serial Number:		**Serial Number:**	

Tubing Type: ☒ Teflon ☒ Poly ○ Other **Decontamination:** ☒ Decontaminated Water Meter ☒ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.12 **Total Well Depth (ft-bpm):** 29.11 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1.	1415	300	~~300~~	7.00	2.81	142.49	21.23	0.45	-81.2	11.12
2.	1420	300		7.00	2.82	108.86	20.88	0.36	-79.1	11.13
3.	1425	300		6.99	2.82	113.81	20.95	0.33	-81.1	11.12
4.	1430	300		7.00	2.83	116.71	20.97	0.27	-79.1	11.13
5.	1435	300		6.99	2.82	103.84	20.92	0.26	-78.2	11.12
6.	1440	300		6.99	2.82	102.23	20.97	0.25	-77.2	11.13
7.	1445	300		6.99	2.80	103.13	20.60	0.23	-76.1	11.13
8.	1450	300		6.99	2.81	103.21	20.69	0.23	-77.1	11.13
9.	1455	~~300~~	Sample							
10.										
11.										
12.									Complete	
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: EMW-21 **SampleClarity/Color/Odor:** Strong odor. Sheen

Sample Time: 1455 **QAQC Samples Collected:** ○ No ○ Yes: **If yes, QAQC IDs**

Analytical methods requested on COC:

Comments: there was a Sorbent Sock in well. No free product detected
Sheen on purge water and strong odor hydrocarbon
Peristaltic Dupe 20170728-D

Terry & 4d

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP15 **WELL DIAMETER:**
SAMPLER(S):
DATE: 7/28/2017
WEATHER CONDITIONS: Sunny, >90°F

Sampling Device:	**Water Quality Inst.:**
Make/Model:	**Make/Model:**
Serial Number:	**Serial Number:**

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.45 **Total Well Depth (ft-bpm):** **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1541	300		6.95	3.29	112.33	18.27	1.49	92.2	
2. 1545	300		6.98	3.38	61.59	16.21	1.76	91.8	
3. 1548	300		6.98	3.42	43.79	15.93	1.77	91.8	
4. 1551	300		6.97	3.43	45.81	15.85	1.75	92.2	
5. 1554	300		6.95	3.44	19.64	15.76	1.69	94.5	
6. 1557	300		6.89	3.43	18.34	15.55	1.68	98.6	
7. 1600	300		6.89	3.45	14.90	15.61	1.65	102.8	
8. 1603	300		6.81	346	15.12	15.63	1.64	105.4	
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: ~~166~~ BPGP15 **SampleClarity/Color/Odor:** Clear
Sample Time: 1605 **QAQC Samples Collected:** Ø No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC:
Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP42 **WELL DIAMETER:** 1/2
SAMPLER(S): LD AC
DATE: 7/28/17

WEATHER CONDITIONS: Sunny 92°

Sampling Device: Peristaltic Pump
Make/Model: Geotech Gen pump
Serial Number:

Water Quality Inst.: In Situ
Make/Model: AquaTroll 600
Serial Number: 496339

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.39 **Total Well Depth (ft-bpm):** 20.75 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1545			7.11	2910.5	2.26	22.85	0.97	164.3	
2. 1548			7.16	2814.6	2.94	20.21	1.16	163.7	
3. 1551			7.15	2792.2	11.05	19.56	1.05	163.0	
4. 1554			7.17	2837.8	0.73	18.62	0.87	163.3	
5. 1557			7.17	2551.6	1.02	18.61	0.88	163.6	
6. 1600			7.18	2536.3	4.41	18.17	0.79	163.7	
7. 1603			7.16	2717.6	0.50	18.04	0.94	164.6	
8. 1606			7.15	2659.1	0.44	17.09	0.80	165.2	
9. 1605		Sample Collected			Full	Suite			
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP42 **SampleClarity/Color/Odor:** Clear No Odor
Sample Time: 1605 **QAQC Samples Collected:** ☒ No ○ Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: Full Suite

Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP41 **WELL DIAMETER:** 1/2
SAMPLER(S): LD AL
DATE: 7/28/17

WEATHER CONDITIONS: Sunny 92°

Sampling Device:	Peristaltic Pump	**Water Quality Inst.:**	In Situ
Make/Model:	Geotech Geopump	**Make/Model:**	Aqua TROLL 200
Serial Number:		**Serial Number:**	796339

Tubing Type: ⊘ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.72 **Total Well Depth (ft-bpm):** 13.62 **Depth to Pump Inlet(ft-bmp):** 12.50

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1422			7.18	4096.7	87.12	22.39	4.83	174.9	
2. 1425			6.91	3531.1	18.88	19.19	5.02	175.6	
3. 1428			6.93	3594.2	4.12	18.09	4.93	175.4	
4. 1431			6.95	3657.6	3.62	17.51	5.00	175.1	
5. 1433			6.95	3472.3	3.53	17.25	5.10	174.9	
6. 1436			6.96	3462.1	1.27	17.00	5.06	175.1	
7. 1439			6.95	3366.1	19.71	17.76	5.03	175.4	
8. 1442			6.95	2898.7	0.61	16.61	5.10	175.6	
9. 1445			6.93	3231.6	1.08	16.56	5.11	176.5	
10. 1448			6.92	3304.7	0.69	16.48	5.11	177.7	
11. 1448		Samples Collected			Full	Suite			
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP41 **SampleClarity/Color/Odor:** Clear No Odor
Sample Time: 1448 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: Full Suite

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BMW-4 **WELL DIAMETER:** 2
SAMPLER(S): JS, BS
DATE: 7-28-17

WEATHER CONDITIONS: Sunny 90°F

Sampling Device: Aqua Troll 600	**Water Quality Inst.:**
Make/Model:	**Make/Model:**
Serial Number:	**Serial Number:**

Tubing Type: ⊗ Teflon ⊗ Poly O Other **Decontamination:** ⊗ Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 15.65 **Total Well Depth (ft-bpm):** 19.85 **Depth to Pump Inlet(ft-bmp):** 17.50

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1630	300		7.11	3.14	105.88	18.34	0.65	99.6	15.65
2. 1635	300		7.12	3.20	88.38	17.64	0.61	99.8	15.68
3. 1640	300		7.09	3.22	94.26	16.55	0.50	101.5	15.67
4. 1645	300		7.07	3.24	88.34	16.33	0.46	102.1	15.66
5. 1650	300		7.06	3.25	94.28	16.04	0.39	101.9	15.68
6. 1655	300		7.05	3.26	82.15	15.56	0.32	100.2	15.67
7. 1700	300		7.04	3.28	28.64	15.22	0.31	100.3	15.67
8. 1705	300		7.03	3.27	27.59	15.17	0.30	100.0	15.68
9. 1710	300		7.00	3.29	17.30	15.08	0.33	101.6	15.67
10. 1715	300		6.95	3.30	13.83	15.21	0.27	102.7	15.69
11. 1720	300		6.93	3.31	12.13	15.00	0.27	105.8	15.70
12. 1725	300		6.92	3.30	12.15	15.00	0.27	105.9	15.69
13. 1730	Sample								
14.									
15.								End	1800
16.									
17.									
18.									

Sample ID: BMW-4 **SampleClarity/Color/Odor:** Clear
Sample Time: 1730 **QAQC Samples Collected:** ⊗ No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: Full Suite

Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BMW-1 **WELL DIAMETER:**
SAMPLER(S): BS, JS
DATE: 7-29-17
WEATHER CONDITIONS: P. Cloudy 72°

Sampling Device: Aqua Troll 600
Make/Model: 600
Serial Number:
Water Quality Inst.:
Make/Model:
Serial Number:

Tubing Type: ● Teflon ● Poly ○ Other **Decontamination:** ● Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.01 **Total Well Depth (ft-bpm):** 20.15 **Depth to Pump Inlet(ft-bmp):** 18.00

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 845	300		7.01	2.36	384.78	16.76	0.36	96.0	13.05
2. 850	300		7.01	2.37	331.47	16.56	0.34	97.4	13.06
3. 855	300		7.00	2.37	344.12	16.09	0.24	99.4	13.05
4. 900	300		7.00	2.34	341.13	16.00	0.14	101.7	13.07
5. 905	300		7.00	2.39	404.43	15.70	0.13	102.7	13.08
6. 910	300		7.00	2.39	332.15	15.68	0.11	103.6	13.09
7. 915	300		6.98	2.35	421.27	15.68	0.11	104.7	13.07
8. 920	300		6.97	2.31	617.57	15.66	0.10	106.5	13.08
9. 925	300		6.97	2.33	617.08	15.56	0.09	107.7	13.07
10. 930	300		6.96	2.32	618.01	15.61	0.09	107.3	13.07
11. 930	Sample								13.03
12.									
13.								End:	1000
14.									
15.									
16.									
17.									
18.									

Sample ID: BMW-1 **SampleClarity/Color/Odor:** Cloudy
Sample Time: 930 **QAQC Samples Collected:** ○ No ○ Yes: **If yes, QAQC IDs**
Analytical methods requested on COC:
Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP91 **WELL DIAMETER:** 1/2
SAMPLER(S): LD SF
DATE: 7/29/17

WEATHER CONDITIONS: MG Cloudy 67°

Sampling Device:	Peristaltic	**Water Quality Inst.:**	In Situ
Make/Model:	Geotech Groundpump	**Make/Model:**	Aqua Troll 600
Serial Number:		**Serial Number:**	496339

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 14.32 **Total Well Depth (ft-bpm):** 24.72 **Depth to Pump Inlet(ft-bmp):** _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 0910			7.11	2719	64.13	21.23	1.79	-116.4	
2. 0913			7.16	2725	12.78	18.63	0.40	-139.8	
3. 0916	0.2 lpm		7.16	2755	8.01	17.80	0.37	-143.1	
4. 0919			7.12	2781	3.19	17.57	0.42	-143.8	
5. 0922			7.11	2786	5.12	17.41	0.44	-141.4	
6. 0925			7.11	2801	4.26	17.70	0.46	-140.1	
7. 0928			7.09	2807	9.94	17.25	0.48	-132.3	
8. 0930	Collected 3 VOA								
9. 0935									14.36
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP91 **SampleClarity/Color/Odor:** Clear No Odor
Sample Time: 0930 **QAQC Samples Collected:** ☒ No ○ Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: VOC

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: EMW-18 **WELL DIAMETER:** 2
SAMPLER(S): LD ST
DATE: 7/29/17

WEATHER CONDITIONS: Mo Sunny 70°

Sampling Device:	QED	**Water Quality Inst.:**	In Situ
Make/Model:	MP50	**Make/Model:**	Aqua Troll 600
Serial Number:	1014	**Serial Number:**	496379

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.70 **Total Well Depth (ft-bpm):** 21.24 **Depth to Pump Inlet(ft-bmp):** 19

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1000			6.90	2620.0	497.25	21.87	2.68	80.3	10.76
2. 1003			6.90	2478.0	140.4	19.66	2.24	101.3	10.76
3. 1006			6.91	2472.8	960.63	18.70	2.18	109.9	10.72
4. 1009			6.91	2490.1	102.24	18.21	2.20	83.5	
5. 1012			6.91	2491.4	97.83	18.76	2.10	93.1	10.74
6. 1015			6.91	2472.3	129.87	18.85	1.90	99.3	10.74
7. 1018			6.91	2471.5	122.87	18.80	1.84	102.4	
8. 1021			6.90	2473.5	122.44	18.83	1.82	102.2	10.79
9. 1025	Collected								
10. MS									
11. MSD									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: EMW-18 **SampleClarity/Color/Odor:**
Sample Time: 1025 **QAQC Samples Collected:** ○ No ☒ Yes: **If yes, QAQC IDs** MS MSD
Analytical methods requested on COC: VOC, VPH EPH

Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BMW07-1 WELL DIAMETER: 2
SAMPLER(S): SS, BS
DATE: 7-29-17

WEATHER CONDITIONS: Sunny 72°

Sampling Device:	Aqua Edge 600	Water Quality Inst.:	
Make/Model:	600	Make/Model:	
Serial Number:		Serial Number:	

Tubing Type: ⊙ Teflon ⊙ Poly O Other **Decontamination:** ⊙ Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 15.78 Total Well Depth (ft-bpm): 23.50 Depth to Pump Inlet(ft-bmp): 21.00

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	–	±10% or less than 0.2 mg/L	–	–
1. 1015	300		6.88	1.67	701.10	20.63	0.81	122.5	15.75
2. 1020	300		7.03	2.36	339.73	15.86	1.06	116.0	15.76
3. 1025	300		7.01	2.85	18.90	15.36	0.99	116.4	15.73
4. 1030	300		6.99	2.79	17.44	15.57	1.02	115.8	15.74
5. 1035	300		6.97	2.80	5.80	15.42	1.07	115.8	15.75
6. 1040	300		6.97	2.80	3.96	15.40	1.07	116.0	15.74
7. 1045	300		6.97	2.81	4.00	15.33	1.02	116.5	15.73
8. 1050	300		6.98	2.80	4.40	15.29	1.02	116.8	15.73
9. 1055	300		6.98	2.84	4.72	15.28	1.03	117.0	15.74
10. 1100	Sample								
11.									
12.									
13.								End	1115
14.									
15.									
16.									
17.									
18.									

Sample ID: BMW07-1 SampleClarity/Color/Odor: Cloudy
Sample Time: 1100 QAQC Samples Collected: ⊙ No O Yes: If yes, QAQC IDs
Analytical methods requested on COC: VOCs, VPH, EPH

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: EMW-26 **WELL DIAMETER:** 2
SAMPLER(S): LD ST
DATE: 7/29/17
WEATHER CONDITIONS: Mo Sunny 77°

Sampling Device:	Bladder Pump	**Water Quality Inst.:**	In Situ
Make/Model:	QED MP50	**Make/Model:**	Aqua Troll 600
Serial Number:	1814	**Serial Number:**	496739

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 10.86 **Total Well Depth (ft-bpm):** 17.22 **Depth to Pump Inlet(ft-bmp):** _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	µS/cm ~~(mS/m)~~ Cond.	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1132			6.97	2301	10.75	23.39	1.16	133.6	10.96
2. 1135			6.96	1425.9	7.67	20.12	0.58	123.5	10.97
3. 1138			6.97	1203.5	5.42	20.39	0.72	103.5	10.97
4. 1141			7.01	541.99	6.31	19.46	0.64	79.6	
5. 1144			6.99	1812.1	6.56	18.71	0.58	53.5	10.97
6. 1147			6.96	1130.8	6.09	18.92	0.60	46.1	
7. 1150			6.88	2469.4	4.61	18.26	0.52	47.6	
8. 1153			6.85	2468.9	4.75	18.08	0.45	51.2	11.00
9. 1154			6.82	2474.1	4.91	17.54	0.42	51.3	
10. 1155	Collect	6 VOA		4 Amber					
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: EMW-26 **SampleClarity/Color/Odor:** Clear No Odor

Sample Time: 1155 **QAQC Samples Collected:** ☒ No O Yes: **If yes, QAQC IDs** _____

Analytical methods requested on COC: VOCs, SVOCs, VPH/EPH

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: EMW-28 **WELL DIAMETER:** 4
SAMPLER(S): JS, BS
DATE: 7-29-17

WEATHER CONDITIONS: 72 Sunny

Sampling Device: Aquatech 600
Make/Model:
Serial Number:

Water Quality Inst.:
Make/Model:
Serial Number:

Tubing Type: ⊖ Teflon ⊖ Poly O Other **Decontamination:** ⊖ Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 15.40 **Total Well Depth (ft-bpm):** 20.85 **Depth to Pump Inlet(ft-bmp):** 18.00

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1130	300		7.45	2.35	27.54	17.22	6.90	104.0	15.40
2. 1135	300		7.47	2.37	24.80	16.81	6.85	100.0	15.40
3. 1140	300		7.48	2.36	24.51	16.75	6.90	98.4	15.40
4. 1145	300		7.47	2.36	25.12	16.65	6.83	97.6	15.40
5. 1150	300		7.50	2.36	27.41	16.47	6.87	92.1	15.39
6. 1155	300		7.50	2.36	29.39	16.41	6.92	92.3	15.40
7. 1200	300		7.50	2.36	38.88	16.45	6.90	90.9	15.39
8. 1205	300		7.50	2.35	40.12	16.46	6.92	89.9	15.42
9. 1210	300		7.50	2.35	42.13	16.61	6.89	88.4	15.42
10. 1215	300		7.54	2.32	43.15	16.59	6.91	87.7	15.39
11. 1220	Sample								
12.									
13.									
14.								End:	
15.									
16.									
17.									
18.									

Sample ID: ~~EMW-28~~ EMW-28 **SampleClarity/Color/Odor:** Clear
Sample Time: 1220 **QAQC Samples Collected:** ● No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC:
Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP50 **WELL DIAMETER:** 1/2
SAMPLER(S): LD ST
DATE: 7/30/17

WEATHER CONDITIONS: Sunny 65°

Sampling Device:	Peristaltic Pump	**Water Quality Inst.:**	~~YSI~~ Fin Sub
Make/Model:	Geotech Geopump	**Make/Model:**	Aqua Troll 600
Serial Number:		**Serial Number:**	496379

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 14.41 **Total Well Depth (ft-bpm):** 19.59 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 0911			6.86	2750.2	125.81	19.35	2.22	229.9	
2. 0914			6.89	1397.4	51.25	19.11	2.06	227.6	
3. 0917			6.91	91.37	17.87	18.65	2.14	229.6	
4. 0919			6.92	3362.8	10.54	18.30	2.15	229.1	
5. 0922			6.92	3376.6	4.01	18.33	2.15	232.2	
6. 0925			6.92	3359.4	2.75	18.28	2.15	232.0	
7. 0928			6.92	3363.4	1.63	18.25	2.15	234.4	
8. 0931			6.91	3380.7	1.73	18.22	2.14	232.2	
9. 0935	Collected 17 bottles								
10. 1010									14.37
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP50 **SampleClarity/Color/Odor:** Clear No Odor
Sample Time: 0935 **QAQC Samples Collected:** ☒ No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: Full Suite

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP-92 **WELL DIAMETER:** 1"
SAMPLER(S): BS, JS
DATE: 7-30-17

WEATHER CONDITIONS: Sunny 68°

Sampling Device:	Aqua troll 600	**Water Quality Inst.:**	
Make/Model:		**Make/Model:**	
Serial Number:	509387	**Serial Number:**	

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ☒ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.16 **Total Well Depth (ft-bpm):** 20.68 **Depth to Pump Inlet(ft-bmp):** 18.00

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	–	±10% or less than 0.2 mg/L	–	–
1. 900	300		7.04	2.80	118.00	14.55	0.52	157.0	11.20
2. 905	300		6.98	2.83	105.12	13.24	0.65	161.5	11.21
3. 910	300		6.84	2.82	23.75	12.72	0.76	146.9	11.22
4. 915	300		6.84	2.81	12.93	12.68	0.79	132.1	11.22
5. 920	300		6.84	2.81	11.67	12.69	0.80	125.7	11.20
6. 925	300		6.89	2.81	9.41	12.68	0.80	120.1	11.21
7. 930	300		6.89	2.81	9.50	12.69	0.80	121.2	11.21
8. 935	300		6.89	2.81	9.51	12.70	0.80	121.4	11.22
9. 940	sample								
10.									
11.									
12.									
13.									
14.								End	1000
15.							End	water level	11.22
16.									
17.									
18.									

Sample ID: BPGP-92 **SampleClarity/Color/Odor:** Clear
Sample Time: 940 **QAQC Samples Collected:** ○ No ● Yes: **If yes, QAQC IDs** 20170730-A
Analytical methods requested on COC:
Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP-22 **WELL DIAMETER:**
SAMPLER(S):
DATE: 7-30-17
WEATHER CONDITIONS: 68° Sunny

Sampling Device:	Aquatrolls	**Water Quality Inst.:**	
Make/Model:		**Make/Model:**	
Serial Number:		**Serial Number:**	

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** ⊗ Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.32 **Total Well Depth (ft-bpm):** **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1.	1015	300		7.07	2.97	67.22	15.85	0.58	138.5	11.31
2.	1020	300		7.06	2.98	68.13	15.72	0.53	138.5	~~11.31~~
3.	1025	300		7.00	3.01	88.78	15.33	0.45	142.7	~~11.31~~
4.	1030	300		6.99	3.02	110.10	15.33	0.44	143.2	~~11.31~~
5.	1035	300		6.97	2.65	133.48	15.40	0.40	144.6	~~11.31~~
6.	1040	300		6.93	2.60	130.12	15.38	0.40	147.5	
7.	1045	300		6.91	2.57	115.74	15.48	0.38	147.6	
8.	1050	300		6.90	2.75	77.01	15.54	0.37	148.5	
9.	1055	300		6.90	2.41	75.00	15.55	0.37	148.9	
10.	1100	300		6.90	2.45	75.01	15.56	0.37	148.7	
11.	1105	sample								
12.										
13.										
14.										
15.									End:	1145
16.									End WL:	11.35
17.										
18.										

DTW ~~11.31~~ ↓ well too small

Sample ID: BPGP-22 **SampleClarity/Color/Odor:** Clear
Sample Time: 1105 **QAQC Samples Collected:** O No ⊗ Yes: **If yes, QAQC IDs**
Analytical methods requested on COC:
Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: RH-MW-1 **WELL DIAMETER:**
SAMPLER(S): LD ST
DATE: 7/30/17

WEATHER CONDITIONS: Smoky Breezy 77°

Sampling Device:	Bladder Pump	**Water Quality Inst.:**	FuSoft
Make/Model:	QED MP50	**Make/Model:**	Aquaroll 600
Serial Number:	1814	**Serial Number:**	496339

Tubing Type: ⊘ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 14.29 **Total Well Depth (ft-bpm):** 20.15 **Depth to Pump Inlet(ft-bmp):** _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	µS/cm ~~mS/m~~ Cond.	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1036			7.09	2208.6	2553.7	22.53	0.73	171.7	14.31
2. 1039			7.10	1826.1	1[illegible]7.70	18.66	0.61	188.9	14.33
3. 1042			7.12	1777	770.60	17.90	1.91	190.8	14.33
4. 1045			7.10	2070	6452.6	17.36	0.36	159.6	14.31
5. 1048			7.12	2081	392.82	17.01	0.29	156.6	14.34
6. 1051			7.09	2088	621.76	16.85	0.29	164.6	14.32
7. 1054			7.05	2079.3	795.26	16.77	0.37	167.7	
8. 1057			7.00	2088	887.77	16.66	0.36	169.9	
9. 1100			6.93	2198	46.96	16.49	0.31	173.5	14.33
10. 1103			6.87	2196	50.06	16.43	0.32	176.1	
11. 1106			6.83	2192.5	47.30	16.40	0.33	177.1	14.32
12. 1110	Collect	3 VOA							
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: RH-MW-1 **SampleClarity/Color/Odor:** Clear No Odor
Sample Time: 1110 **QAQC Samples Collected:** ⊘ No O Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: VOC

Comments:

Page ____ of ____

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: RH-MW-7 **WELL DIAMETER:** 2"
SAMPLER(S): J. Trahan, L. Dannell
DATE: 7/30/17

WEATHER CONDITIONS: Sunny, 90+°F

Sampling Device: Bladder Pump
Make/Model: QED Sample Pro MP50
Serial Number: 1814

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 496339

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.73 **Total Well Depth (ft-bpm):** 20.07 **Depth to Pump Inlet(ft-bmp):** ~17

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	–	±10% or less than 0.2 mg/L	–	–
1. 1133			6.75	1505.2	747.91	23.56	2.21	178.91	13.77
2. 1137			6.85	1392.8	49.58	18.88	2.83	191.7	
3. 1140			6.89	1383.9	49.78	18.43	3.04	187.8	13.78
4. 1143		1 gal	6.92	1373.5	49.52	18.02	3.24	182.8	
5. 1146			6.94	1441	49.51	17.77	3.35	189	13.78
6. 1149			6.95	1442	46.91	17.69	3.40	187.6	
7. 1150	Collect 6 VOA								
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: RH-MW-7 **SampleClarity/Color/Odor:** Clear No Odor
Sample Time: 1150 **QAQC Samples Collected:** ○ No ☒ Yes: **If yes, QAQC IDs** 20170730-0
Analytical methods requested on COC: VOC

Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP-94 **WELL DIAMETER:** 1
SAMPLER(S): JS BS
DATE: 7-30-17

WEATHER CONDITIONS: 72 Sunny

Sampling Device: Aqua troll 600	**Water Quality Inst.:**
Make/Model:	**Make/Model:**
Serial Number:	**Serial Number:**

Tubing Type: ◉ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 12.81 **Total Well Depth (ft-bpm):** 21.62 **Depth to Pump Inlet(ft-bmp):** 19.00

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	–	±10% or less than 0.2 mg/L	–	–
1. 1210	300		7.10	2.92	15.50	16.87	1.40	161.9	12.81
2. 1215	300		7.12	3.02	2.02	15.39	1.39	150.8	12.82
3. 1220	300		7.11	3.02	2.52	15.28	1.38	147.4	12.81
4. 1225	300		7.10	3.02	2.20	15.39	1.37	144.1	12.83
5. 1230	300		7.09	3.01	2.30	15.40	1.36	141.1	12.81
6. 1235	Sample								
7.									
8.									
9.									
10.									
11.									
12.									
13.								End:	1250
14.							End	WL:	12.83
15.									
16.									
17.									
18.									

Sample ID: BPGP-94 **SampleClarity/Color/Odor:** Clear no odor
Sample Time: 1235 **QAQC Samples Collected:** ∅ No ○ Yes: **If yes, QAQC IDs**
Analytical methods requested on COC:
Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: Whitelay-MW-2 **WELL DIAMETER:** 2
SAMPLER(S): LD SS
DATE: 7/30/12

WEATHER CONDITIONS: Sunny 71°

Sampling Device:	Bladder pump	**Water Quality Inst.:**	In Situ
Make/Model:	QED MP50	**Make/Model:**	Aqua Troll 600
Serial Number:	1514	**Serial Number:**	296 339

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 15.37 **Total Well Depth (ft-bpm):** 17.09 **Depth to Pump Inlet(ft-bmp):** _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1315			6.82	3056.0	27.20	20.62	0.80	166.2	15.51
2. 1318			6.81	3743	55.51	22.13	1.01	129.2	
3. 1321	0.1		6.84	3678.2	168.54	21.56	1.39	83.2	15.82 Top of pump
4. 1324			6.85	3555.2	321.77	20.60	1.59	68.7	15.82
5. 1327			6.85	3407.4	58.17	19.69	1.52	57.7	15.82
6. 1330			6.85	3357.6	19.94	19.44	1.67	56.1	15.82
7. 1333			6.81	3339.9	11.93	19.26	1.82	56.2	
8. 1336			6.75	3409.1	10.32	18.98	1.85	57.8	15.82
9. 1339			6.71	3224.8	7.44	18.66	1.84	55.9	
10. 1340	Collected	3	VOA						
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: Whitely-MW-2 **SampleClarity/Color/Odor:** Clear No Odor
Sample Time: 1340 **QAQC Samples Collected:** ☒ No O Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC:

Comments: Recharging to top of pump

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP-16 **WELL DIAMETER:**
SAMPLER(S): JS, BS
DATE: 7-30-17

WEATHER CONDITIONS: 91 Sunny

Sampling Device: Agm Troll 600	**Water Quality Inst.:**
Make/Model:	**Make/Model:**
Serial Number:	**Serial Number:**

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** ⊗ Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 12.30 **Total Well Depth (ft-bpm):** 19.39 **Depth to Pump Inlet(ft-bmp):** 17.00

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1330	300		7.08	2.33	77.53	18.36	1.80	150.2	12.30
2. 1335	300		7.11	2.46	15.81	16.16	1.95	146.3	well too
3. 1340	300		7.12	2.48	11.20	15.75	1.97	145.3	small to
4. 1345	300		7.08	2.50	~~15.98~~ 10.7	15.29	1.99	146.6	fit pump
5. 1350	300		7.04	2.50	0.89	15.27	1.99	146.9	and Tube.
6. 1355	300		6.96	2.52	0.55	15.16	1.99	151.9	
7. 1400	300		6.91	2.53	0.02	15.19	2.01	153.3	
8. 1405	300		6.91	2.52	0.02	15.09	2.00	153.2	
9. 1410	300		6.90	2.53	0.53	14.99	2.00	152.7	
10. 1415	~~300~~ 0	Sample time							
11.									
12.									
13.									
14.								End →	1435
15.								End WL →	12.30
16.									
17.									
18.									

Sample ID: BPGP-16 **SampleClarity/Color/Odor:** Clear *Sample time*
Sample Time: 1415 **QAQC Samples Collected:** O No ⊗ Yes: **If yes, QAQC IDs** BPGP-16MS 1430
BPGP-16MSD 1430
Analytical methods requested on COC:

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: Whitely-MW-1 **WELL DIAMETER:** 2
SAMPLER(S): LD ST
DATE: 7/30/17

WEATHER CONDITIONS: Sunny 94°

Sampling Device:	Bladder pump	**Water Quality Inst.:**	In Situ
Make/Model:	QED MP50	**Make/Model:**	Aqua Troll 600
Serial Number:	1814	**Serial Number:**	496334

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 14.62 **Total Well Depth (ft-bpm):** 19.5 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	µS/cm Cond. ~~(mS/m)~~	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1411			7.11	1601.7	224.57	20.13	1.35	-135.9	14.84
2. 1414			7.21	1412.2	192.44	21.74	1.59	-122.7	14.84
3. 1417			7.24	1411	71.76	19.80	2.39	-117.2	14.85
4. 1420			7.26	1393	35.44	19.47	2.51	-114.7	14.87
5. 1423			7.27	1386.3	43.96	18.97	2.92	-108.0	14.88
6. 1426			7.28	1365.9	16.38	18.99	3.25	-104.7	14.91
7. 1429			7.25	1397.9	9.5	18.33	2.94	-101.2	
8. 1432			7.22	1396.8	9.06	18.43	2.98	-97.8	
9. 1435			7.20	1385.3	6.74	18.29	3.23	-94.4	14.89
10. 1440	Collect	3 VOA							
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: Whitely-MW-1 **SampleClarity/Color/Odor:** Clear No odor
Sample Time: 1440 **QAQC Samples Collected:** ~~O No~~ O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC:
Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP 90 **WELL DIAMETER:** 0.75
SAMPLER(S): S. Trahan, L. Darnell
DATE: 7/30/17

WEATHER CONDITIONS: Hot, Sunny, 90°F+

Sampling Device: Peristaltic Pump
Make/Model: GeoTech GeoPump
Serial Number:

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 496.339

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 12.71 **Total Well Depth (ft-bpm):** 20.97 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	µS/cm Cond. ~~(mS/m)~~	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1505			6.96	2993.2	86.37	28.29	1.26	68.6	
2. 1508			7.00	2812.9	11.91	21.80	0.87	79.8	
3. 1511			7.02	2745.8	4.60	20.59	1.18	85.6	
4. 1514			7.04	2712.3	3.78	20.07	1.26	88.5	
5. 1517			7.04	2719.1	3.34	20.02	1.33	91.1	
6. 1520			7.05	2690.1	2.39	19.86	1.40	94.0	
7. 1525	Collected	3 VOA							
8. 1528									12.74
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP 90 **SampleClarity/Color/Odor:** Clear No Odor
Sample Time: 1525 **QAQC Samples Collected:** ☒ No ○ Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: VOC

Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP-17 **WELL DIAMETER:** 1
SAMPLER(S): JS BB
DATE: 7-30-17

WEATHER CONDITIONS: 91 Sunny

Sampling Device: Aquatroll 600
Make/Model:
Serial Number:

Water Quality Inst.:
Make/Model:
Serial Number:

Tubing Type: ● Teflon ○ Poly ○ Other **Decontamination:** ● Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.89 **Total Well Depth (ft-bpm):** 22.28 **Depth to Pump Inlet(ft-bmp):** 20.00

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1450	300		7.02	3.65	168.46	17.60	0.61	-59.1	11.89
2. 1455	300		7.02	3.70	201.08	16.95	0.64	-59.2	well too
3. 1500	300		7.04	3.75	351.16	15.51	0.70	-57.8	small for
4. 1505	300		7.04	3.74	17.87*	15.25	0.76	-56.2	probe
5. 1510	300		6.87	3.76	47.07	14.83	0.81	-42.7	at turbidity
6. 1515	300		6.84	3.76	108.21	14.53	0.86	-35.7	
7. 1520	300		6.84	3.74	129.27	14.56	0.86	-35.6	
8. 1525	300		6.88	3.83	293.14	14.52	0.88	-34.1	
9. 1530	300		6.91	3.73	191.35	14.53	0.89	-30.8	
10. 1535	300		6.92	3.69	156.60	14.43	0.94	-26.8	
11. 1540	300		6.91	3.67	248.10	14.39	0.97	-21.5	
12. 1545	300		6.92	3.67	271.10	14.39	0.97	-21.2	
13. 1550	300		6.91	3.67	271.17	14.39	0.97	-21.3	
14. 1555	300		6.92	3.63	278.14	14.39	0.97	-20.1	
15. 1600	Sample								
16.									
17.								End	
18.								End WL	

Sample ID: BPGP-17 **SampleClarity/Color/Odor:** Clear
Sample Time: 1600 **QAQC Samples Collected:** ☒ No ○ Yes: **If yes, QAQC IDs**
Analytical methods requested on COC:

Comments: * Turbidity meter wasn't tilted.

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP 89 **WELL DIAMETER:** 0.75"
SAMPLER(S): S. Trahan, L. Darnell
DATE: 7/30/17

WEATHER CONDITIONS: Sunny, 100°F

Sampling Device: Peristaltic Pump
Make/Model: GeoTech Geopump
Serial Number: 2493

Water Quality Inst.: In Situ
Make/Model: Aqua Trol 600
Serial Number: 496339

Tubing Type: X Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 14.03 **Total Well Depth (ft-bpm):** 20.86 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	µS/cm Cond. ~~(mS/m)~~	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1545	0.250		6.95	2,736	~~1.10~~ 1.60	26.56	1.75	-119.2	
2. 1548	0.250		7.15	2677	339.6	21.54	0.27	-147.0	
3. 1551	0.250		7.22	2691	9.47	20.48	0.23	-159.3	
4. 1554	0.250		7.24	2661	6.45	19.95	0.18	-168.9	
5. 1557	0.250		7.25	2670	48.92	19.59	0.17	-174.0	
6. 1600	0.250		7.25	2716	38.75	19.61	0.18	-177.7	
7. 1603	0.250		7.25	2659	44.04	19.10	0.18	-179.2	
8. 1606	0.250		7.25	2703	44.41	19.76	0.18	-180.2	
9.								Final	14.03
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP89 **SampleClarity/Color/Odor:** Clear, ~~no odor~~ slight odor
Sample Time: 1610 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: VOCs EPA/VPH
Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: EMW-15 **WELL DIAMETER:** 2"
SAMPLER(S): S. Trahan, L. Darnell
DATE: 7/31/2017

WEATHER CONDITIONS: Sunny 80+°F

Sampling Device: Peristaltic / Bladder Pump
Make/Model: GeoTech GeoPump / QED Sample Pro
Serial Number: 2493 / ~~1234~~ 184

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 496339

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): ~~12.75~~ 11.55 **Total Well Depth (ft-bpm):** 18.55 **Depth to Pump Inlet(ft-bmp):** 17

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 0829			6.87	1339.9	39.36	21.36	0.64	-19.7	11.55
2. 0832			6.91	1403.2	350.25	21.81	0.87	-87.2	11.54
3. 0835			6.92	1255.3	345.09	22.89	1.08	-95.6	
4. 0838			6.89	1293.0	300.0	20.35	0.38	-81.0	11.59
5. 0841			6.91	1233.2	304.75	15.94	0.28	-106.8	11.57
6. 0844			6.92	2210.9	59.52	17.94	0.26	114.1	
7. 0847			6.92	2252.9	42.20	17.77	0.24	-118.5	
8. 0850			6.92	2204.2	40.32	17.58	0.20	-121.6	11.55
9. 0853			6.91	2204.2	41.45	17.49	0.21	-123.1	
10. 0855	Collect 2 Amber		6 VOA	+ 3 VOA	per peristaltic pump				
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: EMW-15 **SampleClarity/Color/Odor:** Clear Slight Odor
Sample Time: 0855 **QAQC Samples Collected:** ○ No ☒ Yes: **If yes, QAQC IDs** 20170731-A VOC w/ peristaltic
Analytical methods requested on COC: VOC, VPH, EPH

Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP-44 **WELL DIAMETER:** 1"
SAMPLER(S): JS BS
DATE: 7-31-17

WEATHER CONDITIONS: 70° Sunny

Sampling Device: Aquatech 600	**Water Quality Inst.:**
Make/Model:	**Make/Model:**
Serial Number:	**Serial Number:**

Tubing Type: ● Teflon ○ Poly ○ Other **Decontamination:** ● Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 12.94 **Total Well Depth (ft-bpm):** 21.23 **Depth to Pump Inlet(ft-bmp):** 20.00

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 820	300		6.94	2.98	46.03	18.26	2.69	185.4	12.94
2. 825	300		7.06	3.03	25.97	17.02	2.63	166.7	Well too
3. 830	300		7.09	3.05	9.54	16.63	2.64	147.6	small
4. 835	300		7.09	3.05	4.57	16.47	2.65	132.2	for WL probe
5. 840	300		7.08	3.06	3.24	16.34	2.64	123.0	and tubing
6. 845	300		7.04	3.06	4.92	16.34	2.60	113.9	
7. 850	300		7.04	3.07	4.50	16.33	2.60	113.5	
8. 855	300		7.04	3.07	4.53	16.30	2.60	113.4	
9. 900	sample								
10.									
11.									
12.									
13.									
14.								End	915
15.								End WL	12.95
16.									
17.									
18.									

Sample ID: BPGP-44 **SampleClarity/Color/Odor:** Clear
Sample Time: 900 **QAQC Samples Collected:** ● No ○ Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: VOC, VPH, EPH, SVOC

Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP84 **WELL DIAMETER:** 0.75"
SAMPLER(S): S. Trahan, L. Darnell
DATE: 7/31/17

WEATHER CONDITIONS: Sunny, 90+°F

Sampling Device:	Peristaltic Pump	**Water Quality Inst.:**	In Situ
Make/Model:	GeoTech Geopump	**Make/Model:**	Aqua Troll 600
Serial Number:	2493	**Serial Number:**	496339

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.81 **Total Well Depth (ft-bpm):** 20.89 **Depth to Pump Inlet(ft-bmp):** _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	µS/cm ~~(mS/m)~~ Cond.	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	–	±10% or less than 0.2 mg/L	–	–
1. 0930	0.250		7.07	2561	2.98	24.77	2.58	34.9	
2. 0933	0.250		7.07	1236	0.79	19.87	0.84	60.0	
3. 0936	0.250		7.07	1002	0.94	19.36	0.59	66.6	
4. 0939	0.250		7.08	509.1	0.72	18.75	0.45	74.1	
5. 0942	0.250		7.07	78.19	1.06	18.28	0.40	82.2	
6. 0945	0.250		7.07	75.25	1.00	18.29	0.39	88.3	
7. 0948	0.250		7.07	82.38	0.79	18.08	0.37	92.5	
8. 0955	Collect	6 VOAs + 2 1L Ambers for VOCs, VPH, EPH							
9. 1210									11.81
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP84 **SampleClarity/Color/Odor:** Clear, slight odor.
Sample Time: 0955 **QAQC Samples Collected:** ☒ No ○ Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: VOCs, VPH, EPH

Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP-31 **WELL DIAMETER:** 1
SAMPLER(S): JS, BS
DATE: 7-31-17
WEATHER CONDITIONS: 70 Sunny

Sampling Device: Aquatrap 600	**Water Quality Inst.:**
Make/Model:	**Make/Model:**
Serial Number:	**Serial Number:**

Tubing Type: ● Teflon ○ Poly ○ Other **Decontamination:** ● Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 12.20 **Total Well Depth (ft-bpm):** 21.44 **Depth to Pump Inlet(ft-bmp):** 20.00

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 925	300		6.81	3.82	47.40	16.07	0.33	140.1	12.20
2. 930	300		6.82	4.00	45.00	15.26	0.21	136.0	well too
3. 935	300		6.83	4.02	29.95	15.00	0.18	133.8	small for
4. 940	300		6.84	4.02	19.73	14.70	0.11	119.1	practical
5. 945	300		6.87	4.00	33.02	14.81	0.09	114.2	time
6. 950	300		6.87	3.98	33.28	14.87	0.09	113.9	
7. 955	300		6.89	3.95	34.75	14.98	0.09	109.3	
8. 1000	300		6.90	3.94	38.71	15.02	0.09	107.6	
9. 1005	300		6.91	3.93	39.11	15.07	0.90	107.3	
10. 1010	Sample								
11.									
12.									
13.									
14.									
15.								End	1020
16.								End wt	12.20
17.									
18.									

Sample ID: BPGP-31 **SampleClarity/Color/Odor:** ~~Clear~~ SL Cloudy
Sample Time: 1010 **QAQC Samples Collected:** ● No ○ Yes **If yes, QAQC IDs**
Analytical methods requested on COC: VOC & SVOC

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: PEP07 **WELL DIAMETER:** 2"
SAMPLER(S): L. Darnell, S. Trahan
DATE: 7/31/17

WEATHER CONDITIONS: Sunny, 90°F

Sampling Device:	Bladder Pump	**Water Quality Inst.:**	In Situ
Make/Model:	QED Sample Pro	**Make/Model:**	Aqua Troll 600
Serial Number:	184	**Serial Number:**	496339

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.07 **Total Well Depth (ft-bpm):** 23.25 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1032			7.03	2445.8	35.53	24.14	1.15	101.2	
2. 1035			7.06	2287.0	10.88	19.40	1.01	105.1	11.59
3. 1038			7.06	2262.4	117.2	18.39	0.55	106.0	11.82
4. 1041			7.07	2270.8	4.96	17.89	0.32	106.5	
5. 1044			7.06	2239.3	3.70	17.65	0.42	108.7	11.95
6. 1047			7.07	2223.5	4.34	17.53	0.31	111.7	12.02
7. 1050			7.07	2242.1	37.15	17.54	0.36	113.7	12.09
8. 1053			7.06	2226.1	38.16	17.42	0.31	117.0	12.08
9. 1056			7.06	2227.6	39.31	17.44	0.30	118.0	
10. 1100	Collect 4 ~~[illegible]~~ Amber 6 VOA								
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: PEP07 **SampleClarity/Color/Odor:** Clear No odor
Sample Time: 1100 **QAQC Samples Collected:** ☒ No ○ Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: VOC, EPH, SVOC

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: SMW-12 **WELL DIAMETER:** 2"
SAMPLER(S): BS BS
DATE: 7-31-17

WEATHER CONDITIONS: 75 Sunny

Sampling Device: Aqua Troll 600	**Water Quality Inst.:**
Make/Model:	**Make/Model:**
Serial Number:	**Serial Number:**

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.58 **Total Well Depth (ft-bpm):** 22.71 **Depth to Pump Inlet(ft-bmp):** 20.00

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1045	300		7.07	1.24	565.10	16.11	4.63	127.4	13.50
2. 1050	300		7.03	1.24	286.11	15.38	5.90	120.1	13.57
3. 1055	300		7.02	1.26	311.72	15.43	6.06	120.0	13.58
4. 1100	300		6.82	1.24	209.36	15.06	6.55	120.2	13.58
5. 1105	300		6.79	1.25	153.29	15.05	6.52	118.5	13.58
6. 1110	300		6.79	1.26	130.11	14.98	6.52	116.2	13.59
7. 1115	300		6.76	1.29	171.91	14.95	6.20	112.5	13.59
8. 1120	300		6.77	1.29	147.01	14.93	6.14	111.8	13.60
9. 1125	300		6.77	1.29	148.11	14.95	6.13	111.7	13.61
10. 1130	Sample								
11.									
12.									
13.									
14.								End	1145
15.								End WL	13.60
16.									
17.									
18.									

Sample ID: SMW-12 **SampleClarity/Color/Odor:** Rust colored, turbid
Sample Time: 1130 **QAQC Samples Collected:** Ø No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: EPH, VOC, VPH
Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP-67 **WELL DIAMETER:**
SAMPLER(S): BS, JS
DATE: 7-31-17

WEATHER CONDITIONS: 85 Sunny

Sampling Device: Aqua Trap 600 | **Water Quality Inst.:**
Make/Model: | **Make/Model:**
Serial Number: | **Serial Number:**

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ☒ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.13 **Total Well Depth (ft-bpm):** 25.91 **Depth to Pump Inlet(ft-bmp):** 24.00

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	–	±10% or less than 0.2 mg/L	–	–
1. 1200	300		7.08	2.06	51.06	18.75	0.25	94.9	13.13
2. 1205	300		7.09	2.10	10.01	17.63	0.15	94.6	well too
3. 1210	300		7.10	2.08	8.70	17.43	0.12	95.0	small to
4. 1215	300		7.09	2.06	27.01	17.23	0.10	95.4	fit probe
5. 1220	300		7.09	2.05	28.22	17.14	0.10	95.6	and tubing
6. 1225	300		7.07	2.04	76.11	17.31	0.09	95.4	
7. 1230	300		7.06	2.04	125.12	17.28	0.09	96.1	
8. 1235	300		7.04	2.04	136.79	17.37	0.09	96.4	
9. 1240	sample								
10.									
11.									
12.									
13.									
14.									
15.								End	1250
16.								End WL	13.20
17.									
18.									

Sample ID: BPGP-67 **SampleClarity/Color/Odor:** Clear - SL Turbid
Sample Time: 1240 **QAQC Samples Collected:** ● No ○ Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: VOCs, SVOCs

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: GSMW-5 **WELL DIAMETER:**
SAMPLER(S): S. Graham, L. Dorrell
DATE: 7/31/17

WEATHER CONDITIONS: Sunny, Hot 90+°F

Sampling Device:	Bladder Pump	**Water Quality Inst.:**	In Situ
Make/Model:	QED Sample Pro	**Make/Model:**	Aqua Troll 600
Serial Number:	1812	**Serial Number:**	496339

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 12.84 **Total Well Depth (ft-bpm):** 17.17 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1248			7.22	2328.	1253.3	34.26	2.40	-71.5	12.84
2. 1251			7.12	1809.6	2721.4	24.83	1.42	-84.6	12.84
3. 1254			7.18	1698.6	2562.1	20.17	2.21	-87.6	12.85
4. 1257			7.19	1623.3	1798.0	18.20	2.87	-74.6	
5. 1300			7.20	1666.6	1188.7	17.60	2.88	-79.3	12.84
6. 1303			7.10	1584.3	769.13	16.94	2.82	-79.3	
7. 1306			6.98	1568.4	695.66	16.45	2.91	-75.5	
8. 1309			6.91	1568.7	554.01	16.24	2.87	-76.5	12.85
9. 1312			6.91	1568.8	511.47	16.25	2.81	-78.3	
10. 1315			6.96	1566.8	474.39	16.29	2.75	-83.7	
11. 1318			7.01	1567.0	466.15	16.03	2.68	-87.6	12.85
12. 1321			7.04	1565.4	498.46	16.19	2.75	-92.3	
13. 1325	Collected 9 Bottles								
14.									
15.									
16.									
17.									
18.									

Sample ID: GSMW-5 **SampleClarity/Color/Odor:** Cloudy, Possible odor, lots of silt in pump
Sample Time: 1325 **QAQC Samples Collected:** ☒ No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: VOC, EPH, VPH, metals

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP-~~76~~ 70 **WELL DIAMETER:** 1
SAMPLER(S): BS JS
DATE: 7-31-17

WEATHER CONDITIONS: 98 Sunny Hot

Sampling Device: Aqua troll 600	**Water Quality Inst.:**
Make/Model:	**Make/Model:**
Serial Number:	**Serial Number:**

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): ~~[illegible]~~ 7.01 **Total Well Depth (ft-bpm):** 21.55 **Depth to Pump Inlet(ft-bmp):** 20.00

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	–	±10% or less than 0.2 mg/L	–	–
1. 1400	300		7.87	0.40	21.79	22.78	3.02	126.8	7.01
2. 1405	300		7.89	0.40	16.07	22.43	3.06	120.6	Well too
3. 1410	300		7.90	0.40	9.28	22.27	3.03	115.0	small for
4. 1415	300		7.91	0.40	1.91	22.07	3.04	113.6	produced
5. 1420	300		7.92	0.40	0.07	21.56	3.09	84.9	Tube
6. 1425	300		7.91	0.40	0.93	21.38	3.09	80.9	
7. 1430	300		7.91	0.40	0.00	21.35	3.10	71.1	
8. 1435	300		7.91	0.40	0.00	21.78	3.10	70.4	
9. 1440	Sample								
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP-76 **SampleClarity/Color/Odor:** SL Cloudy
Sample Time: 1440 **QAQC Samples Collected:** ⊗ No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: VOC, SVOCs

Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP93 **WELL DIAMETER:**
SAMPLER(S): S. Trahan, L. Darnell
DATE: 7/31/2017

WEATHER CONDITIONS: Sunny, Hot, 90°F +

Sampling Device: Peristaltic Pump
Make/Model: Geotech Geopump
Serial Number: 2493

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 496 339

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.75 **Total Well Depth (ft-bpm):** 22.05 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	µS/cm ~~Cond. (mS/m)~~	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1410	0.250		7.00	2933	214.7	30.52	0.87	77.0	
2. 1413	0.250		7.04	2704	66.7	22.17	0.27	103.0	
3. 1416	0.250		7.06	2669	112.7	20.32	0.25	111.4	
4. 1419	0.250		7.06	2676	335.4	19.73	0.22	122.3	
5. ~~1412~~									
6. 1421	0.250		7.07	2662	158.6	18.87	0.22	123.5	
7. 1424	0.250		7.07	2628	157.7	18.46	0.24	123.8	
8. 1427	0.250		7.07	2636	220.8	18.40	0.26	122.4	
9. 1430	0.250		7.06	2628	652.8	18.08	0.28	122.9	
10. 1433	0.250		7.05	2562	638.9	18.00	0.29	124.0	
11. 1436	0.250		7.01	2533	578.9	17.96	0.30	126.9	
12. 1440	Collect 3		VOAs	for VOCs,	3 VOAs	for VPH,	+ 2 liters	for EPH	
13.								Final	11.76
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP93 **SampleClarity/Color/Odor:**
Sample Time: 1440 **QAQC Samples Collected:** ○ No ○ Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: EPH/VPH, VOCs-

Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP 81 **WELL DIAMETER:** 1/2
SAMPLER(S): LD ST
DATE: 7/21/17
WEATHER CONDITIONS: Sunny 95°

Sampling Device:	Peristaltic	**Water Quality Inst.:**	In Situ
Make/Model:	Geotech Gro pump	**Make/Model:**	Aqua Troll 600
Serial Number:	2493	**Serial Number:**	496339

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.86 **Total Well Depth (ft-bpm):** 18.42 **Depth to Pump Inlet(ft-bmp):** _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	µS/cm Cond. ~~(mS/m)~~	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1515	0.250		6.90	1170	6.43	32.82	1.74	116.1	
2. 1518	0.250		6.95	1519	3.92	23.47	0.30	133.9	
3. 1521	0.250		6.98	1559	3.73	22.06	0.26	136.3	
4. 1524	0.250		6.99	1542	3.57	21.16	0.26	137.6	
5. 1527	0.250		6.99	1548	3.59	20.26	0.26	139.5	
6. 1530	0.250		6.99	1555	3.34	20.51	0.26	140.3	
7.								Final	11.86
8. 1535	collect	3 VOAs	for	VOCs.					
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP81 **SampleClarity/Color/Odor:** Clear, no odor
Sample Time: 1535 **QAQC Samples Collected:** ☒ No ○ Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: VOCs.

Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP-58 **WELL DIAMETER:** 1
SAMPLER(S): JS BS
DATE: 7-31-17

WEATHER CONDITIONS: 100 Sunny

Sampling Device: Aqua Troll 600
Make/Model:
Serial Number:

Water Quality Inst.:
Make/Model:
Serial Number:

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** ⊗ Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.60 **Total Well Depth (ft-bpm):** 22.21 **Depth to Pump Inlet(ft-bmp):** 21.00

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1455	300		6.85	1.09	309.17	21.14	0.20	142.6	13.60
2. 1500	300		6.88	1.08	471.22	20.18	0.16	139.3	well too
3. 1505	300		6.98	1.07	533.64	19.20	0.10	125.3	small for
4. 1510	300		7.00	1.05	~~537.~~ 594.10	18.94	0.09	121.4	take all
5. 1515	300		7.00	0.95	183.12	19.09	0.09	117.9	WL
6. 1520	300		6.99	0.93	229.70	19.58	0.09	115.5	
7. 1525	300		6.99	1.22	14.98*	19.26	0.11	113.5	
8. 1530	300		6.99	1.22	19.63	19.41	0.20	112.1	
9. 1535	300		6.99	1.22	31.67	19.36	0.21	112.7	
10. 1540	Sample								
11.									
12.									
13.									
14.									
15.								End	35.54
16.								End WL	13.61
17.									
18.									

Sample ID: BPGP-58 **SampleClarity/Color/Odor:** SL Cloudy
Sample Time: 1540 **QAQC Samples Collected:** ⊗ No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC:

Comments: * Air bubbles kept affecting the turbidity reading

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP 87 **WELL DIAMETER:** 0.75"
SAMPLER(S): S. Trahan, L. Donnell
DATE: 7/31/17

WEATHER CONDITIONS: Sunny, hot, 90°F+

Sampling Device: Peristaltic Pump
Make/Model: GeoTech GeoPump
Serial Number: 2493

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 496339

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.02 **Total Well Depth (ft-bpm):** 21.62 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	µS/cm Cond. (~~mS/m~~)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1551	0.250		7.09	1433	20.10	24.23	3.36	125.5	
2. 1555	0.250		7.12	1355.3	16.76	19.51	3.35	162.0	
3. 1558	0.250		7.15	1392.1	25.73	19.30	3.80	151.4	
4. 1601	0.250		7.16	1423.3	3.80	18.96	4.47	109.6	
5. 1604	0.250		7.15	1427.7	2.98	19.06	3.63	120.3	
6. 1607	0.250		7.13	1352.1	3.07	19.19	3.85	120.6	
7. 1609	0.250		7.12	1428.5	1.33	19.21	3.67	122.1	
8. 1615	3 VOAs + 1 metals sample collected								
9.								Final	1302
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: DPGP 87 **SampleClarity/Color/Odor:**
Sample Time: 1615 **QAQC Samples Collected:** ☒ No ○ Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: VOCs + metals.

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP-~~58~~04 **WELL DIAMETER:** 1
SAMPLER(S): JS BS
DATE: 7-31-17

WEATHER CONDITIONS: 100 Sunny Hot

Sampling Device: Nguy Fnall 600	**Water Quality Inst.:**
Make/Model:	**Make/Model:**
Serial Number:	**Serial Number:**

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** ⊗ Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.62 **Total Well Depth (ft-bpm):** 21.52 **Depth to Pump Inlet(ft-bmp):** 20.00

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1620	300		7.41	0.77	39.22	18.49	3.55	119.7	13.62
2. 1625	300		7.47	0.77	37.09	17.95	3.66	114.5	well too
3. 1630	300		7.52	0.77	16.53	17.88	3.58	109.6	small for
4. 1635	300		7.57	0.78	14.51	17.75	3.59	98.0	probe and
5. 1640	300		7.59	0.78	12.25	17.76	3.58	88.4	WL
6. 1645	300		7.59	0.78	12.71	17.76	3.52	83.4	
7. 1650	300		7.59	0.78	13.41	17.86	3.53	83.1	
8. 1655	Sample								
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP-04 **SampleClarity/Color/Odor:** Clear
Sample Time: 1655 **QAQC Samples Collected:** ⊗ No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: VOCs, SVOCs
Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: EMW-09 **WELL DIAMETER:** 2
SAMPLER(S): LD SJS
DATE: 8/01/17

WEATHER CONDITIONS: Sunny 70°

Sampling Device:	Bladder Pump	**Water Quality Inst.:**	In Situ
Make/Model:	QED MP50	**Make/Model:**	Aqua Troll 600
Serial Number:	1514	**Serial Number:**	496339

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.85 **Total Well Depth (ft-bpm):** 22.98 **Depth to Pump Inlet(ft-bmp):** ~20

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	mS/cm ~~(mS/m)~~ Cond.	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 0836			7.06	1151.2	207.62	15.23	0.99	-171.3	11.86
2. 0839			7.11	1209.2	219.47	17.03	1.07	-161.9	11.89
3. 0842			~~07~~7.14	1157.8	263.16	16.44	0.67	-176.6	11.88
4. 0845			7.14	1148.5	305.16	16.45	0.66	-182.4	
5. 0848			7.13	1129.1	269.41	16.44	0.77	-198.2	11.88
6. 0851			7.11	1120.9	444.42	16.39	0.85	-202.3	11.88
7. 0854			7.10	1095.8	439.69	16.40	0.94	-202.3	11.87
8. 0857			7.10	1089.9	426.11	16.40	0.96	-192.0	
9. 0900	Collect 2 Amber 6 VOA								
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: EMW-09 **SampleClarity/Color/Odor:** ~~Clo~~ Cloudy, Slight Odor
Sample Time: 0900 **QAQC Samples Collected:** ☒ No ○ Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: VOC, EPH VPH
Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: ZPMW-1 **WELL DIAMETER:** 2"
SAMPLER(S): J. Traher, J. Simons
DATE: 8/1/17

WEATHER CONDITIONS: Sunny, Clear 70°F+

Sampling Device: Bladder Pump
Make/Model: QED Sample Pro
Serial Number: 10780

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 509387

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 12.19 **Total Well Depth (ft-bpm):** 20.08 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 0836	0.250		6.67	22.16	769.28	22.51	0.95	207.6	
2. 0839	0.250		6.76	0.03	614.88	20.33	0.77	197.4	
3. 0842	0.250		6.79	0.01	627.90	19.95	0.89	191.4	
4. 0845	0.250		6.82	1.57	642.77	17.80	1.12	182.5	
5. 0848	0.250		6.86	1.94	588.54	16.99	0.94	175.5	
6. 0851	0.250		6.85	1.99	583.59	16.53	0.93	162.2	
7. 0854	0.250		6.87	2.27	447.61	16.47	0.96	146.9	
8. 0857	0.250		6.85	2.05	327.14	16.41	0.97	116.8	
9. 0900	0.250		6.85	2.11	451.15	16.21	1.07	106.7	
10. 0903	0.250		6.85	2.29	467.35	16.36	0.85	94.7	
11. 0906	0.250		6.85	2.45	423.52	16.13	0.94	82.5	
12. 0909	0.250		6.87	2.46	144.85	16.14	0.85	73.1	
13. 0912	0.250		6.86	2.26	153.80	16.03	0.83	65.8	
14. 0915	0.250		6.88	2.25	225.08	16.07	0.85	61.1	
15. 0918	0.250		6.87	1.97	175.93	16.24	0.83	45.4	
16. Collect 3 VOC vials + 1 metals container.									
17.								Final	12.30
18.									

Sample ID: ZPMW-1 **SampleClarity/Color/Odor:** Turbid, no odor.
Sample Time: 0920 **QAQC Samples Collected:** ⊗ No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: VOCs + Metals.

Comments: Turbidity + ORP have continued to drift downwards. Will sample @ 45min. purge mark. Have purged more than 3 well volumes

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: SD-I-01 **WELL DIAMETER:** 8"
SAMPLER(S): LD SJS
DATE: 8/01/17
WEATHER CONDITIONS: Sunny 70°

Sampling Device:	Peristaltic	**Water Quality Inst.:**	In Situ
Make/Model:	Grundfos Geopump	**Make/Model:**	Aquatroll 600
Serial Number:		**Serial Number:**	#96339

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 14.54 **Total Well Depth (ft-bpm):** 25.4 Top of pump **Depth to Pump Inlet(ft-bmp):** ~24

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 0949	220 ml/m		7.03	2450.7	323.17	19.21	0.43	-2.6	
2. 0952			7.04	2414.7	247.90	17.66	0.35	-1.1	14.55
3. 0955			7.05	2411.0	149.5	16.97	0.27	9.2	
4. 0958			7.05	2415.5	187.85	16.50	0.26	12.6	14.55
5. 1001			7.05	2552.5	148.35	16.50	0.29	17.4	
6. 1004			7.05	2548.0	134.99	16.66	0.27	20.8	
7. 1007			7.05	2540.9	131.53	16.47	0.26	23.5	14.55
8. 1010			7.05	2537.2	95.09	16.35	0.23	26.2	
9. 1013			7.05	2521.4	78.04	16.25	0.24	27.7	
10. 1016			7.05	2512.9	77.33	16.21	0.25	29.0	
11. 1019			7.04	2513.6	75.91	16.30	0.29	30.2	
12. 1020	Collect 17 bottles								
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: SD-I-01 **SampleClarity/Color/Odor:** Reddish Tint, Rust particles present in samples
Sample Time: 1020 **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: Full Suite

Comments: Pump @ about 24.5 to 25' below toc - cannot tag TD
Believed to be GWIC #121818 owned by School District #2 for Billings Public Schools.

See back for contact/access info

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: SD-I-02 **WELL DIAMETER:** 6"
SAMPLER(S): S. Trahan
DATE: 8/1/17

WEATHER CONDITIONS: Sunny, 90°+F

Sampling Device: Peristaltic Pump
Make/Model: GeoTech GeoPump
Serial Number: 2496

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 509387

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.96 **Total Well Depth (ft-bpm):** _____ **Depth to Pump Inlet(ft-bmp):** _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			± 0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1. 1237	0.3		7.17	2.25	72.78	19.23	4.08	139.2	
2. 1240	0.3		7.18	2.24	139.7	18.97	4.08	137.5	
3. 1243	0.3		7.16	2.36	274.00	18.33	4.15	135.6	
4. 1246	0.3		7.16	2.30	275.07	18.54	4.09	131.2	
5. 1249	0.3		7.12	2.28	912.45	18.85	4.00	130.4	
6. 1252	0.3		7.06	2.26	605.91	19.00	3.98	139.3	
7. 1255	0.3		7.02	2.26	1330.6	18.52	4.02	133.7	
8. 1300	Collect 12 VOAs, submit for VOC analysis								
9.								Final	11.96
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: SD-I-02 **SampleClarity/Color/Odor:**
Sample Time: 1300 **QAQC Samples Collected:** ○ No ☒ Yes: **If yes, QAQC IDs** SD-I-02 MS, SD-I-02 MSD, 20170801-D
Analytical methods requested on COC:

Comments: Despite low flow stream becoming increasingly clearer, turbidity continues to rise. Turbidity reading presumed unreliable

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BNMW-8 **WELL DIAMETER:** 2"
SAMPLER(S): S.T L.D
DATE: 8/30/17

WEATHER CONDITIONS: Sunny

Sampling Device:	Bladder Pump	**Water Quality Inst.:**	WQM
Make/Model:	QED SamplePro	**Make/Model:**	In Situ Aqua Troll 600
Serial Number:	10154	**Serial Number:**	465692.

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 14.97 **Total Well Depth (ft-bpm):** 19.90 **Depth to Pump Inlet(ft-bmp):** _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	nS/cm Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.5	±10%	±10% or less than 10 NTU's		±10% or less than 0.2 mg/L		
1. 0927			7.04	3223.8	39.41	16.56		231	14.94
2. 0930			7.06	3250.4	22.40	16.54	1.72	226	14.94
3. 0934			7.06	3263.4	12.00	16.07	1.75	221	
4. 0937			7.07	3262.4	6.90	16.05	1.81	217	14.96
5. 0940		2gal	7.08	3276.5	4.83	15.91	1.90	215	
6. 0945			7.08	3264.4	3.59	15.83	1.97	212	
7. 0945	Sampled								
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BNMW-8 **SampleClarity/Color/Odor:**
Sample Time: 1000 **QAQC Samples Collected:** ○ No ☒ Yes: **If yes, QAQC IDs** 20170830-A B Dup
Analytical methods requested on COC: VOCs, VPH/EPH, Metals + Hg
Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BNMW-20 **WELL DIAMETER:** 2"
SAMPLER(S): JT WD
DATE: 8/30/17

WEATHER CONDITIONS: Sunny

Sampling Device: Bladder Pump
Make/Model: QED Sample Pro
Serial Number: 10154

Water Quality Inst.: WQM
Make/Model: In Situ Aqua Troll 600
Serial Number: 465692

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 14.04 **Total Well Depth (ft-bpm):** _____ **Depth to Pump Inlet(ft-bmp):** _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	uS/cm Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.5	±10%	±10% or less than 10 NTU's		±10% or less than 0.2 mg/L		
1. 1044			7.05	3174.4	22.20	17.41	1.94	204.8	14.11
2. 1047			7.07	3236.2	13.76	16.14	1.95	200.8	
3. 1050			7.08	3272.9	8.01	15.74	1.96	192.1	14.12
4. 1053			7.09	3291.8	5.77	15.32	1.95	194.3	
5. 1056			7.09	3299.4	8.80	15.15	1.98	191.7	14.14
6. 1059			7.08	3305.2	8.41	14.90	2.00	190.2	14.14
7. 1102			7.06	3308.7	6.58	14.92	2.00	190.7	
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BNMW-20 **SampleClarity/Color/Odor:** Clear no odor
Sample Time: 1115 **QAQC Samples Collected:** ☒ No ○ Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: VOC VPH, EPH

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BNMW-7 **WELL DIAMETER:** 2"
SAMPLER(S): S.T. , L.D
DATE: 8/30/17

WEATHER CONDITIONS: Overcast.

Sampling Device:	Sample Pro Bladder Pump	**Water Quality Inst.:**	WQM.
Make/Model:	QED Sample Pro	**Make/Model:**	In Situ Aqua Troll 600
Serial Number:	10134	**Serial Number:**	465692

Tubing Type: ✓ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): Product ~~14.07~~ 15.55 ~~~13.52~~ **Total Well Depth (ft-bpm):** 19.97 **Depth to Pump Inlet(ft-bmp):** _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's		±10% or less than 0.2 mg/L		
1.									
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: **SampleClarity/Color/Odor:**

Sample Time: **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs** _____

Analytical methods requested on COC:

Comments: Approxim. 0.02" of product in well. Thickness not easily identified. Hard to measure thickness. Coats O/W probe. ~~smells somewhat of diesel~~ Strong odor.

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BNMW-17 WELL DIAMETER: 4"
SAMPLER(S): J.T. LD
DATE: 8/30/17

WEATHER CONDITIONS: Sunny, Hot, Smokey

Sampling Device:	Bladder Pump	Water Quality Inst.:	In Situ
Make/Model:	QED Sample Pro	Make/Model:	AquaTroll 600
Serial Number:	10154	Serial Number:	465692

Tubing Type: O Teflon O Poly O Other Decontamination: O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 15.46 Total Well Depth (ft-bpm): 19.29 Depth to Pump Inlet(ft-bmp): _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	µS/cm Cond. ~~(mS/m)~~	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
			±0.5		±10% or less than 10 NTU's		±10% or less than 0.2 mg/L		
1. 1153			6.96	2906.6	37.22	18.79	0.91	-128.3	15.61
2. 1157			7.03	2964.7	40.64	17.44	1.73	-148.3	15.75
3. 1200			7.07	2966.6	51.45	17.21	2.19	-137.6	
4. 1203			7.10	2975.2	68.49	17.28	2.48	-127.5	
5. 1206			7.12	2975.2	79.43	17.24	2.79	-109.0	
6. 1209			7.14	2975.8	88.89	17.15	2.92	-94.2	16.22
7. 1212			7.16	2980.4	111.72	17.32	3.10	-80.3	16.29
8. 1215			7.18	2957.2	160.27	17.22	3.15	-71.8	16.32
9. 1218			7.19	2964.2	166.96	17.23	3.15	-65.6	
10. 1221			7.20	2980.4	194.28	17.28	3.13	-64.1	
11. 1224			7.22	2965.0	212.24	17.27	3.00	-62.3	16.35
12. 1227			7.24	2950.2	215.84	17.22	3.00	-61.4	
13. 1230			7.25	2954.2	224.02	17.16	2.97	-60.6	
14									
15									
16									
17									
18									

Sample ID: BNMW-17 SampleClarity/Color/Odor: Dark color, mild odor
Sample Time: 1235 QAQC Samples Collected: ☒No O Yes: If yes, QAQC IDs _____
Analytical methods requested on COC: EPH/VPH, VOC, Metals.

Comments: VOA samples are bubbling significantly. Difficult to get volatiles to collect w/o bubble or in headspace.

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BNMW-24 **WELL DIAMETER:** 2"
SAMPLER(S): ST/LD
DATE: 8/30/17

WEATHER CONDITIONS: Sunny, Hot 90°F+

Sampling Device:	Bladder Pump	**Water Quality Inst.:**	In Situ
Make/Model:	QED Sample Pro	**Make/Model:**	Aqua Troll 600
Serial Number:	10154	**Serial Number:**	465692

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.72 **Total Well Depth (ft-bpm):** _____ **Depth to Pump Inlet(ft-bmp):** _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.5	±10%	±10% or less than 10 NTU's		±10% or less than 0.2 mg/L		
1. 1320			7.30	2208.6	1.75	17.08	0.19	31.2	13.77
2. 1323			7.34	2223.0	1.56	16.21	0.17	31.2	
3. 1326			7.37	2226.6	1.39	15.62	0.22	31.0	13.77
4. 1329			7.38	2211.9	1.32	15.31	0.29	32.1	
5. 1332			7.39	2151.7	1.28	15.02	0.32	32.6	
6. 1335			7.39	2146.7	1.61	14.89	0.36	34.0	
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BNMW-24 **SampleClarity/Color/Odor:** Clear, no odor
Sample Time: 1355 **QAQC Samples Collected:** ~~O~~No O Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: VOCs, EPH/VPH, Metals + Hg
Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BNMW-9 **WELL DIAMETER:** 2
SAMPLER(S): ST CD
DATE: 8/30/12

WEATHER CONDITIONS: Sunny 70°

Sampling Device:	**Water Quality Inst.:**
Make/Model:	**Make/Model:**
Serial Number:	**Serial Number:**

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 14.35 **Total Well Depth (ft-bpm):** 20.80 **Depth to Pump Inlet(ft-bmp):** _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's		±10% or less than 0.2 mg/L		
1. 1500			7.08	2979.6	1.71	19.08	0.33	70.6	14.49
2. 1503			7.10	3003.9	1.36	18.36	0.35	71.4	14.49
3. 1506			7.13	3027.4	1.71	17.55	0.61	73.2	
4. 1509			7.16	3027.0	2.57	17.11	0.66	74.6	14.42
5. 1512			7.16	3022	6.57	16.81	0.82	76.0	
6. 1515			7.16	3028.5	9.13	16.49	0.89	78.7	
7. 1518			7.16	3030.5	9.73	16.42	0.92	81.1	14.45
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BNMW-9 **SampleClarity/Color/Odor:** clear

Sample Time: 1520 **QAQC Samples Collected:** O No ~~O~~ Yes: **If yes, QAQC IDs** MS MSD

Analytical methods requested on COC:

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: ~~20170830-B~~ WELL DIAMETER: —
SAMPLER(S): ST
DATE:

WEATHER CONDITIONS:

Sampling Device:	Water Quality Inst.:
Make/Model:	Make/Model:
Serial Number:	Serial Number:

Tubing Type: O Teflon O Poly O Other Decontamination: O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ Total Well Depth (ft-bpm): _____ Depth to Pump Inlet(ft-bmp): _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	
1.									
2.	20170830-B - Field Blank → VOCs EPH/VPH, metals								
3.	20170830-C - Equipment blank → VOCs EPH/VPH, metals								
4.	20170830-D - Trip Blank								
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: SampleClarity/Color/Odor:

Sample Time: QAQC Samples Collected: O No O Yes: If yes, QAQC IDs_____

Analytical methods requested on COC:

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: EMW-32 **WELL DIAMETER:** 2"
SAMPLER(S): SR LD
DATE: 8/31/17

WEATHER CONDITIONS: PC Cloudy 68°

Sampling Device:	Bladder Pump	**Water Quality Inst.:**	In Situ
Make/Model:	QED MP50	**Make/Model:**	Aqua Troll 600
Serial Number:	1814	**Serial Number:**	465 042

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 16.25 **Total Well Depth (ft-bpm):** 20.03 **Depth to Pump Inlet(ft-bmp):** _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	
1. 0749			7.03	1612.1	86.99	15.27	6.93	239.1	16.35
2. 0752			7.13	1623.4	79.56	15.28	7.32	234.7	16.34
3. 0755			7.16	1627.5	69.41	14.95	7.37	235.3	
4. 0758			7.21	1624.9	49.17	14.78	7.48	236.6	16.34
5. 0801			7.22	1624.5	41.53	14.70	7.49	236.7	
6. 0804		1.5 gal	7.23	1625.2	41.73	14.69	7.51	237.2	16.32
7. 0807			7.24	1625.4	26.24	14.70	7.51	228.2	
8. 0810			7.24	1628.8	20.09 ~~14.6~~	14.69	7.55	227.7	
9. 0813			7.24	1630.6	20.25	14.72	7.56	230.5	16.34
10. 0816			7.23	1631.2	12.03	14.73	7.55	230.6	
11. 0819			7.27	1636.2	9.54	14.69	7.57	227.8	
12. 0822			7.23	1636.5	8.14	14.69	7.54	226.8	
13. 0825			7.22	1638.6	9.01	14.68	7.56	224.5	
14.									
15.									
16.									
17.									
18.									

Sample ID: EMW-32 **SampleClarity/Color/Odor:** Clear No Odor

Sample Time: 0830 **QAQC Samples Collected:** ~~O No~~ O Yes: **If yes, QAQC IDs** _____

Analytical methods requested on COC: VOC EPH VPH Metals

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BNMW-21 **WELL DIAMETER:** 2"
SAMPLER(S): ST / LD
DATE: 8/31/17

WEATHER CONDITIONS: Overcast 80+ °F

Sampling Device:	Bladder Pump	**Water Quality Inst.:**	In Situ
Make/Model:	QED Sample Pro	**Make/Model:**	Aqua Troll 600
Serial Number:	1819	**Serial Number:**	465692

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 14.50 **Total Well Depth (ft-bpm):** 18.30 **Depth to Pump Inlet(ft-bmp):** _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	µS/cm Cond. (~~mS/m~~)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	-	-
1. 0916			6.84	2963.6	67.36	17.36	1.02	197.8	
2. 0919			6.54	3010.0	64.52	16.27	0.89	193.4	14.55
3. 0922			6.54	3045.5	28.53	15.00	1.13	191.0	
4. 0925			6.57	3062.4	12.29	15.62	1.31	188.5	14.55
5. 0928			6.57	3078	4.38	15.57	1.42	186.4	
6. 0931			6.57	3087.6	2.68	15.51	1.64	185.4	
7. 0934			6.57	3092.3	1.69	15.43	1.56	184.2	
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BNMW-21 **SampleClarity/Color/Odor:** Clear No Odor
Sample Time: 0940 **QAQC Samples Collected:** ☒ No ○ Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: Full Suite - 17 Bottles.
Comments: Can smell diesel from tow truck parked upwind.

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP02 **WELL DIAMETER:** 0.5"
SAMPLER(S): JT
DATE: 8/31/17

WEATHER CONDITIONS: Cloudy, 80°+°F

Sampling Device:	Peristaltic Pump	**Water Quality Inst.:**	In Situ
Make/Model:	Geotech Geopump	**Make/Model:**	Aqua Troll 600
Serial Number:	3126	**Serial Number:**	46569

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 12.90 **Total Well Depth (ft-bpm):** 19.98 **Depth to Pump Inlet(ft-bmp):** _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	µS/cm Cond. (~~mS/m~~)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	
1. 1031			7.26	1054.5	2.20	18.98	0.23	-98.8	
2. 1034			7.25	1226.0	1.16	17.73	0.08	-134.0	
3. 1041			7.22	1359.0	1.13	17.20	0.02	-154.6	
4. 1045			7.21	1389.0	1.53	17.12	0.01	-159.3	
5. 1048			7.21	1397.5	1.52	17.13	0.00	-161.5	
6. 1051			7.21	1417.8	2.15	17.11	0.01	-164.3	
7.								Final	12.90
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 1055 **SampleClarity/Color/Odor:** Clear, no odor
Sample Time: BPGP02 **QAQC Samples Collected:** ○ No ☒ Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: Full Suite

Comments: Collected RB 20170831-A 1115
5 meters near extraction point

Page ____ of ____

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BNMW-23 **WELL DIAMETER:** 0.75"
SAMPLER(S): ST/LD
DATE: 8/31/17

WEATHER CONDITIONS: Overcast, 90°F+

Sampling Device:	Peristaltic Pump	**Water Quality Inst.:**	WQM
Make/Model:	Geotech / Geopump	**Make/Model:**	In Situ Aqua Troll 600
Serial Number:	3126	**Serial Number:**	465692

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 12.99 **Total Well Depth (ft-bpm):** 19.68 **Depth to Pump Inlet(ft-bmp):** _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	
1. 1325			7.06	3083.6	2.43	21.08	0.79	71.0	
2. 1328			7.07	3168.0	10.00	19.70	0.14	-96.2	
3. 1331			7.10	3195.3	6.07	18.88	0.08	-120.1	
4. 1334			7.10	3208.0	3.80	18.50	0.06	-133.7	
5. 1337			7.10	3212.7	3.43	18.20	0.06	-142.6	
6. 1343			7.10	3225.2	4.50	17.95	0.02	-152.3	
7. 1347			7.09	3227.9	6.50	17.52	0.03	-158.3	
8. 1351			7.08	3218.1	3.14	17.86	0.04	-161.1	
9.									12.98
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BNMW-23 **SampleClarity/Color/Odor:**
Sample Time: 1355 **QAQC Samples Collected:** ☒ No ○ Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC: Full Suite

Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP41 **WELL DIAMETER:** 3/4"
SAMPLER: JR/ST
DATE: 5/7/18
WEATHER CONDITIONS Clear

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peristaltic Pump
Make/Model: GeoPump Easy-Load II
Serial Number: 2647

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 465699

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 10.68 **Total Well Depth (ft-bpm):** ~~10.60~~ 14.40 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.1	±3%	±10% or last value if below 10 NTU	±3%	±10% or last value if below 0.3 mg/L	±10%	
1. 10:36	.250								
2. 10:36	.150		6.86	3966	6.39	13.94	3.64	242.6	
3. 10:39	.150		6.89	3968	9.57	13.07	3.68	239.3	
4. 10:42	.150		6.88	3963	2.68	12.84	3.56	238.5	
5.									
6.									
7.									
8.		Final	DTW						
9.			~~10.60~~						
10.			10.63 ST						
11.									
12.		~1 gal	purged						
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP41 **SampleClarity/Color/Odor:**
Sample Time: 10:46 **QAQC Samples Collected:** O No O Yes:
Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-101 WELL DIAMETER: 2"
SAMPLER: RM + JS
DATE: 5-7-18
WEATHER CONDITIONS Warm, 72°F, 9 mph wind W

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Water Quality Inst.: In Situ
Make/Model:	Make/Model: Aqua Troll 600
Serial Number:	Serial Number:

Tubing Type: Ø Teflon O Poly O Other Decontamination: O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 8.74 Total Well Depth (ft-bpm): 23.75 Depth to Pump Inlet(ft-bmp):

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria									
1. 1244	.3		7.21	2357.7	2134.9	17.56	1.19	186.8	8.75
2. 1247			7.19	2322.8	2425	15.02	.61	188.5	8.75
3. 1250			7.14	2339.8	1906	14.46	.57	192.1	8.75
4. 1253			7.13	2346.5	1610.9	14.16	.55	193	8.77
5. 1256			7.12	2348.4	949.8	13.84	.54	193.2	8.82
6. 1259			7.13	2359.8	304.8	13.80	.51	192.7	8.75
7. 1302			7.12	2376.5	163.20	13.40	.42	192.0	8.80
8. 1305			7.14	2381.7	85.81	13.24	.33	190.6	8.76
9. 1308			7.14	2382.8	82.32	13.26	.30	189.8	8.82
10. 1311			7.14	2378.1	76.28	13.31	.26	188.7	8.82
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: MW-101 SampleClarity/Color/Odor: light brown
Sample Time: 1314 QAQC Samples Collected: Ø No O Yes:
Comments: Full Suite

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-124 **WELL DIAMETER:** 2"
SAMPLER: B. Schiche, T. Scott, R. Miller
DATE: 5-7-18
WEATHER CONDITIONS Sunny, 70°, 5-10 mph E

Sampling Device: AQUATROLL 600
Make/Model:
Serial Number: 513586

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number:

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 8.65 **Total Well Depth (ft-bpm):**_____ **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1. 10:09			7.08	3078.3	1,083.5	14.96	.75	227.5	8.65
2. 10:12			7.10	3013.6	773.94	13.77	.45	223.7	8.67
3. 10:15			7.07	3025.9	701.20	13.54	.39	223.7	8.74
4. 10:18			7.06	3011.7	623.87	13.69	.35	224.1	8.74
5. 10:21			7.07	2999.8	457.49	13.80	.29	222.3	8.76
6. 10:24			7.08	2975.4	552.92	13.65	.28	219.3	8.76
7. 10:27			7.10	2930.0	502.63	13.65	.25	216.4	8.75
8. 10:30			7.12	2892	543	13.80	.23	212.5	8.72
9. 10:33			7.13	2883.9	596	13.84	.22	211.9	8.72
10. 10:36			7.14	2857.1	666.38	13.99	.21	209.7	8.72
11. 10:39			7.15	2818	760	14.08	.21	206.3	8.72
12. 10:42			7.15	2807	717	13.95	.20	205.0	8.72
13. 10:45			7.15	2783	6.42	13.97	.19	203.6	8.72
14.									
15.									
16.									
17.									
18.									

Sample ID: MW-124 **SampleClarity/Color/Odor:** light brown
Sample Time: 10:45 **QAQC Samples Collected:** ☒ No ○ Yes:
Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW120 **WELL DIAMETER:** 2"
SAMPLER: BS
DATE: 5/7/18
WEATHER CONDITIONS Cloudy, ~60°F

Sampling Device:	**Water Quality Inst.:** In Situ
Make/Model:	**Make/Model:** Aqua Troll 600
Serial Number:	**Serial Number:**

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 9.51 + .03 = 9.54 **Total Well Depth (ft-bpm):**_____ **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria									
1. 1700 start	.300								
2. 1703	.300		7.35	3319	512.21	13.13	4.00	182.8	9.50
3. 1706	.300		7.34	3373	573.10	12.59	5.76	183.5	9.50
4. 1709	.300		7.33	3339	424.05	12.26	6.42	183.9	9.49
5. 1712	.300		7.33	3347	443.42	12.30	7.00	184.6	9.50
6. 1715	.300		7.32	3345	430.89	12.15	7.17	184.9	9.50
7. 1718	.300		7.32	3336	405.15	12.05	7.21	184.7	9.50
8. 1721	.300		7.32	3299	386.03	11.92	7.32	184.5	9.50
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: MW120 **SampleClarity/Color/Odor:** Light Brown, cloudy
Sample Time: 1723 **QAQC Samples Collected:** ⊗ No O Yes:
Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP31 **WELL DIAMETER:** 0.5"
SAMPLER: ST
DATE: 5/7/18
WEATHER CONDITIONS 70°F+, N 5-10 mph

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peristaltic Pump
Make/Model: Geotech/GeoPump
Serial Number: 2647

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: R31894

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 10.38 **Total Well Depth (ft-bpm):** 21.43 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1. 1311	0.2								
2. 1317	0.2		6.96	4273	48.45	15.86	0.35	-39.6	
1320	0.1		6.98	4347	51.64	15.67	0.25	-63.7	
4. 1323	0.1		7.00	4373	53.02	15.47	0.26	-77.9	
5. 1326	0.1		6.96	4379	64.17	15.16	0.21	-78.6	
6. 1329	0.1		6.91	4400	65.41	14.89	0.17	-85.4	
7. 1332	0.1		6.88	4420	74.27	14.97	0.17	~~-102~~ -103.5	
8. 1335	0.1		6.86	4430	84.46	14.78	0.15	-107.3	
9. 1338	0.1		6.85	4425	86.79	14.86	0.15	-121.1	
10. 1341	0.1		6.84	4420	102.90	14.39	0.15	-130.7	
11. 1344	0.1		6.84	4424	107.73	14.15	0.15	-137.4	
12. 1347	0.1		6.84	4431	110.07	14.04	0.15	-132	
13.									
14.	~~Pump~~								10.40
15.									
16.									
17.									
18.									

Sample ID: BPGP31 **SampleClarity/Color/Odor:** Clear, no odor
Sample Time: 1349 **QAQC Samples Collected:** O No O Yes:
Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP48 **WELL DIAMETER:** 3/4"
SAMPLER: JR
DATE: 5/7/18
WEATHER CONDITIONS Overcast

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peristaltic Pump
Make/Model: GeoPump EasyLoad II
Serial Number: 2493

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 518813

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 8.99 **Total Well Depth (ft-bpm):** 21.83 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1.	1:26	Start purge								
2.	1:29	.21		7.13	2995	49.55	15.99	2.735	207.2	
3.	1:32	.21		7.14	3110	47.76	14.60	2.576	203.3	
4.	1:35	.21		7.05	3125	51.79	14.01	2.513	211.3	
5.	1:38	.21	2.2	7.01	3103	50.76	13.76	2.474	214.0	
6.										
7.										
8.			Final DTW							
9.			~~8.98~~							
10.			9.01							
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: BPGP48 **SampleClarity/Color/Odor:**
Sample Time: 13:41 **QAQC Samples Collected:** ○ No ○ Yes:
Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP29 **WELL DIAMETER:** 3/4"
SAMPLER: JR
DATE: 5/7/18
WEATHER CONDITIONS Clear

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peristaltic Pump	**Water Quality Inst.:** In Situ
Make/Model: Geo Pump Easy Load II	**Make/Model:** Aqua Troll 600
Serial Number: 2493	**Serial Number:** 518813

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): ~~[illegible]~~ 10.81 **Total Well Depth (ft-bpm):** ~~[illegible]~~ 21.65 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.1	±3%	±10% or less when all NTUs		±10% or less when > 1 mg/L	±10	
1. ~~[illegible]~~:16	Start Purge		~~7.21~~	~~2013~~	~~96.58~~	~~14.95~~	~~2.925~~	~~233.75~~	
2. ~~[illegible]~~:19	.250		7.21	2013	96.58	14.95	2.925	233.75	
~~[illegible]~~:22	.250		7.17	2144	25.91	14.10	2.588	239.35	
4. 11:25	.250	2	7.08	2250	20.40	13.62	2.306	244.23	
5. 11:28	.250		7.05	2191	15.27	13.79	2.337	247.62	
6. 11:31	.250		7.05	2210	14.04	13.61	2.393	245.98	
7. 11:34	.250	3.6	7.07	2177	11.27	13.44	2.317	246.18	
8. 11:37	.250		7.08	2227	10.03	13.49	2.343	244.09	
9. 11:40	.250		7.10	2242	8.28	13.80	2.3424	243.64	
10. 11:43	.250	5	7.13	2239	10.29	13.53	2.3081	240.89	
11. 11:46	.250		7.15	2164.	7.82	13.75	2.2759	237.60	
12. 11:49	.250		7.17	2145	6.03	13.13	2.4766	236.26	
13. 11:52	.250	7 ~~[illegible]~~	7.17	2219	5.82	13.09	2.3993	235.78	
14.									
15.		Final DTW							
16.		~~[illegible]~~							
17.		10.81							
18.									

Sample ID: BPGP29 **SampleClarity/Color/Odor:** Clear, No odor
Sample Time: 12:54 **QAQC Samples Collected:** O No O Yes:
Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP47 **WELL DIAMETER:** 0.5"
SAMPLER: ST
DATE: 5/7/18
WEATHER CONDITIONS Rainy, T-Storms

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peristaltic Pump
Make/Model: GeoTech / Geopump
Serial Number: 2647

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: R31894

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 9.41 **Total Well Depth (ft-bpm):** 20.85 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria									
1.	1533	0.1								
2.	1537	0.1		7.04	3201	98.59	12.98	2.01	71.0	
3.	1540	0.1		7.06	3257	96.73	12.54	2.02	75.4	
4.	1543	0.1		7.07	3263	97.08	12.35	1.99	79.2	
5.										
6.										
7.		Final DTW - 9.41								
8.										
9.										
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: BPGP47 **SampleClarity/Color/Odor:** clear, no odor
Sample Time: 1548 **QAQC Samples Collected:** ☒ No O Yes:
Comments: Horizontal utility drilling across street (pic 1).
VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: SPGP86 **WELL DIAMETER:** 0.75
SAMPLER: ST
DATE: 5/7/18
WEATHER CONDITIONS Sunny, 69°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peristaltic Pump	**Water Quality Inst.:** In Situ
Make/Model: Geo Tech / Geopump	**Make/Model:** Aqua Troll 600
Serial Number: 2647	**Serial Number:** R31894

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 10.82 **Total Well Depth (ft-bpm):**_____ **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1127	Stabilization Criteria								
1. ~~1116~~		0.1	7.16	2045	9.26	17.21	2.73	209.0	
2. 1130			7.18	2017	9.55	16.49	2.70	210	
3. 1135			7.20	2034	10.62	15.82	2.64	205.6	
4.									
5. Final DTW									
6.									
7.	10.81 ft								
8.	~1 gal purged.								
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: 1138 **SampleClarity/Color/Odor:** Clear, no odor.
Sample Time: SPGP86 **QAQC Samples Collected:** ○ No ○ Yes:
Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP 27 **WELL DIAMETER:** 0.27
SAMPLER:
DATE: 5/7/2018
WEATHER CONDITIONS Light rain, ~70°F, Calm

Sampling Device: Peristaltic Pump
Make/Model: Geopump Easy Load II
Serial Number: 22493

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 518813

Tubing Type: ✓ Teflon O Poly O Other **Decontamination:** ✓ Decontaminated Water Meter ✓ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 8.46+0.03= 8.49 **Total Well Depth (ft-bpm):** 21.52 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1. 1450	Begin	purging	~~BG~~ BPGP27						
2. 1453			7.23	2639.2	1.08	12.75	2.81	231.6	
3. 1456	0.2		7.08	2516.7	3.61	11.80	2.99	238.0	
4. 1459		2	6.99	2,394.2	2.43	11.23	3.30	241.1	
5. 1502			6.96	2,354.0	2.55	10.90	3.50	241.3	
6. 1505		3	6.95	2,312.7	2.22	10.52	3.55	240.4	
7. 1510	Sampled	BPGP27							
8.	9.37	+ 0.03	= 9.4	Depth to groundwater					
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP 27 **SampleClarity/Color/Odor:** clear / clear / none
Sample Time: 1510 **QAQC Samples Collected:** ✓ No O Yes:
Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP 25 **WELL DIAMETER:** 3/4 "
SAMPLER: JR
DATE: 5/7/18
WEATHER CONDITIONS Rainy, ~60°

Sampling Device: Peristaltic Pump
Make/Model: GeoPump Easy-Load II
Serial Number: 2493

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 518813

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ☑ Decontaminated Water Meter ☑ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 10.10 **Total Well Depth (ft-bpm):** 21.44+.03 = 21.47 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1. 1539	Begin	purging	BPGP	25					
2. 1542	0.22		7.10	3,878.2	19.43	12.61	4.72	241.0	
3. 1545			7.06	3,892.6	17.87	12.26	4.53	241.3	
4. 1548		2.2	7.04	3,913.0	18.67	12.21	4.50	240.4	
5. 1551			7.06	3,922.9	18.92	12.28	4.42	237.9	
6. 1555	Sample	BPGP 25 (MS/MSD)							
7.									
8.		DTW ~~Bot~~							
9.	10.11 +.035	10.14							
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP 25 **SampleClarity/Color/Odor:** clear / clear / none
Sample Time: **QAQC Samples Collected:** ○ No ☒ Yes: MS / MSD
Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: **WELL DIAMETER:**
SAMPLER:
DATE: 5/7/18
WEATHER CONDITIONS

Field QC

Sampling Device:	**Water Quality Inst.:** In Situ
Make/Model:	**Make/Model:** Aqua Troll 600
Serial Number:	**Serial Number:**

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):**_____ **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1.										
2.		20180507-A			Field	Blank				
3.										
4.		20180507-B			Equipment	Blank				
5.										
6.										
7.										
8.										
9.										
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: **SampleClarity/Color/Odor:**
Sample Time: **QAQC Samples Collected:** O No O Yes:
Comments: VOCs, VPH, SVOCs, EPH, Metals, ~~ME-E, Sulfate, Nitrate, Carbon~~ S.T. 5/7

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-102 **WELL DIAMETER:** 2"
SAMPLER: JS/RM
DATE: 5/7/18
WEATHER CONDITIONS Cloudy 57°

Sampling Device:	**Water Quality Inst.:** In Situ
Make/Model:	**Make/Model:** Aqua Troll 600
Serial Number:	**Serial Number:** 509271

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 9.20 **Total Well Depth (ft-bpm):** 20.92 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1. 1554	.2		7.47	1566.5	427.03	17.10	1.38	179.8	9.28
2. 1557			7.45	1723.0	265.42	16.72	1.63	180.9	9.28
3. 1600			7.42	1378.9	233.57	15.73	1.35	181.5	9.28
4. 1603			7.41	1663.0	171.47	14.98	1.34	182.5	9.30
5. 1606			7.41	1587.7	157.01	14.52	1.57	182.9	9.30
6. 1609			7.41	1557.2	153.40	14.31	1.71	182.8	9.30
7. 1612			7.41	1544.7	138.76	14.07	1.73	182.4	9.30
8. 1615			7.42	1553.1	122.98	14.05	1.70	181.8	9.30
9. 1618			7.43	1547.0	124.57	13.95	1.59	181.0	9.30
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: MW-102 **SampleClarity/Color/Odor:** Light Brown
Sample Time: 1622 **QAQC Samples Collected:** ☒ No ○ Yes:
Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: EMW-03 **WELL DIAMETER:** 2.0
SAMPLER: JS, BS, RM
DATE: 5/7/18
WEATHER CONDITIONS Cloudy 58°F

Sampling Device:	**Water Quality Inst.:** In Situ
Make/Model:	**Make/Model:** Aqua Troll 600
Serial Number:	**Serial Number:** 513586

Tubing Type: Ø Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 10.48' **Total Well Depth (ft-bpm):** 19.95' **Depth to Pump Inlet(ft-bmp):** 17.5'

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1.	1530	300	—	7.07	1,722	547	13.74	1.96	183.1	10.50
2.	1535	300	1.5	6.94	1,800	357	13.08	2.89	191	10.54
3.	1540	300	3	6.95	1,380	254	12.98	3.11	194	10.55
4.	1545	300	4.5	6.98	1,791.6	186	13.10	3.32	196	10.51
5.	1550	300	6	7.02	1,762	171	13.13	3.66	194.9	10.54
6.	1555	300	7.5	7.04	1,745	122	13.02	3.76	193.1	10.54
7.	1600	300	9	7.05	1,737	119	13.00	3.61	193.2	10.54
8.	1605	300	10.5	7.07	1,742	108	13.16	3.65	190.3	10.55
9.	1605	Sample	Collected							
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: EMW-03 **SampleClarity/Color/Odor:** High turbidity, brown
Sample Time: 1605 **QAQC Samples Collected:** Ø No O Yes:
Comments: VOC + Metals

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-100 **WELL DIAMETER:** 2"
SAMPLER: Jacob Scott
DATE: 5/7/2018
WEATHER CONDITIONS Partly cloudy 71°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: ~~Aqua Troll 600~~	**Water Quality Inst.:** In Situ
Make/Model:	**Make/Model:** Aqua Troll 600
Serial Number: ~~509271~~	**Serial Number:** 509271

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 8.74 **Total Well Depth (ft-bpm):** 22.73 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria									
1.	1130	0.2	0.2	7.19	2,502.4	1,309	14.69	0.54	201	~~197.6~~ 8.74
2.	1133	0.2	0.8	7.30	2,483.0	1,418.4	14.56	0.44	198.1	8.80
3.	1136	0.2	1.4	7.28	2,461.2	1,070.1	14.73	0.41	199.3	8.81
4.	1139	0.2	2.0	7.29	2,461.0	753.4	14.49	0.39	199.2	8.81
5.	1142	0.2	2.6	7.30	2,449.2	465.3	14.59	0.37	198.2	8.82
6.	1145	0.2	3.2	7.30	2,429.8	478.49	14.43	0.36	197.5	8.82
7.	1148	0.2	3.8	7.31	2,421.9	429.34	14.39	0.35	196.7	8.82
8.										
9.										
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: MW-100 **SampleClarity/Color/Odor:** Light brown / cloudy / No odor
Sample Time: 1150 **QAQC Samples Collected:** ☒ No O Yes:
Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.:	BPGP15
WELL DIAMETER:	0.75
SAMPLER:	JS / JR
DATE:	05/08/2018
WEATHER CONDITIONS	Mostly Sunny, winds 9 mph (W), 76°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Peristaltic Pump	Water Quality Inst.:	In Situ
Make/Model:	Geotech Easy Load II	Make/Model:	Aqua Troll 600
Serial Number:	2493	Serial Number:	509271

Tubing Type: ✓ Teflon O Poly O Other **Decontamination:** ✓ Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 10.51 +0.03= 10.54 Total Well Depth (ft-bpm): 19.58+0.03 = 19.61 Depth to Pump Inlet(ft-bmp):

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria									
1.	1509	Begin	purging	BPGP15						
2.	1512	0.15		7.09	3,649.8	16.90	13.73	1.25	-7.3	—
3.	1515			7.06	3,694.0	4.95	13.16	1.03	-0.1	—
4.	1518		2.4	7.05	3,690.5	1.36	12.89	0.94	5.2	—
5.	1521			7.04	3,702.1	0.96	12.99	0.90	9.9	—
6.	1524		3.5	7.04	3,703.8	0.61	12.74	0.89	13.6	—
7.	1527			7.04	3,707.7	0.65	12.56	0.87	17.1	—
8.	1530			7.04	3,712.1	0.70	12.45	0.86	20.5	—
9.	1533			7.04	3,717.2	0.62	12.40	0.86	22.7	—
10.	1536			7.04	3,717.7	0.61	12.35	0.85	26.9	—
11.	1539		7.0	7.04	3,712.0	0.56	12.29	0.85	27.2	—
12.	1542			7.04	3,713.3	0.66	12.27	0.85	28.2	—
13.	1545	Sample	BPGP	15	for VOC's					
14.		Post purging / sampling depth to Groundwater					10.53 +	0.03 =	10.56	
15.										
16.										
17.										
18.										

Sample ID:	BPGP15	SampleClarity/Color/Odor:	Clear / Clear / None
Sample Time:	1545	QAQC Samples Collected:	✓ No O Yes:

Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP85 **WELL DIAMETER:** 0.75"
SAMPLER: JS/JR
DATE: 5/8/18
WEATHER CONDITIONS Partly cloudy 75° F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peri pump	**Water Quality Inst.:** In Situ
Make/Model: Geotech Easy Load II	**Make/Model:** Aqua Troll 600
Serial Number: 2493	**Serial Number:** 509271

Tubing Type: Ø Teflon O Poly O Other **Decontamination:** Ø Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 10.78 **Total Well Depth (ft-bpm):** 19.92 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1.	1635	Start		Purge						
2.	1638	0.26	0.78	6.98	3,800.2	5.76	26.26	1.82	62.7	–
3.	1641	0.26	1.56	7.0	3,535.2	2.88	14.86	0.79	72.4	–
4.	1644	0.26	2.34	6.93	3,694.0	1.71	12.88	0.66	80.0	–
5.	1647	0.26	4.12	6.89	3,671.9	1.57	12.54	0.67	84.9	–
6.	1650	0.26	4.90	6.89	3,691.7	1.13	12.43	0.67	86.1	–
7.	Collected samples (VOCs) @ 1652									
8.										
9.	Post Purge DTW: 10.83 (ft-bpm)									
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: BPGP85 **SampleClarity/Color/Odor:** Clear, none / no odor
Sample Time: 1652 **QAQC Samples Collected:** Ø No O Yes:

Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP92 **WELL DIAMETER:** 0.75
SAMPLER: JS / JR
DATE: 05/08/2018
WEATHER CONDITIONS Mostly Cloudy, Winds 5mph(W), 75°F

Sampling Device:	Peristaltic Pump	**Water Quality Inst.:**	In Situ
Make/Model:	Geotech Easy Load II	**Make/Model:**	Aqua Troll 600
Serial Number:	2493	**Serial Number:**	509271

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ☒ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 9.95 + 0.03 = 9.98 **Total Well Depth (ft-bpm):** 21.09 + 0.03 = 21.12 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1.	1422	Begin	purging	BPGP92						
2.	1425	0.15		7.10	3,180.0	87.02	13.75	0.45	-121.7	—
3.	1428			7.06	3,199.0	34.90	12.87	0.32	-105.6	—
4.	1431		2.8	7.01	3,218.6	18.72	12.43	0.27	-94.7	—
5.	1434			7.00	3,226.8	13.99	12.27	0.25	-88.3	—
6.	1437		4	6.99	3,231.5	6.99	12.20	0.25	-82.6	—
7.	1440			6.99	3,233.3	3.33	12.19	0.25	-78.7	—
8.	1443			6.99	3,229.3	2.72	12.06	0.25	-75.9	—
9.	1445	Sample	BPGP92 (VOCs & MNA)							
10.	Post	purging/	Sampling depth to groundwater			= 10.40 + 0.03		= 10.43(ft-bmp)		
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: BPGP92 **SampleClarity/Color/Odor:** Clear / clear / none
Sample Time: 1445 **QAQC Samples Collected:** ☒ No ○ Yes:
Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: ~~BGP~~ BPGP17 **WELL DIAMETER:** 0.75"
SAMPLER: JS/JR
DATE: 5/8/18
WEATHER CONDITIONS Partly Cloudy 69°F

Sampling Device: PCE Pump	**Water Quality Inst.:** In Situ
Make/Model: Geotech Easy Loader II	**Make/Model:** Aqua Troll 600
Serial Number: 2493	**Serial Number:** 509271

Tubing Type: ☑ Teflon ○ Poly ○ Other **Decontamination:** ☑ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 10.44 + 0.03 = 10.47 **Total Well Depth (ft-bpm):** 13.30 + 0.03 = 13.33 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1.	1348	~~0.24~~ 0.24	Purge Start							
2.	~~1401~~ 1351	0.24	0.72	7.14	3,449.2	25.72	13.96	0.50	-168.2	—
3.	~~1404~~ 1354	0.24	1.44	7.05	3,599.0	18.88	13.52	0.40	-170.1	—
4.	~~1407~~ 1357	0.24	1.68	7.00	3,626.4	11.70	12.77	0.26	-174.1	—
5.	1400	0.24	1.92	6.96	3,670.2	9.17	12.41	0.23	-174.8	
6.	1403	0.24	2.16	6.95	3,686.0	9.93	12.52	0.22	-172.7	—
7.	1405	Sample	BPGP17 for VOCs							
8.	Post depth to water			10.51 + 0.03 = 10.54						
9.										
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: BPGP17 **SampleClarity/Color/Odor:** clear / clear / None
Sample Time: 1405 **QAQC Samples Collected:** ☒ No ○ Yes:
Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP-22 **WELL DIAMETER:** 0.75"
SAMPLER: JS / JR
DATE: 5/8/18
WEATHER CONDITIONS Partly Cloudy 77°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peri Pump	**Water Quality Inst.:** In Situ
Make/Model: Geotech Easy Load II	**Make/Model:** Aqua Troll 600
Serial Number: 2493	**Serial Number:** 509271

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 10.46 + 0.03 = 10.49 **Total Well Depth (ft-bpm):** 22.02 + 0.03 = 22.05 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1.	1305	Start Purge								
2.	1308	0.22	0.66	7.25	2,457.8	68.96	23.71	1.06	-2.7	—
3.	1311	0.22	1.32	7.02	2,992.2	37.89	16.75	0.81	23.3	—
4.	1314	0.22	1.98	7.05	3,491.3	20.50	14.80	0.80	29.6	—
5.	1317	0.22	2.64	7.02	3,088.6	20.98	14.19	0.82	36.9	—
6.	1320	0.22	3.30	7.00	3,117.5	20.59	14.02	0.83	37.7	—
7.	1323	0.22	3.96	7.01	3,093.4	4.16	14.23	0.82	41.0	—
8.	1325	0.22	4.40	7.00	3,119.5	3.72	14.24	0.86	44.5	—
9.	1327	0.22	4.84	7.02	3,107.3	4.25	13.79	0.85	45.3	—
10.										
11.	Samples Collected: VOCs, Metals, Blind Duplicate,									
12.								↓		
13.	Post Purge: 10.49 (ft-bpm)							20180508-A		
14.										
15.										
16.										
17.										
18.										

Sample ID: BPGP 22 **SampleClarity/Color/Odor:** Clear / none / no odor
Sample Time: 1325 **QAQC Samples Collected:** O No ⊗ Yes:
Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP 16 **WELL DIAMETER:** 0.75"
SAMPLER: JS / JR
DATE: 5/8/18
WEATHER CONDITIONS Partly Cloudy 68°F

Sampling Device: Peristaltic Pump
Make/Model: Geotech Easy Lean II
Serial Number: 2493

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 509271

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ☒ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 11.09 + 0.03 = 11.12 **Total Well Depth (ft-bpm):** 19.64 + 0.03 = 19.67 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1.	1057	Start Purging								
2.	1100	0.2	0.6	7.35	1.54	56.41	18.88	5.28	-103.0	—
3.	1103	0.2	1.2	7.37	2.21	18.26	17.03	5.64	-72.0	—
4.	1106	0.2	1.8	7.51	1.57	4.30	15.17	6.54	-57.3	—
5.	1109	0.2	2.4	7.61	3.52	0.95	14.80	6.81	-81.1	—
6.		Stoped Purging, tubing clogged with sediment. (Roots?)								
7.	1114	Resumed Purging.								
8.	1117	0.2	3.0	7.88	18.20	83.57	11.94	7.51	-70.7	—
9.	1120	0.2	3.6	7.84	7.52	47.04	11.81	7.52	-47.7	—
10.	1123	0.2	4.2	7.83	4.73	12.63	11.81	7.57	-50.3	—
11.	1126	0.2	4.8	7.83	3.78	12.76	11.86	7.60	-44.6	—
12.	1129	0.2	5.4	7.84	3.90	11.32	11.73	7.71	-30.4	—
13.	1131	0.2	5.8	7.85	3.92	10.25	11.86	7.80	-27.2	—
14.	1133	0.2	6.2	7.85	2.88	9.34	12.82	7.78	-27.0	—
15.	Post DTW: 11.09 (Ft. bpm) for VOCs									
16.			11.09 + 0.03 = 11.12							
17.										
18.										

Sample ID: BPGP 16 **SampleClarity/Color/Odor:** Clear / none / no odor
Sample Time: 1135 **QAQC Samples Collected:** ☒ No ○ Yes:
Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP89 **WELL DIAMETER:** 0.75"
SAMPLER: JJ / JR
DATE: 5/8/18
WEATHER CONDITIONS

Sampling Device: Peristaltic pump	**Water Quality Inst.:** In Situ
Make/Model: Geotech Easy Load II	**Make/Model:** Aqua Troll 600
Serial Number: 2493	**Serial Number:** 509271

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 13.09 + 0.03 = 12.52 **Total Well Depth (ft-bpm):** 20.96 + 0.03 = 20.99 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1.	1006	Start Purging								
2.	1009	0.22	0.66	7.28	2,744.3	0.55	15.19	0.40	-148.3	–
3.	1012	0.22	1.32	7.30	2,794.4	0.50	14.70	0.27	-192.6	–
4.	1015	0.22	1.98	7.30	2,773.2	0.48	14.50	0.21	-204.0	–
5.	1018	0.22	2.64	7.30	2,833.7	0.55	14.34	0.17	-210.2	–
6.	1021	0.22	3.30	7.30	2,833.3	0.46	14.30	0.15	-215.2	–
7.	1024	0.22	3.96	7.30	2,819.2	0.47	14.22	0.14	-219.1	–
8.	1025	Samples collected: VOCs, VPH, EPH								
9.		Post depth to water: 13.14 (ft-bmp)								
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: BPGP89 **SampleClarity/Color/Odor:** Clear / none / no odor
Sample Time: 1025 **QAQC Samples Collected:** ☒ No ○ Yes:
Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP42 **WELL DIAMETER:** 0.75"
SAMPLER: JS / JR
DATE: 05/08/2018
WEATHER CONDITIONS Mostly Sunny, calm ~ 65°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Peristaltic Pump	**Water Quality Inst.:**	In Situ
Make/Model:	Geotech Easy Load II	**Make/Model:**	Aqua Troll 600
Serial Number:	2493	**Serial Number:**	509271

Tubing Type: ☑ Teflon ○ Poly ○ Other **Decontamination:** ☑ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 12.49+0.03=12.52 **Total Well Depth (ft-bpm):** 20.80+0.03=20.83 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria			±.1	±3%	±10% or if >10 then 10NTU		±10% or if >5 then 5mg/L	±10%	
1.	0911	Begin	purging	BPGP42						
2.	0914	0.21		7.15	2853.8	0.42	15.01	0.50	231.4	
3.	0917			7.15	2,872.9	0.44	14.68	0.29	230.6	
4.	0920			7.16	2,881.3	0.48	14.52	0.23	229.4	
5.	0923			7.15	2,885.4	0.49	14.42	0.24	229.4	
6.	0926		3	7.16	2,886.0	0.42	14.36	0.24	229.1	
7.	0930	Sample	BPGP	42 (VOC's & MNA)						
8.	Post Depth to water		12.48	+0.03	= 12.51					
9.										
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: BPGP42 **SampleClarity/Color/Odor:** clear / clear / none
Sample Time: 0930 **QAQC Samples Collected:** ☑ No ○ Yes:
Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.: BPGP44	WELL DIAMETER: 0.75
SAMPLER:	JS/JR
DATE:	05/08/2018
WEATHER CONDITIONS	Partly Cloudy 49°

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peristaltic Pump	Water Quality Inst.: In Situ
Make/Model: Geotech Easy Load II	Make/Model: Aqua Troll 600
Serial Number: ~~509271~~ 2493	Serial Number: 509271

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 12.55+0.03= 12.58 Total Well Depth (ft-bpm): 21.96+0.03= 21.99 Depth to Pump Inlet(ft-bmp):

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria									
1. 0833	0.21	0.21	7.19	2,316.7	0.57	13.46	4.04	242.6	12.58
2. 0836	0.21	0.42	7.19	2,312.6	0.49	13.19	4.01	243.1	—
3. 0839	0.21	0.63	7.19	2,304.2	0.54	12.89	3.95	243.5	—
4. 0842	0.21	~~0.84~~ 2.6L	7.19	2,299.7	0.57	12.76	3.98	242.4	—
5. 0845	Collected water sample (VOCs)								→ 11
6.									
7.	Post purge DTW: 12.02 (ft-bmp). 11.99+0.03=								
8.									
9.	Well is damaged due to snow removal activities.								
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP44	SampleClarity/Color/Odor: Clear / none / no odor
Sample Time: 0845	QAQC Samples Collected: ⊗ No O Yes:

Comments: VOCs collected

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BNMW-9 **WELL DIAMETER:** 2"
SAMPLER: ST/BW
DATE: 5/8/18
WEATHER CONDITIONS Clear, 70°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Bladder pump	**Water Quality Inst.:**	In Situ
Make/Model:	Sample Pro	**Make/Model:**	Aqua Troll 600
Serial Number:	10154	**Serial Number:**	R36324

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ☒ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 13.59 **Total Well Depth (ft-bpm):** 20.81 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1. 1342	0.2								
2. 1345	0.2		7.08	3031	7.34	18.97	0.73	181.0	13.59
3. 1348	0.2		6.83	3115	3.08	15.84	0.28	193.1	13.59
4. 1351	0.2		6.80	3156	3.75	14.96	0.23	193.5	13.59
5. 1354	0.2.		6.80	3170	5.48	14.27	0.21	191.0	13.60
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BNMW-9 **SampleClarity/Color/Odor:** Clear, no odor
Sample Time: 1357 **QAQC Samples Collected:** ☒ No ○ Yes:
Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-123 **WELL DIAMETER:** 2"
SAMPLER: JT/BW
DATE: 5/8/18
WEATHER CONDITIONS Sunny 80°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Bladder Pump	**Water Quality Inst.:** In Situ
Make/Model: Sample Pro	**Make/Model:** Aqua Troll 600
Serial Number: 10154	**Serial Number:** R30324

Tubing Type: ⊗ Teflon O Poly O Other. **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 11.17 **Total Well Depth (ft-bpm):** 25.30 **Depth to Pump Inlet(ft-bmp):** 19.95

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1. 1609	Begin Purge								
2. 1612	0.1		7.08	3206	218.07	23.71	2.41	194.8	11.21
3. 1615	0.1		7.14	3299	361.03	19.58	1.19	188.3	11.23
4. 1618	0.1		7.15	3354	429.02	18.27	0.85	186.2	11.20
5. 1621	0.1		7.10	3356	400.48	18.04	0.72	187.8	11.19
6. 1624	0.1		7.08	3360	381.11	17.68	0.65	188.2	11.18
7. 1627	0.1		7.06	3363	381.29	17.68	0.58	188.3	11.19
8. 1630	0.1		7.07	3374	388.37	17.46	0.55	187.5	11.19
9. 1633	0.1		7.07	3358	403.10	17.42	0.52	187.0	11.20
10. 1636	0.1		7.07	3393	399.77	17.65	0.51	186.3	11.18
11. 1637	Sample Collected								
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: MW-123 **SampleClarity/Color/Odor:**
Sample Time: 1637 **QAQC Samples Collected:** O No O Yes:
Comments: VOCs - Collected field blank upwind of MW-123

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BNMW-21 **WELL DIAMETER:** 2"
SAMPLER: ST/BW
DATE: 5/8/18
WEATHER CONDITIONS Clear, 70°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Bladder pump	**Water Quality Inst.:**	In Situ
Make/Model:	Sample Pro	**Make/Model:**	Aqua Troll 600
Serial Number:	10134	**Serial Number:**	R303204

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 13.58 **Total Well Depth (ft-bpm):** 18.20 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria			±0.1	±3%	±10% or remain below 10 NTU		±0.2 mg/L or remain below 10 mg/L	±10	
1.	1437	start purge								
2.	1440	0.15		7.04	3050	149.15	17.15	1.27	168.8	13.58
3.	1443	0.15		6.97	3055	143.36	16.47	1.29	170.5	13.59
4.	1446	0.15		6.94	3076	188.27	15.87	1.33	171.5	13.59
5.	1449	0.15		6.93	3075	228.88	15.57	1.36	171.8	13.59
6.	1452	0.15		6.91	3088	310.52	15.87	1.38	172.4	13.60
7.	1455	0.15		6.91	3101	415.08	15.99	1.63	171.8	13.60
8.	1458	0.15		6.91	3090	440.76	15.92	1.56	170.7	13.60
9.	1501	0.15		6.92	3098	469.76	16.45	1.59	168.5	13.59
10.	1504	0.15		6.94	3080	485.97	16.24	1.58	166.5	13.59
11.	1507	collect	sample							
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: BNMW-21 **SampleClarity/Color/Odor:**
Sample Time: 1507 **QAQC Samples Collected:** O No O Yes:
Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BNMW-20 WELL DIAMETER: 2"
SAMPLER: ST/BW
DATE: 5/8/17
WEATHER CONDITIONS Sunny, ~60°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Bladder Pump
Make/Model: Sample Pro
Serial Number: 10154

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 518813

Tubing Type: O Teflon O Poly O Other Decontamination: O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 13.18 Total Well Depth (ft-bpm): 22.53 Depth to Pump Inlet(ft-bmp):

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1.	1008	Start purge								
2.	1011	0.2		7.06	3502	27.10	16.14	3.02	187.9	13.13
	1014	0.2		7.09	3563	9.11	15.46	2.65	184.0	13.19
4.	1017	0.1		7.00	3566	9.76	16.25	2.55	186.6	13.20
5.	1020	0.1		7.00	3569	3.96	15.62	2.18	184.4	13.20
6.	1023	0.1		6.99	3581	4.30	15.70	2.14	183.1	13.20
7.	1026	0.1		7.00	3589	1.96	15.79	2.22	181.3	13.20
8.	1028	Sample Collected								
9.										
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: BNMW-20 SampleClarity/Color/Odor: Clear, No ODOR
Sample Time: 1028 QAQC Samples Collected: ☒ No O Yes:
Comments: VOC's

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BNMW-8 **WELL DIAMETER:** 2"
SAMPLER: ST/BW
DATE: 5/8/18
WEATHER CONDITIONS Sunny, cool, 65°F E ≥5mph

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Bladder Pump
Make/Model: Sample Pro
Serial Number: ~~[illegible]~~ 10154

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 518813

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 14.13 **Total Well Depth (ft-bpm):** 19.91 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1. 0853	0.3								
2. 0856	0.15		6.99	3405	10.70	14.64	2.62	224.5	14.16
3. 0859	0.15		6.93	3415	8.17	14.07	2.54	230.0	14.17
4. 0902	0.15		6.89	3436	6.72	13.90	2.54	229.9	14.16
5. 0905	Collect sample.								
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BNMW-8 **SampleClarity/Color/Odor:**
Sample Time: 0905 **QAQC Samples Collected:** ☒ No O Yes:

Comments: VOCs - Well vault contained standing H_2O, bailed before opening.

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BNMW-17 **WELL DIAMETER:** 4"
SAMPLER: BS + RM
DATE: 5-8-18
WEATHER CONDITIONS Sunny 54°F, 6mph wind SSW

Sampling Device:	**Water Quality Inst.:** In Situ
Make/Model:	**Make/Model:** Aqua Troll 600
Serial Number:	**Serial Number:**

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ☒ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 14.61 **Total Well Depth (ft-bpm):** _____ **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria									
1. 837	.3		9.38	1402.4	90.62	15.94	7.49	119.5	14.66
2. 842	.3		7.42	1417.3	94.42	14.56	7.05	-104.2	14.80
3. 845	.3		7.11	1547.7	67.59	13.72	5.85	-114.5	14.90
4. 848	.3		7.28	1626.2	30.61	13.52	5.75	-116.1	14.94
5. 851	.3		7.10	3198.3	311.91	13.31	1.46	-147.1	14.98
6. 854	.3		7.10	3197.0	488.60	13.30	.22	-167.4	15.02
7. 857	.3		7.09	3200.4	451.82	13.26	.16	-174.1	15.03
8. 900	.3		7.09	3199.2	414.48	13.27	.14	-177.3	15.07
9. 903	.3		7.09	3194.5	403.27	13.28	.14	-179.5	15.14
10. 906	.3		7.10	3193.5	401.53	13.38	.14	-182.7	15.14
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BNMW-17 **SampleClarity/Color/Odor:** Clear, Slight hydrocarbon odor
Sample Time: 0906 **QAQC Samples Collected:** ☒ No ○ Yes:
Comments: EPH, VPH, Metals, VOC's

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW - 106 **WELL DIAMETER:** 2"
SAMPLER: BS + RM
DATE: 5-8-18
WEATHER CONDITIONS Sunny, 59°F, 8mph wind, SW

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	**Water Quality Inst.:** In Situ
Make/Model:	**Make/Model:** Aqua Troll 600
Serial Number:	**Serial Number:**

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** ⊗ Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 14.80 **Total Well Depth (ft-bpm):** 27.35 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria									
1.	1001	.3		6.85	1.94	18.18	32.62	6.26	79.4	14.67
2.	1004	.3		7.27	2606.4	743.16	16.81	.84	93.8	14.69
3.	1007	.3		7.30	2676.6	550.23	15.32	.57	89.9	14.68
4.	1010	.3		7.06	2704.4	435.19	14.55	.43	96.5	14.68
5.	1013	.3		7.03	2711.7	347.16	14.19	.37	92.9	14.65
6.	1016	.3		7.04	2721.6	356.76	14.10	.33	85.8	14.66
7.	1019	.3		7.09	2740.8	300.52	13.80	.30	76.5	14.70
8.	1022	.3		7.11	2732.2	272.24	13.65	.28	68.3	14.72
9.	1025			7.12	2728.5	256.78	13.62	.25	60.9	14.70
10.										
11.			Final Total -		27.35					
12.			Depth							
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: MW - 106 **SampleClarity/Color/Odor:** Cloudy, light grey
Sample Time: 1025 **QAQC Samples Collected:** ⊗ No O Yes:
Comments: 8260

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LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-105 **WELL DIAMETER:** 2"
SAMPLER: B. Schicke, R. Miller
DATE: 5/8/18
WEATHER CONDITIONS Clear, 70°, 5-10 mph E/SE

Sampling Device:	**Water Quality Inst.:** In Situ
Make/Model:	**Make/Model:** Aqua Troll 600
Serial Number:	**Serial Number:**

Tubing Type: ~~O~~ Teflon O Poly O Other **Decontamination:** ~~O~~ Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 11.75 **Total Well Depth (ft-bpm):** 23.70 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria									
1. ~~1058~~ RM				~~.54~~ RM					
2. 1105	0.1		7.51	4307.3	252.29	18.24	4.60	111.0	11.80
1108	0.1		7.37	5133.6	382.20	16.54	2.91	98.9	11.77
4. 1111	0.1		7.30	5344.5	408.90	15.51	1.54	83.7	11.78
5. 1114	0.1		7.29	5372.6	310.87	15.04	1.39	76.2	11.78
6. 1117	0.1		7.28	5311.7	289.30	14.70	1.78	75.7	11.78
7. 1120	0.1		7.26	5346.1	275.44	14.46	1.77	76.3	11.79
8. 1123	0.1		7.25	5335.8	278.45	14.54	2.10	79.0	11.79
9.									
10.									
11.			Total	depth - 23.70					
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: MW-105 **SampleClarity/Color/Odor:** Cloudy
Sample Time: 1124 **QAQC Samples Collected:** O No O Yes:
Comments: VOC's, SVOC's, Metals, EPH, VPH

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO. MW-116 **WELL DIAMETER:** 2"
SAMPLER: RM + BS
DATE: 5-8-18
WEATHER CONDITIONS Warm + Sunny, 73°F, 3mph ~~wes~~ SW

Sampling Device:	**Water Quality Inst.:** In Situ
Make/Model:	**Make/Model:** Aqua Troll 600
Serial Number:	**Serial Number:**

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 12.99 **Total Well Depth (ft-bpm):** 23.10 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria									
1. 1335	0.3		8.25	1.16	1.52	26.88	7.10	119.2	12.99
2. 1338	0.3		7.31	1908.4	473.11	17.52	1.18	130.5	12.22
3. 1341	0.3		7.33	2224.8	720.56	15.63	.42	127.6	12.22
4. 1344	0.3		7.37	2218.9	972.36	15.06	.38	124.7	12.25
5. 1347	0.3		7.25	2236.0	905.25	14.53	.32	131.5	12.25
6. 1350	0.3		7.16	2237.9	996.03	14.28	.31	135.7	12.25
7. 1353	0.3		7.12	2236.2	738.91	14.12	.35	137.2	12.25
8. 1356	0.3		7.09	2190.0	505.28	13.86	.17	136.5	12.25
9. 1359	0.3		7.08	2176.8	447.64	13.89	.51	134.2	12.25
10. 1402	0.3		7.08	2169.8	298.45	13.83	.56	131.5	12.25
11. 1405	0.3		7.08	2173.3	253.46	13.84	.60	126.7	1225
12. 1408	0.3		7.07	2149.8	225.38	13.90	.63	119.5	1225
13.									
14.			Total depth - 23.10						
15.									
16.									
17.									
18.									

Sample ID: MW-116 **SampleClarity/Color/Odor:** light brown
Sample Time: 1409 **QAQC Samples Collected:** ⊗ No O Yes:
Comments: VOC's

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LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BNMW-23 **WELL DIAMETER:** 3/4"
SAMPLER: RM + BS
DATE: 5-8-18
WEATHER CONDITIONS Warm, sunny, 74°F

Sampling Device: Peristalic pump
Make/Model: GEOTECH Pump
Serial Number: C13002218

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number:

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ☒ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 12.49 **Total Well Depth (ft-bpm):** 19.74 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1. 1440	.25		6.67	1528.4	.94	25.85	6.06	-141.2	
2. 1443	.25		7.42	1832.4	6.59	15.69	.38	-189.6	
3. 1446	.25		7.36	2096.7	.97	14.34	.20	-184.0	
4. 1449	.25		7.39	~~1668.4~~ 2130.5 cm	.99	13.81	.19	-194.9	
5. 1452	.25		7.32	2140.4	1.04	13.79	.15	-197.3	
6. 1455	.25		7.22	2138.5	2.08	13.72	.15	-198.2	
7. 1458	.25		7.19	2148.8	3.02	13.62	.14	-200.7	
8. 1501	.25		7.16	2158.6	2.94	13.59	.14	-203.6	
9. 1504	.25		7.15	2168.9	4.91	13.76	.06	-207.8	
10. 1507	.25		7.15	2163.5	6.61	13.66	.06	-208.2	
11. 1510	.25		7.15	2174.0	9.49	13.69	.07	-212.8	
12. 1513	.25		7.17	2169.9	14.94	14.25	.19	-209.7	
13. 1516	.25		7.19	2172.1	16.96	14.24	.16	-209.2	
14. 1519	.25		7.21	2162.6	19.06	14.44	.21	-215.5	
15.									
16.									
17.									
18.									

Sample ID: BNMW-23 **SampleClarity/Color/Odor:**
Sample Time: 1525 **QAQC Samples Collected:** ☒ No ○ Yes:
Comments: VOC's, MNA, Metals

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: SD-I-02 **WELL DIAMETER:** 6"
SAMPLER: RM + BS
DATE: 5-8-18
WEATHER CONDITIONS Warm, Sunny

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Paristalic pump
Make/Model: GEOTECH pump
Serial Number: C13002218

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number:

Tubing Type: ☒ Teflon O Poly O Other **Decontamination:** ☒ Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 8.84 **Total Well Depth (ft-bpm):** 20.30 (irrigation pump in well) **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria									
1. 1625	.3		7.25	2257.1	91.27	25.98	.79	-193.1	8.84
2. 1628	.3		7.73	2045.4	112.79	16.27	.67	-112.0	8.84
1631	.3		7.78	2107.6	102.81	14.79	.50	-99.3	8.84
4. 1634	.3		7.80	2129.0	96.55	14.22	.37	-90.1	8.84
5. 1637	.3		7.81	2151.2	102.80	14.18	.23	-85.2	8.84
6. 1640	.3		7.83	2148.6	90.25	14.13	.19	-79.5	8.84
7. 1643	.3		7.84	2153.5	82.80	13.91	.19	-73.7	8.84
8. 1646	.3		7.83	2159.8	73.84	13.98	.19	-67.7	8.84
9. 1649	.3		7.83	2150.6	76.03	13.75	.19	-62.0	8.84
10. 1652	.3		7.82	2156.1	76.18	13.74	.19	-57.0	8.84
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: SD-I-02 **SampleClarity/Color/Odor:** light brown, moderate turbidity
Sample Time: 1655 **QAQC Samples Collected:** ☒ No O Yes:
Comments: VOC's

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: SD-I-01 **WELL DIAMETER:** 8"
SAMPLER: BS + RM
DATE: 5-8-18
WEATHER CONDITIONS Warm, Sunny, 75°F, 14 mph wind SW

Sampling Device: Peristaltic Pump	**Water Quality Inst.:** In Situ
Make/Model: Geotech/GeoPump	**Make/Model:** Aqua Troll 600
Serial Number: C13002718	**Serial Number:**

Tubing Type: ☒ Teflon O Poly O Other **Decontamination:** ☒ Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 12.45 **Total Well Depth (ft-bpm):** NR - Pump in well **Depth to Pump Inlet(ft-bmp):** 17'

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria									
1. 1734	.25		7.25	2575	322	17.16	0.92	26.4	12.47
2. 1738	.25		7.22	2712	163	14.40	0.22	42.8	12.47
1741	.25		7.23	2727	152	14.14	0.17	46.8	12.47
4. 1744	.25		7.18	2738	142	14.06	0.14	53.8	12.47
5. 1747	.25		7.14	2441	139	13.94	0.13	59.7	12.47
6. 1750	.25		7.12	2739	134	13.71	0.12	63.9	12.47
7. 1753	.25		7.10	2735	121	14.02	0.13	65.7	12.47
8. 1756	.25		7.10	2729	120	13.97	0.13	67.5	12.47
9. 1759	.25		7.10	2746	113	13.92	0.12	69.2	12.47
10. 1802	.25		7.10	2756	101	14.03	0.12	70.4	12.47
11. 1805	.25		7.10	2749	103	14.03	0.12	71.8	12.47
12. 1808	.25		7.11	2748	101	14.03	0.11	72.5	12.47
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: SD-I-01 **SampleClarity/Color/Odor:** light orange
Sample Time: 1810 **QAQC Samples Collected:** ☒ No O Yes:
Comments: VOCs + MNA

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP84 **WELL DIAMETER:** 0.75"
SAMPLER: JS / JR
DATE: 5/9/18
WEATHER CONDITIONS Mostly Cloudy 66°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peristaltic Pump	**Water Quality Inst.:** In Situ
Make/Model: Geotech Easy Load II	**Make/Model:** Aqua Troll 600
Serial Number: 2647	**Serial Number:** 0074030

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** ⊗ Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): ~~8.43~~ 10.92 +0.03 = ~~8.46~~ 10.95 **Total Well Depth (ft-bpm):** 21.06 + 0.03 = 21.09 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria			±0.1	±10%	±10% or last reading if ≤ 10 NTU		±10% or last reading if > 2 mg/L	±10	
1.	1148	Start Purge								
2.	1151	0.24	0.72	7.21	2,761.6	0.49	15.86	0.54	69.6	—
3.	1154	0.24	1.44	7.21	2,811.2	0.81	15.23	0.23	89.8	—
4.	1157	0.24	2.16	7.22	2,812.0	0.46	15.20	0.17	96.6	—
5.	1200	0.24	2.88	7.22	2,810.7	0.43	15.34	0.12	103.9	—
6.	1203	0.24	3.60	7.22	2,803.6	0.56	15.27	0.09	108.4	—
7.	1206	0.24	4.32	7.22	2,800.3	0.72	15.38	0.09	110.8	—
8.	Collected									
9.			Samples (VOCs) @ 1208							
10.	Post purge dtw: 10.92 +0.03 10.95 (ft-bmp)									
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: BPGP84 **SampleClarity/Color/Odor:** Clear / clear / none
Sample Time: 1208 **QAQC Samples Collected:** ⊗ No O Yes:
Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.: BPGP12	WELL DIAMETER: 0.75
SAMPLER:	JS / JR
DATE:	05/09/2018
WEATHER CONDITIONS	Cloudy, winds W (7mph); 65°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Peristaltic Pump	Water Quality Inst.:	In Situ
Make/Model:	Geotech Easy Load II	Make/Model:	Aqua Troll 600
Serial Number:	2647	Serial Number:	0074030

Tubing Type: ✓ Teflon O Poly O Other **Decontamination:** ✓ Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.24 + 0.03 = 11.27 **Total Well Depth (ft-bpm):** 18.77 + 0.03 = 18.80 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.1	±3%	10% or consistent if <10 NTUs		10% or consistent if <2 mg/L	±10	
1. 1013	Begin	purging	BPGP	12					
2. 1016	0.15		7.18	2,761.8	14.52	12.71	0.77	-65.7	—
3. 1019			7.19	2,795.5	1.37	11.97	0.52	-45.7	—
4. 1022		2.3	7.20	2,814.5	0.51	11.96	0.41	-31.8	—
5. 1025			7.20	2,817.5	0.55	12.07	0.37	-19.7	—
6. 1028			7.20	2,817.7	0.44	11.98	0.36	-11.6	—
7. 1031			7.20	2,827.1	0.34	11.89	0.35	-3.8	—
8. 1034		5.6	7.19	2,830.8	0.38	11.80	0.34	3.9	—
9. 1037			7.19	2,833.8	0.40	11.72	0.34	9.1	—
10. 1040			7.19	2,841.1	0.34	11.64	0.33	15.3	—
11. 1043			7.19	2,845.8	0.36	11.53	0.33	21.0	—
12. 1046		8.7	7.19	2,849.7	0.44	11.53	0.33	26.3	—
13. 1049			7.19	2,847.4	0.39	11.53	0.33	30.8	—
14. 1052		10	7.19	2850.4	0.40	11.43	0.33	35.0	—
15. 1055			7.19	2,850.2	0.36	11.41	0.32	39.1	—
16. 1058			7.18	2,853.4	0.42	11.50	0.32	43.7	—
17. 1101		12	7.18	2,861.4	0.38	11.55	0.32	46.9	—
18. 1104			7.18	2,857.8	0.25	11.59	0.32	50.3	—

Sample ID:	BPGP12	SampleClarity/Color/Odor:	Clear / Clear / NONE
Sample Time:	1113	QAQC Samples Collected:	✓ No O Yes:

Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP12 **WELL DIAMETER:** 0.75
SAMPLER: JS / JR
DATE: 05/09/2018
WEATHER CONDITIONS Cloudy, light rain, winds W (7mph) ; 65°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peristaltic pump
Make/Model: Geotech Easy Load II
Serial Number: 2647

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 0074030

Tubing Type: ☑ Teflon ○ Poly ○ Other **Decontamination:** ☑ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 11.27 **Total Well Depth (ft-bpm):** 18.77+0.03=18.80 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1.	1107		13.5	7.18	2,857.1	0.53	11.64	0.32	53.3	—
2.	1110			7.18	2,859.2	0.36	11.67	0.32	55.9	—
3.	1113	Sample	BPGP12		(VOC's	& MNA)				
4.		Post purging/sampling depth to groundwater					11.24 + 0.03 = 11.27			
5.		~~Collected~~	~~Samples~~	~~(VOCs~~						
6.										
7.										
8.										
9.										
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: BPGP12 **SampleClarity/Color/Odor:** Clear / Clear / None
Sample Time: 1113 **QAQC Samples Collected:** ☒ No ○ Yes:
Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP 91 **WELL DIAMETER:** 0.75"
SAMPLER: JS/JR
DATE: 5/3/18
WEATHER CONDITIONS Mostly Cloudy 57°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peristaltic Pump	**Water Quality Inst.:** In Situ
Make/Model: Geo Tech	**Make/Model:** Aqua Troll 600
Serial Number: 2647	**Serial Number:** 0074030

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 14.41 + 0.03 = 14.44 **Total Well Depth (ft-bpm):** 24.83 + 0.03 = 24.86 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1	0936	Start Purge								
2	0939	0.22	0.66	7.30	3,199.4	3.17	14.25	0.68	-83.5	—
3	0942	0.22	1.32	7.26	3,641.4	2.44	13.62	0.35	-119.8	—
4	0945	0.22	1.98	7.26	3,692.0	1.26	13.55	0.34	-122.3	—
5	0948	0.22	2.64	7.26	3,685.9	1.35	13.56	0.35	-122.9	—
6	0951	0.22	3.30	7.27	3,641.9	0.98	13.54	0.34	-122.9	—
7.	Samples (VOCs) collected @ 0952									
8.										
9.	Post Purge DTW: 14.44 + 0.03 = 14.47 (ft-bmp)									
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: BPGP91 **SampleClarity/Color/Odor:** Clear/none/no odor
Sample Time: 0952 **QAQC Samples Collected:** ☒ No O Yes:
Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: ~~BPGP05~~ BPGP50 **WELL DIAMETER:** 0.75"
SAMPLER: JS/JR
DATE: 5/9/18
WEATHER CONDITIONS Partly cloudy 58°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peristaltic Pump
Make/Model: Geotech
Serial Number: ~~0074030~~ 2647

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 0074030

Tubing Type: ☑ Teflon ○ Poly ○ Other **Decontamination:** ☑ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 14.40+0.03 = 14.43 **Total Well Depth (ft-bpm):** 19.88 + 0.03 = 19.91 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria									
0849	Start Purge								
0852	0.21	0.63	6.94	987.25	155.40	15.82	5.28	237.1	–
0855	0.21	1.26	7.09	4,611.5	4.39	14.76	2.69	239.8	–
0858	0.21	1.89	7.08	4,529.5	0.60	14.14	2.41	240.8	–
0901	0.21	2.52	7.09	4,484.2	0.95	14.08	2.30	239.0	–
0903	0.21	3.15	7.10	4,464.8	0.57	14.03	2.24	238.0	–
7.									
8. Samples (VOCs and MNA) collected @ 0905									
9. Post purge DTW: 14.41 + 0.03 = 14.44 (ft-bmp)									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: ~~BPGP05~~ BPGP50 **SampleClarity/Color/Odor:** Clear / none / no odor
Sample Time: 0905 **QAQC Samples Collected:** ☑ No ○ Yes:
Comments: Logged as BPGP05 on computer but location reads BPGP50.

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.: MW-128	WELL DIAMETER: 2"
SAMPLER: BS & RM	
DATE: 5-9-18	
WEATHER CONDITIONS Sunny	

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Water Quality Inst.: In Situ
Make/Model:	Make/Model: Aqua Troll 600
Serial Number:	Serial Number:

Tubing Type: ⊗ Teflon O Poly O Other Decontamination: ⊗ Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 8.10 Total Well Depth (ft-bpm): 23.42 Depth to Pump Inlet(ft-bmp):

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1. 0819	0.25		7.13	3445.4	142	12.74	1.58	252.0	
2. 0822	0.25		7.18	3507	209	12.29	0.43	260.0	~~8.18~~ BM 8.2:
3. 0825	0.25		7.16	3399.7	303.90	12.07	0.29	245.9	8.22
4. 0828	0.25		7.16	3336.6	250.99	12.09	0.27	239.4	8.22
5. 0831	0.25		7.15	3258.1	173.90	12.08	0.20	223.4	8.22
6. 0834	0.25		7.15	3217.8	143.82	12.09	0.17	212.6	8.22
7. 0837	0.25		7.14	3182.2	132.93	12.09	0.15	194.5	8.22
8. 0840	0.25		7.14	3164.7	113.29	12.19	0.14	177.6	8.22
9. 0843	0.25		7.14	3146.6	99.97	12.08	0.14	154.8	8.22
10. 0846	0.25		7.14	3130.1	88.52	12.20	0.12	132.7	8.22
11. 0849	0.25		7.14	3116.6	78.67	12.18	0.11	118.2	8.22
12. 0852	0.25		7.14	3114.5	68.59	12.20	0.11	100.4	8.22
13. 0855	0.25		7.14	3110.9	50.77	12.18	0.11	86.1	8.22
14. 0858	0.25		7.14	3088.9	47.39	12.14	0.10	73.4	8.22
15. 0901	0.25		7.14	3082.8	46.00	12.19	0.10	55.8	8.22
16. 0904	0.25		7.14	3082.3	46.08	12.16	0.10	43.7	8.22
17. 0907	0.25		7.14	3074.8	42.06	12.20	0.09	23.8	8.22
18. 0910	0.25		7.14	3065.0	~~34~~ 40.96	12.27	0.09	9.6	8.22

Sample ID: MW-128 SampleClarity/Color/Odor: Cloudy

Sample Time: QAQC Samples Collected: ⊗ No O Yes:

Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-128 **WELL DIAMETER:** 2"
SAMPLER: BS + RM
DATE: 5-9-18
WEATHER CONDITIONS Sunny, 60° F

Sampling Device:	**Water Quality Inst.:** In Situ
Make/Model:	**Make/Model:** Aqua Troll 600
Serial Number:	**Serial Number:**

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ☒ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** _____ **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1.	0913	0.25		7.14	3064.4	40.97	12.25	0.09	-1.5	8.22
2.	0916	0.25		7.14	3062.4	40.56	12.20	0.08	-11.3	8.22
3.	0919	0.25		7.14	3065.6	41.10	12.26	0.08	-24.6	8.22
4.										
5.										
6.										
7.										
8.										
9.										
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: MW-128 **SampleClarity/Color/Odor:** Cloudy
Sample Time: 0920 **QAQC Samples Collected:** ☐ No ☒ Yes: Dup collected 20180509-A
Comments: VOC's, EPH, VPH, Metals, MNA, SVOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: SYS-EMW-3 **WELL DIAMETER:**
SAMPLER: BS
DATE: 5-9-18
WEATHER CONDITIONS Cloudy, 61°F

Sampling Device:	**Water Quality Inst.:** In Situ
Make/Model:	**Make/Model:** Aqua Troll 600
Serial Number:	**Serial Number:**

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** ⊗ Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 9.33 **Total Well Depth (ft-bpm):** 13.80 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria			±0.1	±3%	10% or last reading if >10NTU		±0.3 mg/L or last reading if <2 mg/L	±10mV	
1.	1059	0.3		7.13	3126.9	28.30	20.32	1.63	-115.1	9.42
2.	1102	0.3		6.88	903.60	2013.6	14.18	0.23	-170.5	9.58
3.	1105	0.3		6.79	921.01	2022.1	13.07	0.13	-178.7	10.05
4.	1108	0.3		6.77	1056.5	1849.9	12.68	0.10	-179.9	10.17
5.	1111	0.3		6.85	1081.7	1889.2	12.59	0.06	-183.4	10.26
6.	1114	0.3		6.98	1143.7	1590.7	12.65	0.06	-182.2	10.23
7.	1117	0.3		7.04	1219.7	818.2	12.56	0.06	-175.3	10.25
8.	1120	0.3		7.07	1256.3	550.5	12.49	0.07	-169.3	10.27
9.	1123	0.3		7.14	1262.8	466.7	12.46	0.06	-166.1	10.26
10.	1126	0.3		7.22	1271.6	319.06	12.50	0.06	-165.3	10.25
11.	1129	0.3		7.27	1280.5	285.9	12.43	0.06	-164.0	10.26
12.	1132	0.3		7.33	1287.1	230.5	12.42	0.05	-161.9	10.25
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: SYS-EMW-3 **SampleClarity/Color/Odor:** grey, hydrcarbon odor
Sample Time: 1135 **QAQC Samples Collected:** ⊗ No O Yes:
Comments: VOC's
purge water has slight sheen and was black, purged to clear

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: REGAL-I-01 **WELL DIAMETER:** 6"
SAMPLER: BS + RM
DATE: 5-9-18
WEATHER CONDITIONS Cloudy, 63°F, 7mph wind, E, NE

Sampling Device: Paristaltic pump	**Water Quality Inst.:** In Situ
Make/Model: GEO Pump	**Make/Model:** Aqua Troll 600
Serial Number: D1300752	**Serial Number:**

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ☒ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 14.45 **Total Well Depth (ft-bpm):** 39.30 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria									
1. 1215	0.4		7.22	0.27	1.46	22.26	7.80	19.3	14.45
1219 2. ~~1218~~ RM	0.4		7.34	0.26	1.57	23.78	7.72	-47.2	14.45
3. 1222	0.4		7.63	1925.0	400.38	15.49	0.26	-133.1	14.45
4. 1225	0.4		7.58	1977.7	354.49	14.53	0.17	-137.5	14.46
5. 1228	0.4		7.56	1991.4	357.93	14.37	0.15	-139.9	14.46
6. 1231	0.4		7.56	1997.3	344.77	14.31	0.13	-143.2	14.46
7. 1234	0.4		7.58	1996.4	361.03	14.20	0.13	-144.4	14.46
8. 1237	0.4		7.60	2000.6	338.74	14.23	0.13	-146.0	14.46
9. 1240	0.4		7.62	2004.4	309.98	14.22	0.12	-148.1	14.46
10. 1243	0.4		7.64	2002.9	275.30	14.26	0.10	-150.4	14.46
11. 1246	0.4		7.65	2003.1	270.54	14.23	0.11	-150.5	14.46
12. 1249	0.4		7.65	2003.0	263.61	14.19	0.10	-151.3	14.46
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: REGAL-I-01 **SampleClarity/Color/Odor:** light yellow, no odor
Sample Time: 1250 **QAQC Samples Collected:** ☒ No ○ Yes:
Comments: VOC's

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: ZPMW-1 **WELL DIAMETER:** 2"
SAMPLER: BS + RM
DATE: 5-9-18
WEATHER CONDITIONS sunny, 69°F, 8 mph wind, E,NE

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	**Water Quality Inst.:** In Situ
Make/Model:	**Make/Model:** Aqua Troll 600
Serial Number:	**Serial Number:**

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** ⊗ Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 9.71 **Total Well Depth (ft-bpm):** 20.10 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria									
1. 1320	0.25		7.27	2201.8	469.89	18.29	1.43	-57.7	9.71
2. 1325	0.25		7.05	2333.8	646.78	13.72	1.41	4.3	9.75
3. 1328	0.25		7.05	2333.6	519.80	13.42	1.57	15.6	9.75
4. 1331	0.25		7.06	2320.9	372.36	13.16	1.68	26.6	9.75
5. 1334	0.25		7.07	2328.4	367.74	13.12	1.83	33.4	9.78
6. 1337	0.25		7.08	2298.5	324.34	13.01	1.97	40.3	9.75
7. 1340	0.25		7.10	2290.9	234.40	13.14	2.10	47.4	9.75
8. 1343	0.25		7.10	2288.0	250.17	13.13	2.23	50.6	9.75
9. 1346	0.25		7.11	2299.3	185.43	12.96	2.45	55.8	9.75
10. 1349	0.25		7.12	2289.7	197.57	13.05	2.54	59.4	9.75
11. 1352	0.25		7.13	2288.0	179.60	13.04	2.59	62.6	9.75
12. 1355	0.25		7.13	2268.4	156.03	12.99	2.74	66.1	9.75
13. 1358	0.25		7.13	2255.8	148.48	13.14	2.74	69.5	9.75
14. 1401	0.25		7.14	2250.6	133.29	12.91	2.86	71.7	9.75
15.									
16.									
17.									
18.									

Sample ID: ZPMW-1 **SampleClarity/Color/Odor:**
Sample Time: 1405 **QAQC Samples Collected:** ⊗ No O Yes:
Comments: VOC's, Metals

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-110 **WELL DIAMETER:** 2"
SAMPLER: BS + RM
DATE: 5-9-18
WEATHER CONDITIONS Cloudy, 70°F, 15 mph wind, E, NE

Sampling Device:	**Water Quality Inst.:** In Situ
Make/Model:	**Make/Model:** Aqua Troll 600
Serial Number:	**Serial Number:**

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ☒ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 16.07 **Total Well Depth (ft-bpm):** 28.03 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Calibration Check									
1.	1522	0.25		7.05	2316.1	176.53	23.61	2.83	74.5	16.17
2.	1525	0.25		7.02	3041.7	283.98	17.91	1.93	82.4	16.17
3.	1528	0.25		7.00	3092.6	367.94	15.94	1.53	86.9	16.17
4.	1531	0.25		6.99	3137.0	430.62	15.23	1.40	90.9	16.17
5.	1534	0.25		6.98	3132.7	499.37	14.84	1.34	94.0	16.17
6.	1537	0.25		6.98	3134.6	536.37	14.67	1.29	96.0	16.17
7.	1540	0.25		6.98	3138.7	538.99	14.51	1.25	97.7	16.17
8.	1543	0.25		6.99	3134.6	532.69	14.48	1.22	99.1	16.17
9.										
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: 1545 **SampleClarity/Color/Odor:**
Sample Time: MW-110 **QAQC Samples Collected:** ☒ No ○ Yes:
Comments: VOC's

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-109 **WELL DIAMETER:** 2"
SAMPLER: BS + RM
DATE: 5-9-18
WEATHER CONDITIONS Warm, 71°F, 14 mph wind, E, SE

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: QED Sample Pro	**Water Quality Inst.:** In Situ
Make/Model:	**Make/Model:** Aqua Troll 600
Serial Number:	**Serial Number:**

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ☒ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 16.70 **Total Well Depth (ft-bpm):** 28.70 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria			±0.1	±3%	±10% or 5 NTU		±10% or 0.2 mg/L	±10	
1.	1607	0.25		7.00	3264.3	331.69	21.63	1.90	92.2	16.75
2.	1610	0.25		7.09	2467.2	252.40	16.84	0.84	99.9	16.80
3.	1613	0.25		7.10	2485.4	269.99	15.36	0.55	98.5	16.85
4.	1616	0.25		7.11	2496.8	327.50	14.67	0.44	95.9	16.85
5.	1619	0.25		7.11	2495.2	302.73	14.59	0.39	93.5	16.80
6.	1622	0.25		7.12	2496.6	326.96	14.52	0.38	90.6	16.85
7.	1625	0.25		7.13	2496.6	380.40	14.49	0.35	87.6	16.85
8.	1628	0.25		7.13	2494.5	382.87	14.47	0.34	86.1	16.85
9.	1631	0.25		7.14	2494.9	256.52	14.30	0.33	82.9	16.85
10.	1634	0.25		7.15	2491.8	163.55	14.26	0.34	80.1	16.85
11.	1637	0.25		7.15	2499.3	165.64	1422	0.35	77.8	16.83
12.	1640			7.16	2485.1	167.54	14.21	0.33	75.3	16.83
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: MW-109 **SampleClarity/Color/Odor:** Clear, no odor
Sample Time: 1645 **QAQC Samples Collected:** ☒ No ○ Yes:
Comments: VOC's, SVOC's, EPH, VPH, Metals

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: EMW-28 **WELL DIAMETER:** 4"
SAMPLER: BS + RM
DATE: 5-9-18
WEATHER CONDITIONS Cloudy, 72°F, 15mph, E,SE

Sampling Device: QED Sample Pro	**Water Quality Inst.:** In Situ
Make/Model:	**Make/Model:** Aqua Troll 600
Serial Number:	**Serial Number:**

Tubing Type: ☒ Teflon O Poly O Other **Decontamination:** ☒ Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 14.52 **Total Well Depth (ft-bpm):** 15.60 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria									
1. 1728	0.15		7.12	850.69	90.01	19.67	1.67	61.0	14.55
2. 1731	0.15		7.31	576.07	17.62	14.19	2.10	69.4	14.54
3. 1734	0.15		7.21	502.38	15.70	12.25	2.13	82.5	14.54
4. 1737	0.15		7.16	497.78	15.11	11.46	2.12	88.1	14.54
5. 1740	0.15		7.14	495.78	11.23	11.29	2.14	91.8	14.54
6. 1743	0.15		7.13	494.99	12.17	11.05	2.30	94.2	14.54
7. 1746	0.15		7.13	496.13	11.67	11.04	2.46	95.6	14.54
8. 1749	0.15		7.15	497.11	11.41	10.78	2.81	96.4	14.54
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: EMW-28 **SampleClarity/Color/Odor:** Clear, no odor
Sample Time: 1752 **QAQC Samples Collected:** ☒ No O Yes:
Comments: VOC's

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: RH-MW-3 **WELL DIAMETER:** 2"
SAMPLER: BW/ST
DATE: 5/9/18
WEATHER CONDITIONS Clear, 70°

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Bladder Pump
Make/Model: Sample Pro
Serial Number: 10154

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 518813

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 14.15 **Total Well Depth (ft-bpm):** 19.74 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1. 1336	begin	purge.							
2. 1339	0.15		7.02	1481	68.95	17.95	4.97	175.3	14.11
3. 1342	0.15		7.07	1457	65.19	15.33	5.40	175.6	14.23
4. 1345	0.15		6.87	1500	64.76	13.80	4.52	191.9	14.24
5. 1348	0.15		6.73	1547	69.79	13.43	4.28	201.1	14.24
6. 1351	0.15		6.68	1645	70.72	13.24	4.05	204.8	14.23
7. 1354	0.15		6.67	1722.1	65.78	13.09	3.77	205.0	14.25
8. 1357	0.15		6.67	1791	53.62	13.21	3.55	205.0	14.23
9. 1400	0.15		6.68	1891	58.81	12.97	3.17	204.4	14.25
10. 1403	0.15		6.69	1946	56.95	12.97	3.01	203.4	14.25
11. 1406	0.15		6.70	1931	62.73	12.98	2.91	202.4	14.24
12. 1410	Collect sample		~ 2 gal	purged.					
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: RH-MW-3 **SampleClarity/Color/Odor:**
Sample Time: 1410 **QAQC Samples Collected:** ☒ No ○ Yes:
Comments: VOCs + MNA

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-112 **WELL DIAMETER:** 2"
SAMPLER: ST/BW
DATE: 5/9/18
WEATHER CONDITIONS Cloudy/Drizzle, 60°

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Bladder Pump	**Water Quality Inst.:** In Situ
Make/Model: Sample Pro	**Make/Model:** Aqua Troll 600
Serial Number: 10154	**Serial Number:** 518813

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 6.21 **Total Well Depth (ft-bpm):** 16.15 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria									
1.	1104	0.2	Begin	purge						
2.	1107	0.2		7.01	3217	231.62	14.82	0.34	227.6	6.26
3.	1110	0.2		7.03	3250	142.87	14.12	0.21	228.6	6.25
4.	1113	0.2		7.03	3260	105.75	13.82	0.15	229.9	6.31
5.	1116	0.2		7.03	3236	100.20	13.72	0.13	225.3	6.28
6.	1119	0.2		7.03	3218	90.81	13.62	0.11	214.8	6.28
7.	1122	0.2		7.03	3215	105.36	13.61	0.11	196.8	6.29
8.	1125	0.2		7.04	3203	100.54	13.51	0.10	177.5	6.29
9.	1128	0.2		7.04	3183	57.89	13.47	0.10	159.3	6.29
10.	1131	0.2		7.05	3170	44.68	13.53	0.08	139.0	6.29
11.	1134	0.2		7.06	3157	45.47	13.51	0.08	123.2	6.29
12.	1137	0.2		7.06	3151	41.15	13.50	0.08	111.0	6.29
13.	1140	0.2		7.06	3144	37.53	13.43	0.08	102.2	6.29
14.	1143	0.2		7.06	3146	39.79	13.44	0.11	95.7	6.29
15.	1146	0.2		7.07	3126	27.86	13.42	0.07	88.5	6.30
16.	1149	Sample Collected								
17.										
18.										

Sample ID: MW-112 **SampleClarity/Color/Odor:** Clear, no odor.
Sample Time: 1149 **QAQC Samples Collected:** ⊗ No O Yes:

Comments: VOCs - Sample collected @ 45 minutes. ORP decreased over entire purge time. Purge about 3 gal

14.3
1489
6520
1309
23

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-115 **WELL DIAMETER:** 2"
SAMPLER: ST / BW
DATE: 5/9/19
WEATHER CONDITIONS Sunny 65°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Bladder pump	**Water Quality Inst.:**	In Situ
Make/Model:	Sample Pro	**Make/Model:**	Aqua Troll 600
Serial Number:	10154	**Serial Number:**	518813

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 9.32 **Total Well Depth (ft-bpm):** 23.60 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1. 0947	Start Purge								
2. 0950	0.1		7.14	2743	257.24	14.66	1.70	218.5	9.34
3. 0953	0.1		7.14	2707	442.28	13.66	1.10	215.0	9.33
4. 0956	0.1		7.13	2724	480.07	13.15	0.89	213.6	9.33
5. 0959	0.1		7.13	2726	537.43	12.98	0.81	212.5	9.33
6. 1002	0.1		7.12	2725	576.29	12.86	0.78	212.6	9.34
7. 1005	0.1		7.12	2721	560.68	12.85	0.71	211.4	9.34
8. 1008	0.1		7.12	2719	648.29	12.86	0.68	213.6	9.34
9. 1011	0.1		7.12	2714	652.51	13.14	0.67	212.5	9.34
10. 1014	0.1		7.13	2718	589.41	13.26	0.66	209.8	9.33
11. 1017	0.1		7.13	2704	501.35	13.10	0.65	207.6	9.33
12. 1020	0.1		7.13	2698	501.40	13.16	0.63	205.8	9.33
13. 1023	0.1		7.13	2685	570.57	13.39	0.61	204.3	9.33
14. 1026	0.1		7.13	2691	468.51	13.77	0.58	202.9	9.33
15. 1029	0.1		7.13	2680	406.00	13.95	0.56	202.2	9.33
16. 1030	Sample Collected								
17.									
18.									

Sample ID: MW-115 **SampleClarity/Color/Odor:** Cloudy, Gray, No odor
Sample Time: 1030 **QAQC Samples Collected:** ⊗ No O Yes:
Comments: VOCs - Turbidity is not stable. Varies anywhere from 450 to 650 NTUs. Sample collected @ 45 min. Purged about 1 gal

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-113 **WELL DIAMETER:** 2"
SAMPLER: ST/BW
DATE: 5/9/18
WEATHER CONDITIONS Clear, 60°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Bladder Pump
Make/Model: Sample Pro
Serial Number: 10154

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 518813

Tubing Type: ☒ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 2.76 **Total Well Depth (ft-bpm):** 13.85 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria									
1. 0826									
2. 0829	0.1		6.98	3488	121.08	13.73	1.05	259.6	2.76
3. 0832	0.1		6.99	3525	90.98	12.45	0.40	264.3	2.78
4. 0835	0.1		6.98	3534	87.08	12.01	0.32	262.2	2.79
5. 0838	0.1		6.97	3539	66.69	11.75	0.26	263.0	2.79
6. 0841	0.1		6.96	3542	59.42	11.53	0.23	263.0	2.79
7. 0844	0.1		6.95	3545	61.20	11.52	0.21	261.7	2.78
8. 0847	0.1		6.95	3539	61.3	11.41	0.19	260.1	2.78
9. 0849	Sample Collected								
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: MW-113 **SampleClarity/Color/Odor:** Clear, no odor
Sample Time: 0849 **QAQC Samples Collected:** ☒ No O Yes:
Comments: VOCs. Purged ~1 gal

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-114 **WELL DIAMETER:** 2"
SAMPLER: ST/BW
DATE: 5/9/18
WEATHER CONDITIONS Sunny 80°F, W 25mph

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Bladder pump	**Water Quality Inst.:**	In Situ
Make/Model:	Sample Pro	**Make/Model:**	Aqua Troll 600
Serial Number:	101524	**Serial Number:**	518813

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 14.12 **Total Well Depth (ft-bpm):** 24.15 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1.	1637	Start Purge								
2.	1640	0.15		7.30	2862	184.81	17.29	0.71	209.3	14.15
3.	1643	0.15		7.32	2901	197.93	16.12	0.37	204.0	14.15
4.	1646	0.15		7.33	2893	167.36	15.67	0.30	199.8	14.15
5.	1649	0.15		7.33	2946	127.28	15.36	0.25	196.0	14.15
6.	1652	0.15		7.32	2936	162.26	15.27	0.25	192.9	14.15
7.	1655	0.15		7.32	2917	154.79	15.27	0.21	190.2	14.15
8.	1658	0.15		7.32	2905	148.13	15.14	0.18	187.5	14.16
9.	1701	0.15		7.32	2885	140.12	15.16	0.15	185.2	14.16
10.	1704	0.15		7.31	2900	111.88	15.06	0.14	182.4	14.16
11.	1707	0.15		7.31	2900	104.59	14.94	0.13	180.1	14.16
12.	1710	0.15		7.30	2871	83.35	15.06	0.12	177.5	14.15
13.	1713	0.15		7.30	2841	87.33	14.88	0.12	175.4	14.16
14.	1715	0.15		7.30	2821	68.68	14.87	0.12	173.6	14.15
15.	1718	0.15		7.30	2796	66.34	14.92	0.11	171.3	14.15
16.	1720	Sample Collected								
17.		~2 gallons	purged							
18.										

Sample ID: MW-114 **SampleClarity/Color/Odor:** Cloudy, no odor.
Sample Time: 1720 **QAQC Samples Collected:** O No O Yes:
Comments: VOCs - Purged for 45 min - Turbidity not w/in criteria

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.:	RH-MW-7
WELL DIAMETER:	
SAMPLER:	JT/BW
DATE:	5/9/18
WEATHER CONDITIONS	Sunny 75°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Bladder Pump	Water Quality Inst.:	In Situ
Make/Model:	Sample Pro	Make/Model:	Aqua Troll 600
Serial Number:	10184	Serial Number:	518813

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.17 **Total Well Depth (ft-bpm):** 20.09 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1	1526	Begin purge								
2	1529	0.175		7.06	2980	274.99	17.10	2.70	200.4	13.20
3	1532	0.175		7.12	2842	206.96	15.13	2.69	195.9	13.21
4	1535	0.175		7.08	2908	120.57	14.39	2.69	197.3	13.22
5	1538	0.175		7.01	2929	67.74	13.84	2.73	199.5	13.22
6	1541	0.175		6.97	2950	66.80	13.48	2.76	201.0	13.22
7	1544	0.175		6.94	2945	43.22	13.33	2.73	201.0	13.22
8	1547	0.175		6.94	2950	37.62	13.24	2.75	200.4	13.22
9	1550	0.175		6.94	2984	45.36	13.25	2.75	199.2	13.22
10	1553	0.175		6.96	2993	18.29	12.98	2.73	197.9	13.22
11	1556	0.175		6.96	2998	36.81	13.17	2.72	196.9	13.23
12	1559	0.175		6.97	2991	14.55	12.91	2.70	196.0	13.22
13	1602	0.175		6.97	2996	30.15	12.99	2.68	195.3	13.23
14	1605	0.175		6.98	2996	10.90	12.78	2.64	194.6	13.22
15	1608	0.175		6.98	2956	9.88	12.56	2.64	194.0	13.23
16.										
17.										
18.										

Sample ID: RH-MW-7	SampleClarity/Color/Odor:
Sample Time: 1610	QAQC Samples Collected: ⊗No O Yes:

Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: RH-MW-1 **WELL DIAMETER:** 2"
SAMPLER: ST/RW
DATE: 5/9/18
WEATHER CONDITIONS Overcast, warm 80°F

Sampling Device:	Bladder Pump	**Water Quality Inst.:**	In Situ
Make/Model:	Sample Pro	**Make/Model:**	Aqua Troll 600
Serial Number:	10154	**Serial Number:**	518813

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 13.73 **Total Well Depth (ft-bpm):** 19.98 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1. 1436	0.2								
2. 1439	0.2		7.16	2225	37.13	17.22	0.51	181.2	13.74
3. 1442	0.2		7.18	2241	36.27	16.36	0.26	178.6	13.73
4. 1445	0.2		7.18	2248	57.75	16.09	0.21	177.2	13.73
5. 1448	0.2		7.18	2256	44.61	15.70	0.17	176.3	13.74
6. 1451	0.2		7.18	2267	34.98	15.77	0.15	175.6	13.74
7. 1454	0.2		7.18	2262	28.31	15.81	0.14	174.9	13.74
8. 1457	0.2		7.17	2272	23.71	15.91	0.12	174.5	13.74
9. 1500	0.2		7.17	2265	23.13	16.61	0.12	174.0	13.73
10. 1503	0.2		7.17	2273	24.46	15.76	0.11	173.7	13.74
11. 1505	Collect	sample.							
12.									
13.	Approx	2 gal	bailed						
14.									
15.									
16.									
17.									
18.									

Sample ID: RH-MW-1 **SampleClarity/Color/Odor:**
Sample Time: 1505 **QAQC Samples Collected:** ~~O~~ No O Yes:
Comments: VOCs.

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.: BPGP-81	WELL DIAMETER: 0.75
SAMPLER:	JS / JR
DATE:	05/09/2018
WEATHER CONDITIONS	mostly cloudy, winds E 15-4; 72°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Peristaltic Pump	Water Quality Inst.:	In Situ
Make/Model:	Geotech Easy Load II	Make/Model:	Aqua Troll 600
Serial Number:	2647	Serial Number:	0074030

Tubing Type: ☑ Teflon ○ Poly ○ Other **Decontamination:** ☑ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 11.84 + 0.03 = 11.87 **Total Well Depth (ft-bpm):** 18.49 + 0.03 = 18.52 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1. 1627	Begin	purging	BPGP81						
2. 1630	0.19		7.15	1,523.4	18.72	14.07	2.10	143.4	—
3. 1633			7.16	1,581.7	8.60	12.90	2.09	145.4	—
4. 1636		2	7.20	1,614.7	4.66	12.44	2.04	145.1	—
5. 1639			7.08	1,621.0	1.62	12.16	1.97	154.7	
6. 1642	Sample	BPGP-81 (VOCs)							
7. Post	purge	/sampling	depth to groundwater = 11.83 + 0.03 = 11.86 (ft-bmp)						
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID:	BPGP81	SampleClarity/Color/Odor:	clear / clear / None
Sample Time:	1642	QAQC Samples Collected:	☑ No ○ Yes:

Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP83 **WELL DIAMETER:** 0.75
SAMPLER: JS / SR
DATE: 05/09/2018
WEATHER CONDITIONS Mostly Cloudy; Winds E @15mph; 72°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peristaltic Pump
Make/Model: Geotech Easy Load V
Serial Number: 2647

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 0074030

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ☒ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 12.42 + 0.03 = 12.45 **Total Well Depth (ft-bmp):** 22.81 + 0.03 = 22.84 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1.	1530	Begin	purging	BPGP83						
2.	1533	0.23		7.23	1,905.1	20.08	17.20	0.85	162.2	—
3.	1536			7.24	1,941.5	16.48	16.41	0.49	160.6	—
4.	1537	Pump stopped, changed battery; Resumed purging								
5.	1540			7.27	1,942.0	14.41	16.11	0.43	158.0	—
6.	1543		3	7.24	1,954.0	11.55	16.05	0.39	158.8	—
7.	1546			7.18	1,953.4	10.58	15.91	0.36	161.1	—
8.	1549			7.16	1,958.1	9.23	15.71	0.36	161.9	—
9.	1552		5	7.13	1,964.8	7.47	15.68	0.34	162.3	—
10.	1555			7.12	1,967.5	5.66	15.76	0.34	162.7	—
11.	1558	Sample BPGP83 (VOC & MS/MSD)								
12.		Post purging & sampling depth to groundwater = 12.43 + 0.03 = 12.46 (ft bmp)								
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: BPGP83 **SampleClarity/Color/Odor:** Clear / Clear / NONE
Sample Time: 1558 **QAQC Samples Collected:** ○ No ☒ Yes: MS/MSD

Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP94 **WELL DIAMETER:** 0.75
SAMPLER: JS / JR
DATE: 5/9/18
WEATHER CONDITIONS Partly Cloudy 80°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peristaltic Pump	**Water Quality Inst.:** In Situ
Make/Model: Geotech Easy Load II	**Make/Model:** Aqua Troll 600
Serial Number: 2647	**Serial Number:** 0074030

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ☒ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 11.66 + 0.03 = 11.69 **Total Well Depth (ft-bpm):** 21.73 + 0.03 = 21.76 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Start purge/Collection									
1.	1439	Begin	purging	BPGP94						
2.	1442	0.16		7.37	2,299.3	138.11	14.77	1.04	119.6	—
	1445			7.38	2,337.5	135.55	13.90	0.95	120.1	—
4.	1448		2	7.30	2,365.7	135.04	13.23	0.81	127.3	—
5.	1451		7.23 (SR) → ~~7.23~~ 2.3		2,378.4	129.03	12.98	0.73	132.4	—
6.	1454			7.18	2,387.0	128.41	12.88	0.69	135.7	—
7.	1457		3.6	7.15	2,400.2	128.77	12.77	0.67	137.7	
8.	1500	Sample	BPGP94 (VOCs & MNA)							
9.		Post purging & sampling depth to groundwater = 11.66 + 0.03 = 11.69 (ft-bmp)								
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: BPGP94 **SampleClarity/Color/Odor:** clear / clear / none
Sample Time: 1500 **QAQC Samples Collected:** ☒ No ○ Yes:
Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP05 **WELL DIAMETER:** –
SAMPLER: JS/JR
DATE: 5/9/18
WEATHER CONDITIONS

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	**Water Quality Inst.:** In Situ
Make/Model:	**Make/Model:** Aqua Troll 600
Serial Number:	**Serial Number:**

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):**_____ **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1.									
2.	Could not Sample. Well has								
3.	been destroyed by construction.								
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: **SampleClarity/Color/Odor:**
Sample Time: **QAQC Samples Collected:** O No O Yes:
Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP 93 **WELL DIAMETER:** 0.75"
SAMPLER: JS / JR
DATE: 5/9/18
WEATHER CONDITIONS Partly cloudy, 77°

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peristaltic Pump
Make/Model: Geotech Easy Load II
Serial Number: 2647

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 0074030

Tubing Type: Ø Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 11.72 + 0.03 = 11.75 **Total Well Depth (ft-bpm):** 22.18 + 0.03 **Depth to Pump Inlet(ft-bmp):** 22.21

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1. 1350	Start Purge								
2. 1353	0.21	0.63	7.12	2,785.6	71.64	17.37	0.61	127.2	–
3. 1356	0.21	1.26	7.16	2,875.4	74.25	15.14	0.29	129.4	–
4. 1359	0.21	1.89	7.14	2,936.4	72.29	14.35	0.17	137.1	–
5. 1402	0.21	2.52	6.95	2,943.7	76.63	13.84	0.13	147.0	–
6. 1405	0.21	3.15	6.92	2,962.2	81.56	13.78	0.11	149.5	–
7. 1408	0.21	3.78	6.92	2,967.4	83.75	13.54	0.10	149.7	–
8.									
9. Collected Samples (VOCs) @ 1410.									
10. Post purge DTW: ~~11.34~~ 11.73 + 0.03 = 11.76 (ft-bmp)									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP93
Sample Time: 1410
SampleClarity/Color/Odor: Clear, none, no odor
QAQC Samples Collected: Ø No O Yes:

Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP08 **WELL DIAMETER:** 0.50
SAMPLER: JR / JS
DATE: 05/10/2018
WEATHER CONDITIONS Mostly Sunny ; 55°F

Sampling Device: Peristaltic Pump
Make/Model: Geotech Easy Load II
Serial Number: 2647

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 0074030

Tubing Type: ✓ Teflon O Poly O Other **Decontamination:** ✓ Decontaminated Water Meter ✓ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 11.28 + 0.03 = 11.31 **Total Well Depth (ft-bpm):** 20.70 + 0.03 = 20.73 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1. 0821	Begin purging		BPGP08						
2. 0824	0.21		7.01	2,768.5	76.98	12.21	0.58	249.3	—
0827			7.05	2,747.0	79.78	12.09	0.55	244.3	—
4. 0830		2.4	7.06	2,738.9	80.55	11.97	0.31	244.7	—
5. 0833			7.06	2,734.7	59.22	11.86	0.26	242.8	—
6. 0836			7.06	2,734.7	78.01	11.84	0.27	242.3	—
7. 0839		4.6	7.06	2,735.3	85.54	11.87	0.33	240.6	—
8. 0842			7.06	2,733.6	84.16	11.84	0.27	240.0	—
9. 0845			7.06	2,734.0	43.28	11.87	0.23	239.1	—
10. 0848		7	7.07	2,733.6	56.84	11.93	0.22	239.1	—
11. 0851			7.07	2,732.0	57.80	11.87	0.23	238.1	—
12. 0854			7.07	2,732.5	59.83	11.87	0.23	237.7	—
13. 0858	Sample BPGP08 (VOC's)								
14. Post purging /sampling depth to ground water 11.29 + 0.03 = 11.32 ft-bmp									
15.									
16.									
17.									
18.									

Sample ID: BPGP08 **SampleClarity/Color/Odor:** Clear / clear / none
Sample Time: 0858 **QAQC Samples Collected:** ✓ No O Yes:
Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-121 **WELL DIAMETER:**
SAMPLER: BS + RM
DATE: 5-10-18
WEATHER CONDITIONS Sunny, 62°F, 18mph, E.NE

Sampling Device: QED Sample Pro / Bladder Pump	**Water Quality Inst.:** In Situ
Make/Model: QED Sample Pro	**Make/Model:** Aqua Troll 600
Serial Number:	**Serial Number:**

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ☒ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 10.76 **Total Well Depth (ft-bpm):** 21.38 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.1	±3%	±10% or less than 5 NTUs	±3%	±10% or less than 0.3 mg/L	±10%	± 0.3
1. 1752	0.25		7.01	4173.7	336.87	14.24	0.68	-81.4	10.90
2. 1755	0.25		7.01	4200.5	482.32	12.79	1.24	-90.9	10.90
3. 1758	0.25		6.99	4212.3	561.77	12.25	1.64	-91.6	10.90
4. 1801	0.25		6.97	4233.0	540.47	12.02	2.02	-89.3	10.90
5. 1804	0.25		6.97	4241.0	488.81	11.77	2.38	-87.1	10.90
6. 1807	0.25		6.96	4246.8	353.50	11.53	2.78	-84.4	10.90
7. 1810	0.25		6.96	4244.5	298.24	11.37	2.98	-82.4	10.90
8. 1813	0.25		6.96	4241.3	231.48	11.30	3.17	-80.7	10.90
9. 1816	0.25		6.96	4248.2	189.88	11.11	3.45	-79.3	10.90
10. 1819	0.25		6.96	4246.5	181.62	11.18	3.48	-78.1	10.90
11. 1822	0.25		6.96	4259.2	137.01	11.13	3.79	-76.5	10.90
12. 1825	0.25		6.96	4938.1	113.27	10.98	3.95	-74.9	10.90
13. 1828	0.25		6.97	4902.1	71.28	10.94	4.15	-73.0	10.90
14. 1831	0.25		6.97	4908.4	72.64	10.86	4.25	-72.2	10.90
15. 1834	0.25		6.97	4902.6	64.53	10.86	4.40	-70.7	10.90
16. 1837	0.25		6.97	4896.4	41.21	10.83	4.56	-69.6	10.90
17. 1840	0.25		6.97	4891.2	43.43	10.80	4.70	-68.6	10.90
18. 1843	0.25		6.98	4887.3	39.68	10.76	4.89	-66.9	10.90

Sample ID: MW-121 **SampleClarity/Color/Odor:**
Sample Time: 1845 ST **QAQC Samples Collected:** ☒ No ○ Yes:
Comments: VOC's, ~~FD~~ RM-20180510-A

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-125 **WELL DIAMETER:** 2"
SAMPLER: ST/BW
DATE: 5/10/18
WEATHER CONDITIONS Clear, breezy, 65°

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

61.5 mL

Sampling Device: Bladder Pump	**Water Quality Inst.:** In Situ
Make/Model: Sample Pro	**Make/Model:** Aqua Troll 600
Serial Number: 10154	**Serial Number:** 518813

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 12.18 **Total Well Depth (ft-bpm):** 23.81 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
~~0~~ 1740 start purge									
1. 1743	0.35		7.01	60.06	0.60	15.06	8.34	182.5	12.10
2. 1746	Ø		7.17	56.23	0.60		8.26	182.8	
1748 purge start over - Pump stopped. Reconnected battery									
4. 1751	0.35		7.14	3018	1364.0	13.10	0.37	168.5	12.15
5. 1754	0.35		7.14	3039	1374	12.75	0.28	162.0	12.18
6. 1767	0.35		7.12	3040	1204	12.69	0.24	154.1	12.16
7. 1800	0.35		7.10	3046	822.64	12.57	0.22	141.4	12.15
8. 1803	0.35		7.09	3053	531.66	12.52	0.20	116.0	12.14
9. 1806	0.35		7.09	3050	278.84	12.88	0.28	116.0	12.09
10. 1809	0.35		7.10	3053	241.52	13.32	0.48	117.2	12.08
11. 1812	0.35		7.11	3055	219.81	13.65	0.63	118.1	12.09
12. 1815	0.35		7.12	3032	404.4	12.73	0.31	107.4	12.14
13. 1818	0.35		7.11	3046	324.84	12.49	016	70.5	12.16
14. 1821	0.35		7.11	3053	287.14	12.40	0.14	46.5	12.16
15. 1824	0.35		7.11	3055	~~331.66~~ 331.66	12.31	0.13	37.7	12.15
16. 1827	0.35		7.11	3058	332.99	12.32	0.12	36.3	12.15
17. 1830	0.35		7.10	3057	486.62	12.3	0.12	31.7	12.15
18. 1833	0.35		7.10	3061	743.61	12.27	0.12	24.2	12.15

Sample ID: MW-125 **SampleClarity/Color/Odor:** No ODOR, tan, cloudy
Sample Time: 1900 **QAQC Samples Collected:** O No ⊗ Yes: DUP: 20180510-C
Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-125 **WELL DIAMETER:**
SAMPLER: ST/BW
DATE: 5/10/18
WEATHER CONDITIONS 60°F Windy NE 10 mph

Sampling Device:	See p. 1	**Water Quality Inst.:**	In Situ
Make/Model:		**Make/Model:**	Aqua Troll 600
Serial Number:		**Serial Number:**	

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** _____ **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1.	1836	0.35		7.10	3061	692.87	12.25	0.11	19.8	12.16
2.	1839	0.35		7.10	3063	665.83	12.25	0.11	15.1	12.16
	1842	0.35		7.11	3063	563.48	12.24	0.11	12.7	12.14
4.	1845	0.35		7.11	3064	499.15	12.23	0.10	10.6	12.15
5.	1848	0.35		7.11	3065	379.85	12.23	0.10	8.8	12.15
6.	1851	0.35		7.11	3066	422.87	12.21	0.09	8.6	12.15
7.	1854	0.35		7.11	3065	385.15	12.21	0.09	8.0	12.15
8.	1857	0.35		7.11	3066	367.91	12.22	0.09	8.4	12.16
9.	1900	Sample Collected								
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: MW-125 **SampleClarity/Color/Odor:** NO ODOR, CLOUDY, TAN
Sample Time: 1900 **QAQC Samples Collected:** O No ☒ Yes: DUP 20180510-C
Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP80 **WELL DIAMETER:** 0.75"
SAMPLER: JS/JR
DATE: 5/10/18
WEATHER CONDITIONS Mostly Cloudy 60°F

Sampling Device: Peristaltic Pump
Make/Model: Geotech Easy Load II
Serial Number: 2647

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 0074030

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 11.99+0.03 = 12.02 **Total Well Depth (ft-bpm):** 20.08+0.03 = 20.11 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1. 0928	Start Purge								
2. 0931	0.23	0.69	7.04	3,095.8	0.74	13.81	0.77	230.1	–
3. 0934	0.23	1.38	7.07	2,925.2	0.44	13.44	0.38	234.4	–
4. 0937	0.23	2.07	7.08	2,831.1	0.69	13.39	0.32	237.5	–
5. 0940	0.23	2.76	7.08	2,830.1	0.52	13.36	0.33	236.5	–
6. 0943	0.23	3.45	7.09	2,810.0	0.40	13.35	0.37	236.2	–
7. Stop	Collected Samples (VOCs + EPH/VPH + Metals + Dup)								
8.	@ 0947								
9.									
10. Post Purge DTW: 12.08+0.03 = 12.11 (ft-bmp)									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP80 **SampleClarity/Color/Odor:** Clear / None / No odor
Sample Time: 0947 **QAQC Samples Collected:** ○ No ☒ Yes:
Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-111 **WELL DIAMETER:** 2"
SAMPLER: ST/BW
DATE: 5/10/18
WEATHER CONDITIONS Clear, 60°

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Bladder Pump	**Water Quality Inst.:** In Situ
Make/Model: Sample Pro	**Make/Model:** Aqua Troll 600
Serial Number:	**Serial Number:** 518813

Tubing Type: ☒ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 13.52 **Total Well Depth (ft-bpm):** 23.70 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)	
Stabilization Criteria										
1. 0852	Start Purge									
2. 0855	0.175		7.44	2363	77.31	13.93	0.73	173.7	13.61	
0858	0.2		7.45	2375	111.57	13.46	0.51	147.0	13.63	
4. 0901	0.2		7.43	2387	178.96	13.09	0.37	106.9	13.63	
5. 0904	0.2		7.41	2395	213.29	12.96	0.37	60.2	13.65	
6. 0907	0.2		7.38	2430	241.57	12.81	0.43	15.2	13.66	
7. 0910	0.2		7.37	2445	191.07	12.91	0.49	-21.1	13.65	S.T.
8. 0913	0.2		7.35	2478	182.56	12.92	0.60		13.66	-55.5 ORP
9. 0916	0.2		7.34	2507	160.16	12.89	0.73	-69.4	13.65	
10. 0919	0.2		7.33	2531	126.11	12.78	0.82	-76.1	13.65	
11. 0922	0.2		7.32	2553	120.14	12.74	0.95	-84.8	13.65	
12. 0925	0.2		7.31	2558	109.12	12.84	1.01	-88.1	13.65	
13. 0928	0.2		7.30	2573	117.42	12.80	1.08	-86.8	13.65	
14. 0931	0.2		7.30	2583	115.38	12.78	1.13	-77.1	13.66	
15. 0934	0.2		7.29	2596	114.84	12.84	1.18	-81.0	13.66	
16. 0937	0.2		7.30	2587	94.79	13.10	1.21	-78.0	13.66	
17. 0940	0.2		7.29	2599	105.48	13.01	1.28	-79.5	13.66	
18. 0943	0.2		7.28	2612	84.26	12.93	1.37	-77.6		

Sample ID: MW-111 **SampleClarity/Color/Odor:** Clear, no odor
Sample Time: 0945 **QAQC Samples Collected:** O No O Yes:

Comments: VPH, EPH, VOCs, SVOCs, metals - stability reached during purge
purged ~3 gal

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: EMW-32 **WELL DIAMETER:** 2"
SAMPLER: ST/BW
DATE: 5/10/18
WEATHER CONDITIONS Overcast ~10mph

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Bladder Pump	**Water Quality Inst.:**	In Situ
Make/Model:	Sample Pro	**Make/Model:**	Aqua Troll 600
Serial Number:	10154	**Serial Number:**	318813

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 15.09 **Total Well Depth (ft-bpm):** 20.06 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	1040 start Purge									
1.	1043	.325		7.00	1916	49.04	14.00	5.68	185.2	15.11
2.	1046	.325		7.00	1915	31.64	12.70	5.73	194.7	15.15
3.	1049	.325		6.86	1941	24.13	12.32	5.75	200.7	15.16
4.	1052	.325		6.81	1944	12.63	12.16	5.78	200.3	15.17
5.	1055	0.325		6.79	1954	14.78	11.99	5.80	199.6	15.16
6.	1058	0.325		6.78	1965	14.59	11.86	5.80	198.3	15.16
7.	1101	0.325		6.79	1976	10.74	11.89	5.80	196.4	15.17
8.	1104	0.325		6.81	1991	6.10	11.82	5.81	195.0	15.17
9.	1107	0.325		6.82	2002	9.70	11.84	5.80	193.6	15.17
10.	1110	0.325		6.84	2016	6.81	11.74	5.83	192.1	15.18
11.	1112	Sample Collected								
12.										
13.		~25 gal purged								
14.										
15.										
16.										
17.										
18.										

Sample ID: EMW-32 **SampleClarity/Color/Odor:** Clear, no odor
Sample Time: 1112 **QAQC Samples Collected:** ☒ No ○ Yes:
Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

55 min

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BMW07-01 WELL DIAMETER: 2"
SAMPLER: ST/BW
DATE: 5/10/18
WEATHER CONDITIONS Windy ~65°F

S.T 5/10/18

Sampling Device:	~~Peristaltic~~ P Bladder	Water Quality Inst.:	In Situ
Make/Model:	Sample Pro	Make/Model:	Aqua Troll 600
Serial Number:	10154	Serial Number:	518813

Tubing Type: ⊗ Teflon O Poly O Other Decontamination: O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 15.00 Total Well Depth (ft-bpm): 23.93 Depth to Pump Inlet(ft-bmp):

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1135 start purge									
1. 1138	0.3		7.00	3084	247.45	15.38	0.79	203.6	15.01
2. 1141	0.3		7.02	3114	268.42	14.68	0.57	202.1	15.01
3. 1144	0.3		7.02	3117	215.67	14.29	0.51	199.8	15.01
4. 1147	0.3		7.02	3130	95.06	14.13	0.51	197.7	15.02
5. 1150	0.3		7.01	3133	45.26	13.96	0.40	196.4	15.01
6. 1153	0.3		7.01	3133	27.34	13.80	0.37	195.1	15.01
7. 1156	0.3		7.01	3138	12.31	13.72	0.36	193.6	15.01
8. 1159	0.3		7.01	3138	6.23	13.75	0.26	192.2	15.01
9. 1202	0.3		7.01	3136	4.03	13.7	0.25	191.6	15.01
10. 1205	0.3		7.01	3135	3.11	13.67	0.25	191.3	15.01
11. 1208 Sample Collected									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BMW07-1 SampleClarity/Color/Odor: NO ODOR
Sample Time: 1208 QAQC Samples Collected: ⊗ No O Yes:
Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BMW-4 **WELL DIAMETER:** 2"
SAMPLER: ST/BW
DATE: 5/10/18
WEATHER CONDITIONS Breezy, Clear, 65°

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Bladder Pump
Make/Model: Sample Pro
Serial Number: 10154

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 518813

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 14.92 **Total Well Depth (ft-bpm):** 19.89 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	1356	Start Purge								
1.	1359	0.35		7.08	3189	92.11	15.76	0.67	188.8	14.94
2.	1402	0.35		7.06	3257	49.72	13.83	0.52	189.1	14.93
3.	1405	0.35		6.89	3278	15.06	12.86	0.40	199.3	14.93
4.	1408	0.35		6.85	3289	8.76	12.52	0.32	200.3	14.93
5.	1411	0.35		6.83	3312	30.28	12.22	0.28	198.8	14.93
6.	1415	0.35		6.84	3311	7.88	12.01	0.27	196.8	14.93
7.	1418	0.35		6.84	3315	3.24	12.05	0.23	195.5	14.93
8.	1421	0.35		6.84	3321	3.57	12.00	0.20	194.1	14.93
9.	1424	0.35		6.85	3322	3.42	12.02	0.20	192.6	14.93
10.	1425	Sample Collected								
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: BMW-4 **SampleClarity/Color/Odor:** No Odor.
Sample Time: 1425 **QAQC Samples Collected:** O No ☒ Yes:
Comments: VOCs, MS/MSD

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-107 **WELL DIAMETER:** 2"
SAMPLER: STBW
DATE: 5/10/18
WEATHER CONDITIONS Overcast 70°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Bladder pump	**Water Quality Inst.:**	In Situ
Make/Model:	Sample Pro	**Make/Model:**	Aqua Troll 600
Serial Number:	10154	**Serial Number:**	518813

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 15.10 **Total Well Depth (ft-bpm):** 28.20 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	1502	start purge								
1.	1505	0.3		7.18	2502	189.41	16.00	1.55	158.6	15.11
2.	1508	0.3		7.22	2521	149.56	15.20	1.28	121.5	15.10
3.	1511	0.3		7.22	2529	113.10	14.72	1.22	100.3	15.11
4.	1514	0.3		7.20	2523	119.24	14.71	1.19	90.1	15.10
5.	1517	0.3		7.20	2528	126.81	14.61	1.19	83.6	15.09
6.	1520	0.3		7.19	2533	89.12	14.59	1.20	78.2	15.09
7.	1523	0.3		7.19	2535	89.83	14.59	1.19	74.9	15.10
8.	1526	0.3		7.19	2533	98.88	14.50	1.20	71.7	15.10
9.	1529	0.3		7.19	2539	94.29	14.43	1.22	68.6	15.10
10.	1530	Sample Collected								
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: MW-107 **SampleClarity/Color/Odor:** Clear, no odor
Sample Time: 1530 **QAQC Samples Collected:** ☒ No O Yes:
Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-104 **WELL DIAMETER:** 2"
SAMPLER: ST/BW
DATE: 5/10/18
WEATHER CONDITIONS Clear, 70°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

56 min

Sampling Device: Bladder Pump	**Water Quality Inst.:** In Situ
Make/Model: Sample Pro	**Make/Model:** Aqua Troll 600
Serial Number: 10154	**Serial Number:** 518813

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 12.99 **Total Well Depth (ft-bpm):** 23.61 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1606 Start purge									
1. 1609	0.35		7.11	2912	270.98	15.62	0.48	150.0	12.99
2. 1612	0.35		7.15	2971	716.36	14.24	0.28	148.4	13.00
3. 1615	0.35		7.06	2993	862.16	13.67	0.26	155.0	13.00
4. 1618	0.35		6.99	2992	313.34	13.30	0.21	159.2	13.00
5. 1621	0.35		6.95	2987	189.35	13.15	0.17	161.2	13.00
6. 1624	0.35		6.92	2978	135.65	12.91	0.15	161.7	12.99
7. 1627	0.35		6.90	2972	72.23	12.80	0.13	162.3	13.00
8. 1630	0.35		6.89	2966	83.88	12.75	0.12	161.9	13.00
9. 1633	0.35		6.89	2962.4	62.38	12.77	0.11	162.2	13.00
10. 1636	0.35		6.90	2961	65.23	12.72	0.10	161.5	12.99
11. 1639	0.35		6.90	2966	42.78	12.58	0.10	161.4	12.99
12. 1642	0.35		6.91	2958	32.84	12.55	0.10	161.7	13.00
13. 1645	0.35		6.92	2961	65.49	12.53	0.09	162.2	13.00
14. 1648	0.35		6.92	2962	52.26	12.50	0.09	162.2	13.00
15. 1651	0.35		6.93	2965	46.57	12.53	0.09	161.7	13.00
16. 1654	0.35		6.94	2976	31.59	12.54	0.08	161.5	13.00
17. 1657	0.35		6.95	2963	25.66	12.43	0.08	160.5	13.00
18. 1700	0.35		6.95	2962	20.66	12.43	0.08	160.3	13.00

Sample ID: MW-104 **SampleClarity/Color/Odor:**
Sample Time: 1705 **QAQC Samples Collected:** ☒ No ○ Yes:

Comments: Three well volumes purged. Turbidity is low, but not stable
VOCs, SVOCs, EPH/VPH, Metals.

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.: MW-108	WELL DIAMETER: 2"
SAMPLER: RM + BS	
DATE: 5-10-18	
WEATHER CONDITIONS	Sunny, 64°F, 9mph wind, E,NE

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: QED Sample Pro / Bladder Pump	Water Quality Inst.: In Situ
Make/Model: QED Sample Pro	Make/Model: Aqua Troll 600
Serial Number:	Serial Number:

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ☒ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.60 Total Well Depth (ft-bpm): 28.05 Depth to Pump Inlet(ft-bmp):

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria									
1. 1604	0.25		7.11	2913.1	1322.0	18.36	0.67	-59.7	13.64
2. 1607	0.25		7.12	2929.4	902.61	16.33	0.73	-64.9	13.64
3. 1610	0.25		7.10	2955.3	713.35	15.36	0.81	-66.2	13.64
4. 1613	0.25		7.09	2989.0	564.78	14.95	0.93	-65.0	13.64
5. 1616	0.25		7.08	2988.3	399.92	14.64	0.84	-66.2	13.64
6. 1619	0.25		7.08	3002.3	377.64	14.43	0.87	-67.3	13.64
7. 1622	0.25		7.08	3016.8	342.06	14.33	1.08	-65.1	13.64
8. 1625	0.25		7.09	3018.6	274.58	14.37	1.11	-64.2	13.64
9. 1628	0.25		7.09	3019.2	227.14	14.34	1.19	-63.3	13.64
10. 1631	0.25		7.10	3025.8	221.92	14.37	1.28	-62.4	13.64
11. 1634	0.25		7.11	3026.2	208.86	14.91	1.40	-61.8	13.64
12. 1637	0.25		7.12	3026.4	177.01	14.97	1.47	-61.4	13.64
13. 1640	0.25		7.12	3035.8	176.43	14.00	1.57	-60.1	13.64
14. 1643	0.25		7.13	3039.3	158.78	14.13	1.67	-58.7	13.64
15.									
16.									
17.									
18.									

Sample ID: MW-108	SampleClarity/Color/Odor: Clear, Strong hydrocarbon odor
Sample Time: 1645	QAQC Samples Collected: ☒ No ○ Yes:

Comments: VOC's, SVOC's, EPH, VPH, Metals, MNA

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.: MW-119	WELL DIAMETER: 2"
SAMPLER: BS + RM	
DATE: 5-10-18	
WEATHER CONDITIONS sunny, 64°F, 9mph wind, E, NE	

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: QED Sample Pro / Bladder Pump	Water Quality Inst.: In Situ
Make/Model: QED Sample Pro	Make/Model: Aqua Troll 600
Serial Number:	Serial Number:

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** ⊗ Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 14.20 Total Well Depth (ft-bpm): 23.67 Depth to Pump Inlet(ft-bmp):

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria									14.18
1. 1423	0.25		7.07	2773.7	213.33	19.87	1.07	-46.4	14.18
2. 1426	0.25		7.06	2958.6	232.50	16.30	0.30	-32.5	14.37
3. 1429	0.25		7.06	2950.5	222.27	15.46	0.27	-26.2	14.37
4. 1432	0.25		7.06	2957.1	196.53	14.92	0.24	-20.9	14.37
5. 1435	0.25		7.06	2976.0	181.12	14.74	0.21	-16.5	14.37
6. 1438	0.25		7.06	2978.4	149.72	14.89	0.19	-11.4	14.37
7. 1441	0.25		7.07	2973.6	109.18	14.86	0.19	-7.6	14.37
8. 1444	0.25		7.07	2977.3	102.64	14.53	0.20	-5.1	14.37
9. 1447	0.25		7.08	2971.9	75.99	14.49	0.16	-1.7	14.37
10. 1450	0.25		7.08	2988.6	52.37	14.36	0.13	0.9	14.37
11. 1453	0.25		7.08	2995.7	47.51	14.28	0.14	3.1	14.37
12. 1456	0.25		7.08	2990.8	41.35	14.51	0.10	6.3	14.37
13. 1459	0.25		7.08	2999.3	40.90	14.83	0.10	8.7	14.37
14. 1502	0.25		7.07	3030.9	29.46	17.97	0.11	10.6	14.37
15. 1505	0.25		7.06	3015.5	25.41	20.08	0.15	12.3	14.37
16. 1508	0.25		7.04	3012.0	25.34	21.87	0.18	15.0	14.37
17. 1511	0.25		7.02	3002.6	25.08	23.80	0.22	18.2	14.37
18. 1514	0.25		7.01	2998.6	25.52	24.91	0.26	20.4	14.37

Sample ID: MW-119	SampleClarity/Color/Odor: Clear, no odor
Sample Time: 1515	QAQC Samples Collected: ⊗ No O Yes:

Comments: VOC's, SVOC's, metals, EPH, VPH

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-118 **WELL DIAMETER:** 2"
SAMPLER: RM + BS
DATE: 5-10-18
WEATHER CONDITIONS Cloudy, 60°F, 22 mph wind, N,NW

Sampling Device: QED Sample Pro / Bladder Pump
Make/Model: QED Sample Pro
Serial Number:

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number:

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** ⊗ Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 15.58 **Total Well Depth (ft-bpm):** 23.77 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria									15.60
1. 1156	0.25		7.12	3014.7	572.59	16.00	0.69	-73.1	15.60
2. 1159	0.25		7.10	3024.0	604.44	14.99	0.31	-109.7	16.66
3. 1202	0.25		7.10	3023.8	658.47	14.91	0.27	-128.1	16.66
4. 1205	0.25		7.10	3019.5	681.66	14.84	0.30	-132.1	16.66
5. 1208	0.25		7.10	3019.2	679.28	14.82	0.33	-133.7	16.66
6. 1211	0.25		7.09	3019.7	619.78	14.93	0.40	-133.0	16.66
7. 1214	0.25		7.09	3004.9	540.89	14.96	0.54	-130.2	16.66
8. 1217	0.25		7.08	2994.6	421.92	15.07	0.62	-126.9	16.66
9. 1220	0.25		7.08	2994.8	372.77	15.02	0.70	-122.4	16.66
10. 1223	0.25		7.07	2988.6	332.23	15.12	0.78	-118.0	16.66
11. 1226	0.25		7.07	2972.4	259.16	15.10	0.83	-110.2	16.66
12. 1229	0.25		7.07	2964.7	238.61	15.25	0.92	-105.9	16.66
13. 1232	0.25		7.07	2960.2	206.61	15.24	0.99	-102.0	16.66
14. 1235	0.25		7.07	2948.4	168.35	15.18	1.10	-96.7	16.66
15. 1238	0.25		7.07	2945.6	156.83	15.17	1.10	-94.0	16.66
16. 1241	0.25		7.07	2946.2	154.10	15.30	1.11	-90.0	16.66
17. 1244	0.25		7.07	2940.3	135.78	15.35	1.17	-85.9	16.66
18. 1247	0.25		7.06	2936.6	133.92	15.32	1.22	-82.7	16.66

Sample ID: MW-118 **SampleClarity/Color/Odor:** Clear, no odor
Sample Time: ~~MW-119~~ RM 1248 **QAQC Samples Collected:** ⊗ No O Yes:
Comments: VOC's, ~~SVOC's, metals, EPH, VPH~~

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.: MW-117	WELL DIAMETER: 2"
SAMPLER: RM + BS	
DATE: 5-10-18	
WEATHER CONDITIONS	Cloudy, 60°F, 21mph wind, NW

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: QED Sample Pro / Bladder Pump	Water Quality Inst.: In Situ
Make/Model: QED Sample Pro	Make/Model: Aqua Troll 600
Serial Number:	Serial Number:

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ☒ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.82 Total Well Depth (ft-bpm): 22.34 Depth to Pump Inlet(ft-bmp):

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1. 1042	0.25		7.05	3132.4	466.30	16.30	1.50	53.4	11.97
2. 1045	0.25		7.22	2772.2	650.60	13.88	0.42	5.0	11.98
1048	0.25		7.23	2765.3	803.78	13.08	0.21	-28.2	11.98
4. 1051	0.25		7.23	2754.8	721.83	12.84	0.17	-50.5	11.98
5. 1054	0.25		7.24	2735.2	634.17	12.85	0.15	-64.1	11.98
6. 1057	0.25		7.24	2731.1	593.18	12.75	0.14	-74.1	11.98
7. 1100	0.25		7.25	2726.1	502.34	12.70	0.14	-81.1	11.98
8. 1103	0.25		7.25	2726.1	430.83	12.73	0.13	-87.2	11.98
9. 1106	0.25		7.25	2722.9	428.43	12.79	0.12	-92.5	11.98
10. 1109	0.25		7.25	2723.8	378.99	12.78	0.11	-95.7	11.98
11. 1112	0.25		7.26	2710.9	368.19	12.73	0.12	-99.8	11.98
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: MW-117	SampleClarity/Color/Odor: low turbidity, hydrocarbon odor
Sample Time: 1114	QAQC Samples Collected: ☒ No ○ Yes:

Comments: VOC's, SVOC's, metals, EPH, VPH

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: EMW-18 **WELL DIAMETER:** 4"
SAMPLER: RM + BS
DATE: 5-10-18
WEATHER CONDITIONS Partly Cloudy, 63°F, 9mph wind, W

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: QED Sample Pro / Bladder Pump	**Water Quality Inst.:** In Situ
Make/Model: QED Sample Pro	**Make/Model:** Aqua Troll 600
Serial Number:	**Serial Number:**

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ☒ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 10.46 **Total Well Depth (ft-bpm):** 20.90 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Calibration Check									
1	0936	0.3		7.06	2575.0	11.17	16.94	0.84	RM 12.8	10.49
2	0939	0.3		6.94	3790.2	91.62	14.52	1.64	220.1	10.55
3	0942	0.3		6.94	3826.0	47.53	13.95	1.44	218.9	10.55
4	0945	0.3		6.94	3839.4	26.70	13.78	1.40	217.9	10.55
5	0948	0.3		6.94	3840.3	20.59	13.76	1.38	217.1	10.55
6	0951	0.3		6.94	3842.0	15.89	13.83	1.36	215.9	10.55
7	0954	0.3		6.94	3844.6	14.44	13.90	1.34	214.4	10.55
8	0957	0.3		6.94	3851.4	13.19	13.84	1.33	213.8	10.55
9	1000	0.3		6.94	3837.5	11.45	13.75	1.35	212.8	10.55
10	1003	0.3		6.94	3838.2	11.65	13.87	1.32	212.1	10.55
11	1006	0.3		6.94	3839.4	11.34	13.88	1.30	211.1	10.55
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: EMW-18 **SampleClarity/Color/Odor:** Clear, no odor
Sample Time: 1007 **QAQC Samples Collected:** ☒ No ○ Yes:
Comments: VOC's

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BMW-1 **WELL DIAMETER:**
SAMPLER: BS + RM
DATE: 5-10-18
WEATHER CONDITIONS Some clouds, 53°F, 7mph wind, S,SW

Sampling Device: QED Sample Pro/Bladder Pump
Make/Model: QED Sample Pro
Serial Number:

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number:

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ☒ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 12.20 **Total Well Depth (ft-bpm):** 20.17' **Depth to Pump Inlet(ft-bmp):** 18'

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria									
1. 0835	0.3		7.16	0.66	1.89	17.43	8.34	210.7	12.22
2. 0838	0.3		7.06	2450.8	144.55	13.78	0.67	233.0	12.24
3. 0841	0.3		7.05	2477.9	113.51	13.13	0.31	231.6	12.23
4. 0844	0.3		7.06	2486.9	69.85	12.99	0.23	228.3	12.25
5. 0847	0.3		7.06	2484.5	67.33	13.01	0.21	227.3	12.23
6. 0850	0.3		7.06	2485.6	56.74	12.96	0.20	227.0	12.25
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BMW-1 **SampleClarity/Color/Odor:** Clear, no odor
Sample Time: 0852 **QAQC Samples Collected:** ☒ No ○ Yes:
Comments: VOC's, SVOC's, EPH, VPH, MNA

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP65B **WELL DIAMETER:** 0.5"
SAMPLER: JS / JR
DATE: 5/10/15
WEATHER CONDITIONS Partly cloudy, slight breeze, 64°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peristaltic Pump	**Water Quality Inst.:** In Situ
Make/Model: Geotech Easy Load II	**Make/Model:** Aqua Troll 600
Serial Number: 2647	**Serial Number:** 0074030

Tubing Type: Ø Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 13.36+0.03 = 13.39 **Total Well Depth (ft-bpm):** 29.93+0.03 = 29.96 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1.	1548	Start Purge								
2.	1551	0.23	0.69	7.17	2,245.9	1.17	15.70	0.33	-66.3	–
3.	1554	0.23	1.3	7.18	2,387.3	1.25	15.31	0.32	-50.1	–
4.	1557	0.23	1.9	7.18	2,422.8	1.78	15.23	0.20	-32.7	–
5.	1600	0.23	2.6	7.20	2,432.9	3.21	14.94	0.15	-6.2	–
6.	1603	0.23	3.3	7.20	2,447.6	3.96	15.04	0.18	5.8	–
7.	1606	0.23	3.9	7.19	2,439.3	5.80	15.07	0.16	19.0	–
8.	1609	0.23	4.7	7.18	2,435.8	7.53	15.07	0.13	28.8	–
9.	1612	0.23	5.5	7.18	2,427.8	8.76	14.78	0.13	36.7	–
10.	1615	0.23	6.3	7.18	2,440.3	11.96	14.71	0.13	43.7	–
11.	1618	0.23	6.9	7.17	2,429.3	13.50	14.87	0.12	50.7	–
12.	1621	0.23	7.5	7.17	2,430.5	15.32	14.41	0.15	58.1	–
13.	1624	0.23	8.2	7.17	2,430.1	24.58	14.53	0.16	64.3	–
14.	1627	0.23	8.9	7.17	2,460.5	24.69	14.52	0.14	68.3	–
15.	1630	0.23	9.6	7.17	2,455.7	26.25	14.49	0.15	71.5	–
16.	1633	0.23	10.3	7.17	2,501.2	27.88	14.52	0.13	73.4	–
17.	Collected Samples (VOCs) @ 1635.									
18.	Post Purge DTW: 13.38 (ft-bmp).									

Sample ID: BPGP65B **SampleClarity/Color/Odor:** Clear / No Color / No odor.
Sample Time: 1635 **QAQC Samples Collected:** Ø No O Yes:
Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGB 60 **WELL DIAMETER:** 0.5
SAMPLER: JS / JR
DATE: 05/10/2018
WEATHER CONDITIONS Mostly Sunny, Winds NE 13; 65°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peristaltic Pump	**Water Quality Inst.:** In Situ
Make/Model: Geotech Easy Load II	**Make/Model:** Aqua Troll 600
Serial Number: 2647	**Serial Number:** 0074030

Tubing Type: ✓ Teflon O Poly O Other **Decontamination:** ✓ Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 13.72+0.03 = 13.75 **Total Well Depth (ft-bpm):** 22.40+0.03= 22.43 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Measurement Criteria			±0.1	±10%	±10% or 5 NTU		±10% or 0.1 mg/L	±10%	
1.	1437	Begin	purging	BPGB60						
2.	1440	0.26		6.94	1,986.6	72.86	15.42	4.88	195.8	—
3.	1443			6.99	2,154.8	62.90	14.74	3.75	196.4	—
4.	1446		2.3	7.03	2,186.2	49.97	14.50	3.42	197.4	—
5.	1449			6.90	2,198.7	46.19	14.35	3.38	206.2	—
6.	1452			6.81	2,203.3	42.94	13.95	3.37	212.6	—
7.	1455		4.7	6.77	2,223.8	40.82	13.82	3.32	216.1	—
8.	1458			6.74	2,227.4	35.53	13.68	3.38	218.1	—
9.	1501			6.74	2,241.6	34.01	13.72	3.36	219.3	—
10.	1504		7	6.73	2,246.7	31.32	13.70	3.39	220.6	—
11.	1507			6.73	2,257.4	27.32	13.75	3.36	221.5	—
12.	1510			6.73	2,244.6	26.41	13.65	3.54	222.3	—
13.	1513		11.6	6.73	2,248.6	24.11	13.53	3.61	223.0	—
14.	1516			6.73	2,260.4	19.84	13.49	3.59	223.6	—
15.	1519			6.73	2,264.1	19.59	13.44	3.61	224.0	—
16.	1522		14	6.74	2,299.7	18.99	13.45	3.50	224.5	—
17.	1525	Sample BPGP60		(VOCs)						
18.	Post purge/sampling depth to groundwater = 13.75 + 0.03 = 13.78									

Sample ID: BPGP60 **SampleClarity/Color/Odor:** Clear / Clear / NONE
Sample Time: 1525 **QAQC Samples Collected:** ✓ No O Yes:

Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP G7 **WELL DIAMETER:** 0.50"
SAMPLER: JS/JR
DATE: 5/10/18
WEATHER CONDITIONS Partly Cloudy, slight breeze, 66°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peristaltic Pump	**Water Quality Inst.:** In Situ
Make/Model: Geotech Easy Load II	**Make/Model:** Aqua Troll 600
Serial Number: 2647	**Serial Number:** 0079030

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 12.99 + 0.03 = 13.02 **Total Well Depth (ft-bpm):** 25.96 + 0.03 = 25.99 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1.	Start Purge @ 1353									
2.	1356	0.24	0.8	7.16	1,458.5	38.28	20.64	0.69	135.9	–
3.	1359	↓	1.5	7.19	1,578.6	37.20	17.62	0.22	140.9	–
4.	1402		2.3	7.21	1,590.8	38.90	17.14	0.16	147.0	–
5.	1405		3.1	7.22	1,605.8	37.84	17.09	0.14	150.1	–
6.	1408		3.8	7.24	1,606.1	36.70	16.96	0.12	153.5	–
7.	Collected samples (VOCs) @ 1410.									
8.										
9.	Post ~~Stopped~~ Purge DTW: 12.99 + 0.03 = 13.02 (ft-bmp).									
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: BPGP G7 **SampleClarity/Color/Odor:** Clear, None, No odor
Sample Time: 1410 **QAQC Samples Collected:** ☒ No ○ Yes:

Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP59 **WELL DIAMETER:** 0.50"
SAMPLER: JS / JR
DATE: 5/10/18
WEATHER CONDITIONS Partly cloudy 63°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peristaltic Pump	**Water Quality Inst.:** In Situ
Make/Model: Geotech Easy Load II	**Make/Model:** Aqua Troll 600
Serial Number: 2647	**Serial Number:** 0076030

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 13.38 + 0.03 = 13.41 **Total Well Depth (ft-bpm):** 22.34 + 0.03 = 22.37 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1.	1254	Start Purge								
1257 2.	~~1302~~	0.26	0.78	7.08	1,767.5	33.41	16.65	2.10	259.9	–
3.	1300	0.26	2.0	7.12	1,826.7	31.55	16.16	1.45	253.4	–
4.	1303	0.26	2.7	7.15	1,848.2	27.98	15.88	1.17	249.0	–
5.	1306	0.26	3.4	7.16	1,857.7	26.65	15.68	0.99	247.0	–
6.	1309	0.26	4.1	7.11	1,857.9	26.83	15.45	0.90	248.6	–
7.	1312	0.26	4.8	7.07	1,872.0	25.69	15.47	0.87	249.3	–
8.	1315	0.26	5.5	7.04	1,875.9	27.39	15.42	0.76	248.9	–
9.	1318	0.26	6.2	7.03	1,873.2	26.05	15.34	0.73	248.1	–
10.	1321	0.26	6.9	7.03	1877.5	26.33	15.36	0.71	247.7	–
11.	Collected samples (VOCs, EPH/VPH, Metals, and MNA)									
12.	@ 1320.									
13.										
14.	Post Purge DTW; 13.38 + 0.03 = 13.41 (ft-bmp).									
15.										
16.										
17.										
18.										

Sample ID: BPGP59 **SampleClarity/Color/Odor:** Clear, None, No odor.
Sample Time: 1320 **QAQC Samples Collected:** ☒ No ○ Yes:
Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP53 **WELL DIAMETER:** 0.50
SAMPLER: JS/JR
DATE: 05/10/2018
WEATHER CONDITIONS Cloudy, 60°F, Winds ~ 22mph

Sampling Device:	Peristaltic Pump	**Water Quality Inst.:**	In Situ
Make/Model:	Geotech Easy Load II	**Make/Model:**	Aqua Troll 600
Serial Number:	2647	**Serial Number:**	0074030

Tubing Type: ⊙ Teflon O Poly O Other **Decontamination:** ⊙ Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 13.58 + 0.03 = 13.61 **Total Well Depth (ft-bpm):** 27.28 + 0.03 = 27.31 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.1	±3%	±10% or 5 NTU		±10% or 0.2 mg/L	±20	
1. 1107	Begin purging BPGP53								
2. 1110	0.23		7.19	2,326.2	11.16	13.91	1.50	269.1	—
1113			7.20	2,392.4	3.78	13.37	0.94	264.0	—
4. 1116		2	7.21	2,410.7	2.78	13.25	0.77	259.2	—
5. 1119			7.21	2,415.8	2.20	13.11	0.71	252.3	—
6. 1122			7.22	2,425.7	2.11	13.06	0.66	246.4	—
7. 1125		4.2	7.22	2,425.4	1.39	13.03	0.64	243.8	—
8. 1128			7.22	2429.0	2.83	13.11	0.63	240.3	—
9. 1130	Sample BPGP53 (VOCs)								
10.	Post purging/sampling depth to groundwater					= 13.59	+ 0.03 =	13.62	
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP53 **SampleClarity/Color/Odor:** Clear / Clear / None
Sample Time: 1130 **QAQC Samples Collected:** ⊗ No O Yes:
Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP87 **WELL DIAMETER:** 0.75"
SAMPLER: JS / JR
DATE: 5/10/18
WEATHER CONDITIONS Mostly Cloudy 61°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peristaltic Pump	**Water Quality Inst.:** In Situ
Make/Model: Geotech Easy Load II	**Make/Model:** Aqua Troll 600
Serial Number: 2641	**Serial Number:** 0074030

Tubing Type: Ø Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 13.80 + 0.03 = 13.83 **Total Well Depth (ft-bpm):** 21.73 + 0.03 = 21.76 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria									
1.	1025	Start Purge								
2.	1027	0.24	0.72	7.14	2,018.9	1.51	13.22	3.36	271.3	—
3.	1030	0.24	1.44	7.16	2,126.9	1.26	12.85	2.98	263.3	—
4.	1033	0.29	2.16	7.16	2,151.1	0.94	12.82	2.86	248.6	—
5.	1036	0.24	2.88	7.17	2,150.9	0.72	12.79	2.88	244.9	—
6.	Collected Samples (VOCs) @ 1038									
7.										
8.	Post Purge DTW: 13.18 + 0.03 = 13.21 (ft-bmp)									
9.										
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: BPGP87 **SampleClarity/Color/Odor:** Clear, None, No odor
Sample Time: 1038 **QAQC Samples Collected:** Ø No O Yes:

Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP-63 **WELL DIAMETER:** 2"
SAMPLER: B. Schiele, S. Trahan
DATE: 5/11/16
WEATHER CONDITIONS cloudy, 45°, 5-7 mph SW

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Bladder Pump	**Water Quality Inst.:** In Situ
Make/Model: QED Sample Pro	**Make/Model:** Aqua Troll 600
Serial Number:	**Serial Number:** 509271

Tubing Type: X Teflon O Poly O Other **Decontamination:** X Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 14.23 **Total Well Depth (ft-bpm):** 19.97 **Depth to Pump Inlet(ft-bmp):** 17'

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1.	1902	0.35	—	8.47	1355	407	12.86	0.80	-58	14.28
2.	1905	0.35	1.05	7.78	1360	230	13.37	0.42	-26	14.28
3.	1908	0.35	2.10	7.55	1369	138	13.60	0.27	-15	14.28
4.	1911	0.35	3.15	7.51	1368	94	13.66	0.26	-7	14.28
5.	1914	0.35	4.20	7.48	1366	48	13.66	0.24	-0.5	14.28
6.	1917	0.35	5.25	7.46	1368	50	13.66	0.23	2.1	14.28
7.	1920	0.35	6.30	7.45	1372	32	13.76	0.18	6.1	14.28
8.	1923	0.35	7.35	7.46	1372	17	13.81	0.16	9.7	14.28
9.	1927	0.35	8.40	7.45	1373	18	13.85	0.17	11.5	14.28
10.	1930	0.35	9.45	7.42	1372	17	13.82	0.17	13.1	14.28
11.	1933	0.35	10.50	7.44	1368	17	13.81	0.17	14.6	14.28
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: BPGP-63 **SampleClarity/Color/Odor:** light brown
Sample Time: 1935 **QAQC Samples Collected:** X No O Yes:
Comments: VOC's 10.6

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-126 **WELL DIAMETER:**
SAMPLER(S): ST
DATE: 5/11/18

WEATHER CONDITIONS: Overcast, 46°F 10mph N

Sampling Device:	Bladder pump	**Water Quality Inst.:**	In Situ Aqua Troll
Make/Model:		**Make/Model:**	
Serial Number:		**Serial Number:**	

Tubing Type: ⊖ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 32.73 **Total Well Depth (ft-bpm):** 36.05 **Depth to Pump Inlet(ft-bmp):** _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTUs	–	±10% or less than 0.2 mg/L	–	–
1. 1830	Begin purge								
2. 1841	<0.1		11.68	4423	14.02	12.90	4.96	-120.0	unk, H_2O too shallow
3. 1843	<0.1		11.67	4410	22.66	12.77	5.04	-270.3	
4. 1844	well purged dry. approx 700 ml purged. no sample collected.								
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: **SampleClarity/Color/Odor:**

Sample Time: **QAQC Samples Collected:** O No O Yes: **If yes, QAQC IDs** _____

Analytical methods requested on COC:

Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGW-01 **WELL DIAMETER:** 2"
SAMPLER: B. Schreve
DATE: 5/11/18
WEATHER CONDITIONS cloudy, 50°, 5-10 mph SW

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Bladder Pump
Make/Model: QED Sample Pro
Serial Number:

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 509271

Tubing Type: Ø ~~Teflon~~ O Poly O Other **Decontamination:** Ø ~~Decontaminated~~ Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 13.42 **Total Well Depth (ft-bpm):** 18.95 **Depth to Pump Inlet(ft-bmp):** 16'

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±.05	±3%	Greater than 10 NTUs		±10% or 0.2mg/L	±10	
1. 1752	0.35	—	7.01	3993	270	11.53	1.01	42	13.46
2. 1755	0.35	1.05	7.00	4011	284	11.40	0.76	42	13.46
3. 1758	0.35	2.10	7.00	3997	250	11.40	0.73	41	13.46
4. 1801	0.35	3.15	7.01	3936	190	11.37	0.64	40	13.46
5. 1804	0.35	4.20	7.02	3851	138	11.37	0.54	39	13.47
6. 1807	0.35	5.25	7.02	3815	103	11.37	0.51	37	13.47
7. 1810	0.35	6.30	7.02	3771	75	11.37	0.50	36	13.47
8. 1813	0.35	7.35	7.03	3756	76	11.35	0.48	35	13.47
9. 1816	0.35	8.40	7.03	3729	46	11.35	0.46	34	13.47
10. 1819	0.35	9.45	7.03	3708	38	11.35	0.46	33	13.47
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGW-01 **SampleClarity/Color/Odor:** high turbidity, brown
Sample Time: 1820 **QAQC Samples Collected:** ~~O~~ No O Yes:
Comments: VOCs 9.3 2 brown

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-103 **WELL DIAMETER:** 2"
SAMPLER: B. Schiche
DATE: 5/11/18
WEATHER CONDITIONS Cloudy, 50°, 5mph SW

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Bladder Pump
Make/Model: QED Sample Pro
Serial Number:

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 509221

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** ⊗ Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 10.67' **Total Well Depth (ft-bpm):** 24.00 **Depth to Pump Inlet(ft-bmp):** 21.5'

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.1	±3%	±10% or last reading if < 10 NTU's		±10% or last reading if < 0.2 mg/L	±10mV	
1. 1612	0.325	—	7.62	25.61	212	11.51	7.56	-1.3	10.71
2. 1617	0.325	~~0.975~~ 1.6	7.06	3503	810	11.50	0.36	-6.7	10.71
1622	0.325	~~1.625~~ 1.95	7.06	3505	516	11.49	0.25	-7.9	10.65
4. 1627	0.325	~~2.275~~ 2.925	7.05	3501	424	11.50	0.22	-20	10.65
5. 1632	0.325	~~3.9~~ 3.645	7.05	3502	228	11.51	0.18	-24	10.71
6. 1637	0.325	8.05	7.05	3502	204	11.51	0.15	-27	10.71
7. 1642	0.325	9.65	7.05	3503	158	11.51	0.14	-30	10.71
8. 1647	0.325	11.25	7.05	3503	114	11.53	0.14	-32	10.71
9. 1652	0.325	12.85	7.05	3503	84	11.49	0.14	-33	10.71
10. 1657	0.325	14.45	7.05	3504	80	11.48	0.13	-34	10.71
11. 1702	0.325	16.05	7.05	3504	72	11.49	0.11	-36	10.71
12. ~~1707~~	~~0.325~~	~~17.65~~	BS						
13.									
14.									
15.									
16.									
17.									
8.									

Sample ID: MW-103 **SampleClarity/Color/Odor:**
Sample Time: 1705 **QAQC Samples Collected:** ⊗ No O Yes:
Comments: VOC'S/SVOC'S, EPH/VPH, Metals

Page ____ of ____

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Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: SMW-12 **WELL DIAMETER:**
SAMPLER: B. Schiche, S. Trahan
DATE: 5/11/18
WEATHER CONDITIONS Cloudy, 50°, 5-10 mph SW

Sampling Device: Bladder Pump
Make/Model: QED Sample Pro
Serial Number:

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 509271

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ☒ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 13.31' **Total Well Depth (ft-bpm):** 20.53 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria			±0.1	±10%	10% or greater than 10 NTUs		10% or greater than 0.3 mg/L	±10	
1.	1512	0.35	—	7.24	1958	73	12.85	2.42	-176	13.34'
2.	1515	0.35	1.05	7.16	2110	306	11.96	0.79	-162	13.34
	1518	0.35	2.10	7.15	1995	287	11.65	1.59	-139	13.34
4.	1521	0.35	3.15	7.13	1790	217	11.43	3.16	-114	13.34
5.	1524	0.35	4.20	7.14	1636	239	11.13	5.11	-92	13.83
6.	1527	0.35	5.25	7.14	1600	311	10.98	6.01	-77	13.69
7.	1530	0.35	6.30	7.14	1528	149	10.85	6.62	-65	13.69
8.	1533	0.35	7.35	7.15	1548	152	10.78	6.35	-54	13.69
9.	1536	0.35	8.40	7.15	1554	200	10.77	6.27	-43	13.94
10.	1539	0.275	9.2	7.15	1549	139	10.77	6.22	-34	13.95
11.	1542	0.225	10	7.15	1544	131	10.75	6.16	-23	13.95
12.	1545	0.225	10.8	7.15	1574	154	10.74	5.87	-15	13.95
13.	1548	0.275	11.6	7.15	1608	118	10.77	5.52	-9.2	13.95
14.	1551	0.275	12.4	7.15	1653	100	10.83	5.07	-5.1	13.95
15.	1554	0.275	13.2	7.15	1687	151	10.87	4.77	-2.4	13.95
16.										
17.										
18.										

Sample ID: SMW-12 **SampleClarity/Color/Odor:**
Sample Time: 1556 **QAQC Samples Collected:** ○ No ○ Yes:

Comments: Three well volumes purged. VOC'S.

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: ~~SMW-72~~ EMW-09 **WELL DIAMETER:**
SAMPLER: B. Schiche, S. Trahan
DATE: 5/11/18
WEATHER CONDITIONS Cloudy, 50°, 5mph SE

Sampling Device: Bladder Pump	**Water Quality Inst.:** In Situ
Make/Model: QED Sample Pro	**Make/Model:** Aqua Troll 600
Serial Number: 10154	**Serial Number:** 509221

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ☒ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 11.28 **Total Well Depth (ft-bpm):** 22.95 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria			±0.1	±3%	±10% or Sections 10 NTUs		±10% or Sections 0.1 mg/L	±10	
1.	1253	0.3	—	7.36	2682	323	11.75	1.10	-170	11.27
2.	1256	0.3	0.9	7.36	2685	307	11.49	0.26	-193	11.27
3.	1259	0.3	1.8	7.36	2680	286	11.36	0.19	-202	11.27
4.	1302	0.3	2.7	7.36	2620	191	11.25	0.18	-207	11.27
5.	1305	0.3	3.6	7.37	2552	108	10.96	0.17	-213	11.30
6.	1308	0.3	4.5	7.38	2539	54	10.79	0.14	-218	11.30
7.	1311	0.3	3.4	7.38	2535	19.54	10.74	0.13	-223	11.30
8.	1314	0.3	4.3	7.39	2531	25.04	10.64	0.13	-228	11.30
9.	1317	0.3	5.2	7.39	2530	26.20	10.65	0.13	-229	11.30
10.	1320	0.3	6.1	7.39	2529	15.96	10.60	0.12	-232	11.30
11.	1323	0.3	7.0	7.39	2582	10.76	10.61	0.12	-234	11.30
12.	1326	0.3	7.9	7.39	2525	6.79	10.57	0.10	-236	11.30
13.	1329	0.3	8.8	7.40	2532	2.86	10.59	0.10	-238	11.30
14.	1332	0.3	9.7	7.39	2535	5.58	10.61	0.09	-239	11.30
15.										
16.										
17.										
18.										

Sample ID: ~~SMW-72~~ EMW-09 **SampleClarity/Color/Odor:** Hydrocarbon odor, clear
Sample Time: 1332 **QAQC Samples Collected:** ☒ No ○ Yes:
Comments: VOC'S

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGW-04 **WELL DIAMETER:** 2"
SAMPLER: B. Schicke, S. Trahan
DATE: 5/11/18
WEATHER CONDITIONS Cloudy, 55°, 5 mph SE

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Bladder Pump
Make/Model: QED Sample Pro
Serial Number:

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 509271

Tubing Type: ~~O~~ Teflon O Poly O Other **Decontamination:** ~~O~~ Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 11.37 **Total Well Depth (ft-bpm):** 20.40 **Depth to Pump Inlet(ft-bmp):** 18.00'

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria									
1.	1210	0.35	—	7.38	2947	65.92	11.94	3.89	211	11.46
2.	1213	0.35	1.05	7.32	2952	60	11.42	2.84	212	11.46
3.	1216	0.35	2.10	7.32	2891	44	11.27	2.81	213	11.46
4.	1219	0.35	3.15	7.31	2831	25	11.14	3.10	213	11.46
5.	1222	0.35	4.20	7.30	2845	16	10.98	3.30	213	11.49
6.	1225	0.35	5.25	7.30	2881	7.15	10.92	3.36	213	11.49
7.	1228	0.35	6.30	7.30	2909	5.49	10.87	3.40	213	11.49
8.	1231	0.35	7.35	7.30	2940	3.50	10.83	3.42	213	11.49
9.										
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: BPGW-04 **SampleClarity/Color/Odor:**
Sample Time: 1235 **QAQC Samples Collected:** ~~O~~ No O Yes:
Comments: VOC'S

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-122 **WELL DIAMETER:** 2"
SAMPLER: B Schiche, S. Trahan
DATE: 5/11/18
WEATHER CONDITIONS cloudy, 55°, 5-10 SE

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Bladder Pump	**Water Quality Inst.:** In Situ
Make/Model: QED Sample Pro	**Make/Model:** Aqua Troll 600
Serial Number:	**Serial Number:** 509221

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ☒ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 11.19' **Total Well Depth (ft-bpm):** 22.97 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1. 1028	.3	—	7.34	3574	400	12.62	3.50	222	11.17
2. 1036	.3	0.9	7.06	4958	4019	10.80	0.35	221	11.17
3. 1039	.3	1.8	7.06	4960	3517	10.51	0.61	218	11.16
4. 1042	.3	2.7	7.07	4963	2997	10.44	1.71	216	11.16
5. 1045	.3	3.6	7.08	4936	2627	10.38	2.18	215	11.16
6. 1048	.3	4.5	7.07	4921	2064	10.39	2.09	214	11.16
7. 1051	.3	5.4	7.08	4882	1432	10.33	2.46	213	11.16
8. 1054	.3	6.3	7.08	4869	1136	10.32	2.32	212	11.16
9. 1057	.3	7.2	7.07	4863	934	10.30	2.14	209	11.14
10. 1100	.3	8.1	7.08	4855	644	10.26	2.28	208	11.14
11. 1103	.3	9.0	7.08	4853	477	10.24	2.23	205	11.14
12. 1106	.3	9.9	7.08	4864	384	10.25	2.10	201	11.14
13. 1109	.3	10.8	7.08	4848	344	10.26	2.14	200	11.14
14. 1112	.3	~~11.7~~	~~7.08~~					→	NR
15. 1115	.3	12.6	7.08	4850	306	10.27	2.31	196	11.15
16. 1118	.3	13.5	7.08	4843	291	10.28	2.52	194	11.15
17. 1121	.3	~~14.4~~						→	NR
18. 1124	.3	14.4	7.08	4840	270	10.44	2.95	192	11.15

Sample ID: MW-122 **SampleClarity/Color/Odor:**
Sample Time: 1135 **QAQC Samples Collected:** ☒ No ○ Yes:
Comments: NR - Not Recorded, VOC'S/SVOC'S, EPH/VPH, Metals

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-122 **WELL DIAMETER:**
SAMPLER:
DATE:
WEATHER CONDITIONS

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	**Water Quality Inst.:** In Situ
Make/Model:	**Make/Model:** Aqua Troll 600
Serial Number:	**Serial Number:**

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): _____ **Total Well Depth (ft-bpm):** _____ **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria			±0.1	±5%	±10 NTU or ±10%		±0.2 mg/L or ±10%	±10	
1.	1127	.3	15.3	7.09	4826	255	10.32	3.29	191	11.15
2.	1130	.3	16.2	7.09	4836	226	10.32	3.19	189	11.15
3.										
4.										
5.										
6.										
7.										
8.										
9.										
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: MW-122 **SampleClarity/Color/Odor:**
Sample Time: 1135 **QAQC Samples Collected:** O No O Yes:
Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: PEP-07 **WELL DIAMETER:** 2"
SAMPLER: B. Schiche
DATE: 5/11/18
WEATHER CONDITIONS Cloudy, 55°, 5-10 mph S.

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Bladder Pump
Make/Model: QED Sample Pro
Serial Number:

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 509271

Tubing Type: ☒ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 10.81 **Total Well Depth (ft-bpm):** 23.44 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.1	±3%	10NTU or ±10% if greater than 10 NTU		10% or ±0.3 mg/L if greater than 3 mg/L	±10%	
1. 0942	.35	—	7.13	3006	31.45	12.53	1.67	236.3	11.01
2. 0945	.35	1.05	7.13	3014	25.83	12.36	1.06	233	11.01
0948	.35	2.10	7.13	2993	30.74	12.27	1.02	230	11.01
4. 0951	.35	3.15	7.13	2992	32.40	12.17	1.07	228	11.23
5. 0954	.35	4.20	7.14	2991	33.02	12.12	1.17	226	11.26
6. 0957	.35	5.25	7.14	2991	30.15	12.08	1.24	224	11.34
7. 1000	.35	6.30	7.15	2994	29.24	12.07	1.24	222	11.34
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: PEP-07 **SampleClarity/Color/Odor:** Clear, low turbidity,
Sample Time: 1000 **QAQC Samples Collected:** O No ☒ Yes: 20180511-A
Comments: Soft well bottom VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.:	BPGP 76
WELL DIAMETER:	0.50
SAMPLER:	JR
DATE:	05/11/2018
WEATHER CONDITIONS	cloudy, Wind: NE @ 16mph; 46°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Peristaltic Pump	Water Quality Inst.:	In Situ
Make/Model:	Geotech Easy Load II	Make/Model:	Aqua Troll 600
Serial Number:	2493	Serial Number:	513586

Tubing Type: ✓ Teflon O Poly O Other **Decontamination:** ✓ Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 12.58+0.03 = 12.61 **Total Well Depth (ft-bpm):** 21.58 +0.03 = 21.61 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	STABILIZATION CRITERIA			±0.1	±3%	10 NTUs or three readings ±10%		10 mg/L or three readings ±10%	±10	
1.	1708	Begin	purging	BPGP76						
2.	1711	0.13		7.32	1,246.7	92.82	11.38	4.90	195.9	—
3.	1714			7.31	1,089.0	17.82	11.18	5.18	196.0	—
4.	1717			7.32	1,091.1	4.14	11.02	5.10	68.49	—
5.	1720			7.32	1,089.0	2.13	11.02	5.07	68.14	—
6.	1723		2.1	7.32	1,088.0	2.16	11.05	5.08	68.15	—
7.	1725	Sample	BPGP76	(VOCs)						
8.	Post	purge &	sampling	depth to	groundwater	=	12.61 +	0.03 =	12.64	
9.										
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: BPGP 76 **SampleClarity/Color/Odor:** clear / clear / none

Sample Time: 1725 **QAQC Samples Collected:** ✓ No O Yes:

Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.: BPGP 51B	WELL DIAMETER: 0.50
SAMPLER:	JR
DATE:	05/11/2018
WEATHER CONDITIONS	Cloudy ; winds NEC 14mph ; 49°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Peristaltic Pump	Water Quality Inst.:	In Situ
Make/Model:	Geotech Easy Load II	Make/Model:	Aqua Troll 600
Serial Number:	2493	Serial Number:	513584

Tubing Type: ✓ Teflon O Poly O Other **Decontamination:** ✓ Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.63 +0.03 = 13.66 **Total Well Depth (ft-bpm):** 27.60 +0.03 = 27.63 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1.	1606	Begin	purging	BPGP	51B					
2.	1609	0.13		7.31	1,404.0	0.96	13.38	0.87	146.8	—
3.	1612			7.33	1,399.0	1.12	13.44	0.65	154.2	—
4.	1615			7.34	1,391.3	0.98	13.47	0.52	158.6	—
5.	1618			7.34	1,387.6	1.14	13.59	0.43	156.9	—
6.	1621			7.34	1,385.4	0.96	13.65	0.36	157.4	—
7.	1624			7.34	1,382.3	0.91	13.71	0.31	156.9	—
8.	1627		3.3	7.35	1,379.1	0.89	13.74	0.30	154.3	—
9.	1630	Sample	BPGP	51B	(VOCs)					
10.	Post	purge &	sampling	depth to	groundwater	= 13.67	+0.03	= 13.70 (ft	-bmp)	
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID:	BPGP51B	SampleClarity/Color/Odor:	Clear / Clear / None
Sample Time:	1630	QAQC Samples Collected:	✓ No O Yes:

Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP46 **WELL DIAMETER:** 0.5
SAMPLER: JS / JR
DATE: 05/11/2018
WEATHER CONDITIONS Cloudy, winds NE @ 14-ph, 48°F

Sampling Device: Peristaltic Pump
Make/Model: Geotech Easy Load II
Serial Number: 2493

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 513586

Tubing Type: ☑ Teflon ○ Poly ○ Other **Decontamination:** ☑ Decontaminated Water Meter ☑ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 13.54 +0.03=13.57 **Total Well Depth (ft-bpm):** 21.55 +0.03= 21.58 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria									
1.	1510	Begin	purging	BPGP46						
2.	1513	0.16		7.20	1,659.3	1.06	13.79	0.63	190.0	—
3.	1516			7.22	1,654.6	0.88	14.02	0.32	162.0	—
4.	1519			7.22	1,648.5	1.81	14.09	0.23	143.6	—
5.	1522			7.23	1,640.7	1.23	14.12	0.18	135.4	—
6.	1525		3.5	7.23	1,632.5	2.26	14.15	0.16	133.2	—
7.	1528	Sample	BPGP46 (VOC's, EPH, VPH, Metals)							
8.	Post	purging/sampling depth to groundwater = 13.54 +0.03 = 13.57 (ft-bmp)								
9.										
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: BPGP46 **SampleClarity/Color/Odor:** Clear / Clear / None
Sample Time: 1528 **QAQC Samples Collected:** ☑ No ○ Yes:
Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP74 **WELL DIAMETER:** 0.5"
SAMPLER: JS
DATE: 5/11/18
WEATHER CONDITIONS Cloudy 45°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peri Pump	**Water Quality Inst.:** In Situ
Make/Model: Geotech Easy Load II	**Make/Model:** Aqua Troll 600
Serial Number: 2647	**Serial Number:** 465699

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ☒ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 12.88 + 0.03 = 12.92 **Total Well Depth (ft-bpm):** 21.74 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.1	±3%	10% or last > 5 NTU		10% or last > 0.2 mg/L	±10	
1. 1703	Start Purge								
2. 1706	0.12	0.35	7.26	1,510.2	28.64	11.87	0.84	36.4	–
3. 1709	0.12	0.70	7.31	1,382.0	9.27	11.96	0.58	37.4	–
4. 1712	0.12	1.10	7.34	1,323.6	5.84	12.01	0.37	38.5	–
5. 1715	0.12	1.50	7.35	1,303.7	7.21	12.03	0.28	38.4	–
6. 1718	0.12	1.90	7.36	1,288.9	8.02	11.97	0.23	37.6	–
7. 1721	0.12	2.30	7.36	1,232.2	4.59	12.01	0.20	36.9	–
8. 1723	0.12	2.70	7.36	1,287.3	2.27	12.10	0.20	36.2	–
9. Collected samples (VOCs) @ 1725.									
10. Post Purge DTW: 12.88 + 0.03 = 12.91									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP74 **SampleClarity/Color/Odor:** Clear / No color / No odor
Sample Time: 1725 **QAQC Samples Collected:** ☒ No ○ Yes:
Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP51 **WELL DIAMETER:** 0.5"
SAMPLER: JJ
DATE: 5/11/18
WEATHER CONDITIONS Cloudy, 48°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peri Pump	**Water Quality Inst.:** In Situ
Make/Model: Geotech Easy Load II	**Make/Model:** Aqua Troll 600
Serial Number: 2647	**Serial Number:** 465699

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ☒ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 13.63+0.03 = 13.66 **Total Well Depth (ft-bpm):** ~~21.0~~ 21.90+0.03 = 21.93 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1.	1557	Start Purge								
2.	1600 ~~1540~~	0.10	0.3	7.34	1,702.3	1.57	12.54	1.34	2.4	–
3.	1603 ~~1543~~	0.10	0.6	7.35	1,679.9	1.36	12.60	1.20	8.5	–
4.	1606	0.10	0.9	7.36	1,665.1	0.79	12.58	1.10	12.1	–
5.	1609	0.10	1.2	7.37	1,669.4	0.86	12.59	1.04	15.9	–
6.	1612	0.10	1.5	7.37	1,669.7	0.67	12.56	0.96	19.3	–
7.	1615	0.10	1.8	7.37	1,663.1	0.59	12.60	0.94	21.3	–
8.	1618	0.10	2.1	7.37	1,677.4	1.06	12.59	0.92	21.9	–
9.	1621	0.10	2.4	7.38	1,676.7	1.04	12.62	0.92	24.2	–
10.	1624	0.10	3.2	7.38	1,681.2	1.29	12.63	0.92	24.8	–
11.	1627	0.10	3.7	7.37	1,676.5	0.66	12.65	0.89	25.9	–
12.	Collected samples (VOCs) @ 1628.									
13.	Post purge DTW: 13.63+0.03 = 13.66									
14.										
15.										
16.										
17.										
18.										

Sample ID: BPGP51 **SampleClarity/Color/Odor:** Clear, None, No odor,
Sample Time: 1628 **QAQC Samples Collected:** ☒ No ○ Yes:
Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP46B **WELL DIAMETER:** 0.5"
SAMPLER: JS / JR
DATE: 5/1/18
WEATHER CONDITIONS Cloudy, 48°F

Sampling Device: Peri Pump	**Water Quality Inst.:** In Situ
Make/Model: Geotech Easy Load II	**Make/Model:** Aqua Troll 600
Serial Number: 2647	**Serial Number:** 465699

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** ⊗ Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 13.51 + 0.03 = 13.54 **Total Well Depth (ft-bpm):** 34.72 + 0.03 = 34.75 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1.	1453	Start Purge								
2.	1457	0.16	0.75	7.26	3,249.6	14.96	14.20	0.92	-24.9	–
3.	1500	0.10	1.25	7.25	3,108.8	6.41	14.05	0.85	-22.2	–
4.	1503	0.10	1.40	7.27	3,044.9	3.57	14.02	0.76	-22.2	–
5.	1506	0.10	1.55	7.30	3,163.2	3.53	14.04	0.60	-22.1	
6.	1509	0.10	1.70	7.30	3067.1	0.99	14.03	0.52	-21.5	–
7.	1512	0.10	1.85	7.30	3,085.9	0.75	14.09	0.48	-20.6	–
8.	1515	0.10	2.0	7.30	3,078.8	0.72	14.02	0.37	-18.8	–
9.	1518	0.10	2.15	7.29	3,080.5	0.62	13.95	0.38	-18.9	–
10.	1521	0.10	2.3	7.30	3,088.2	0.53	13.93	0.39	-18.7	–
11.	Samples collected (VOCs) @ 1522									
12.	Post Purge DTW: 18.94 + 0.03 = 18.97									
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: BPGP46B **SampleClarity/Color/Odor:**
Sample Time: 1522 **QAQC Samples Collected:** Ø No O Yes:
Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP61 **WELL DIAMETER:** 0.5"
SAMPLER: JS
DATE: 5/11/18
WEATHER CONDITIONS Cloudy

Sampling Device: Peri Pump	**Water Quality Inst.:** In Situ
Make/Model: Geotech Easy Load II	**Make/Model:** Aqua Troll 600
Serial Number: 2647	**Serial Number:** 465699

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ☒ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 13.82 + 0.03 = 13.85 **Total Well Depth (ft-bpm):** 22.18 + 0.03 = 22.21 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1. 1413	Start Purge								
2. 1416	0.2	0.6	6.87	2.36	0.72	14.59	9.06	225.6	-
3. 1419	0.2	1.2	6.87	2.37	0.70	14.60	9.05	225.5	-
4. 1421	0.2	1.8	6.86	2.42	0.67	14.55	9.06	225.5	-
5. 1424	0.2	2.4	6.85	2.47	0.76	14.50	9.07	225.5	-
6. Collected Samples (VOCs) @ 1425. Also collected an MS/MSD									
7. Post purge DTW: 14.78									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP61 **SampleClarity/Color/Odor:** Clear / None / Slight HC odor.
Sample Time: 1425 **QAQC Samples Collected:** ○ No ☒ Yes:
Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP 78 **WELL DIAMETER:** 0.75"
SAMPLER: JS / JR
DATE: 5/11/18
WEATHER CONDITIONS Cloudy, 48°F

Sampling Device: Peri Pump	**Water Quality Inst.:** In Situ
Make/Model: Geotech Easy Load II	**Make/Model:** Aqua Troll 600
Serial Number: 2647	**Serial Number:** 465699

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ☒ Decontaminated Water Meter ☒ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 12.88 + 0.03 = 12.91 **Total Well Depth (ft-bpm):** 22.15 + 0.03 = 12.18 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1. 1003	Start Purge								
2. 1006	.21	0.6	7.0	2,482.1	25.63	12.32	2.11	85.1	–
3. 1009		1.2	7.04	2,558.1	13.89	12.27	1.60	49.3	–
4. 1012		1.8	7.05	2,576.4	4.98	12.18	1.40	29.1	–
5. 1015		2.4	7.06	2,599.8	4.45	12.12	~~1.26~~ 1.26	12.6	–
6. 1018		3.0	7.07	2,627.5	3.69	12.10	1.21	1.0	–
7. 1021		3.6	7.07	2,657.0	1.84	12.09	1.17	-8.9	–
8. 1024		4.2	7.07	2,678.0	3.57	12.10	1.13	-14.8	–
9. 1027		5.4	7.08	2,701.7	1.15	12.12	1.12	-20.7	–
10. 1030		6.2	7.08	2,720.9	1.62	12.14	1.10	-26.6	–
11. 1033		7.0	7.08	2,733.7	1.02	12.13	1.11	-28.7	–
12. 1036		7.8	7.08	2,745.3	0.68	12.13	1.10	-29.3	–
13. 1039		8.6	7.08	2,751.1	1.16	12.13	1.10	-33.0	–
14. 1042		9.4	7.08	2,771.2	0.80	12.09	1.09	-39.8	–
15. 1045		10.2	7.08	2,782.3	0.85	12.09	1.10	-41.8	–
16. 1048		11.0	7.08	2,788.5	3.52	12.12	1.09	-43.7	–
17. Collected Samples (VOCs, EPH/VPH, SVOCs, and MNA) @ 1050									
18. Post purging & sampling depth to water = 12.92 + 0.03 = 12.95									

Sample ID: BPGP78 **SampleClarity/Color/Odor:** clear / clear / slight odor
Sample Time: 1050 **QAQC Samples Collected:** ☒ No ○ Yes:

Comments: Well cap was not on at arrive, looks like debris might have been going into the well.

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP02 **WELL DIAMETER:** 0.5
SAMPLER: JS / JR
DATE: 05/11/2018
WEATHER CONDITIONS Cloudy

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Peristaltic Pump	**Water Quality Inst.:**	In Situ
Make/Model:	Geotech Easy Load II	**Make/Model:**	Aqua Troll 600
Serial Number:	2647	**Serial Number:**	465699

Tubing Type: ⊙ Teflon O Poly O Other **Decontamination:** ⊙ Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 11.61 + 0.03 = 11.64 **Total Well Depth (ft-bpm):** 19.98 + 0.03 = 20.01 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria									
1. 1142	Begin	purging	BPGP02						
2. 1145	0.22		6.93	2,434.2	1.29	11.98	0.92	11.75	—
3. 1148			6.94	2,460.5	0.53	11.82	0.56	-76.5	—
4. 1151		2.2	6.95	2,462.8	0.39	11.72	0.44	-89.8	—
5. 1154			6.96	2,462.1	0.37	11.67	0.39	-95.1	—
6. 1157			6.96	2,468.2	0.37	11.63	0.37	-99.2	—
7. 1200		4.4	6.96	2,473.7	0.52	11.61	0.35	-102.5	
8. 1203	Sample BPGP02 (VOCs, ~~SVOCs~~, EPH/VPH, MNA).								
9.									
10. Post purge DTW:			1.63 + 0.03 = 1.66						
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP02 **SampleClarity/Color/Odor:** Clear, None, HC odor
Sample Time: 1203 **QAQC Samples Collected:** ⊗ No O Yes:
Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.:	BP6P49
WELL DIAMETER:	0.50
SAMPLER:	JR
DATE:	05/11/2018
WEATHER CONDITIONS	cloudy, winds NE @ 14 mph, 50°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Peristaltic Pump	Water Quality Inst.:	In Situ
Make/Model:	Geotech Easy Load II	Make/Model:	Aqua Troll 600
Serial Number:	2647	Serial Number:	465699

Tubing Type: ☑ Teflon ○ Poly ○ Other **Decontamination:** ☑ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.55+0.03=13.58 Total Well Depth (ft-bpm): 21.59+0.03=21.62 Depth to Pump Inlet(ft-bmp):

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria									
1.	1342	Begin	purging	BP6P49						
2.	1345	0.26		7.12	2,403.2	9.56 ~~13.04~~	13.04	2.03	25.1	—
3.	1348		1.5	7.13	2,352.6	11.99	13.12	1.56	30.5	—
4.	1351			7.14	2,318.5	7.24	13.09	1.31	33.9	—
5.	1354		3.1	7.14	2,299.0	7.01	13.10	1.19	35.4	—
6.	1357			7.15	2,282.7	1.39	13.12	1.09	36.6	—
7.	1400	45	~~4.4~~	7.15	2,267.8	3.30	13.10	1.02	37.9	—
8.	1403	sampled	BP6P49 (VOCs)							
9.	Post	purging &	sampling	depth	to groundwater=		13.55+0.03=13.58			
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID:	BP6P49	SampleClarity/Color/Odor:	Clear / Clear / hydrocarbon odor
Sample Time:	1403	QAQC Samples Collected:	☒ No ○ Yes:

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP 65 **WELL DIAMETER:** 2
SAMPLER(S): JS / BS
DATE: 5/12/2018

WEATHER CONDITIONS: Rain, Calm, 42°F

Sampling Device:	Bladder Pump	**Water Quality Inst.:**	
Make/Model:	QED Sample Pro	**Make/Model:**	
Serial Number:	11477	**Serial Number:**	518813

Tubing Type: ☑ Teflon ○ Poly ○ Other **Decontamination:** ☑ Decontaminated Water Meter ☑ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.25 **Total Well Depth (ft-bpm):** 14.65 **Depth to Pump Inlet(ft-bmp):** _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.5	±10%	±10% or less than 10 NTUs		±10% or less than 0.2 mg/L		
1. 0740	Begin	purging	BPGP 65						
2. 0743	0.2		7.09	7,170.1	184.37	9.99	4.35	250.2	13.28
3. 0746		1.6	7.12	7,092.6	107.33	10.13	3.68	248.8	13.27
4. 0749			7.15	7,055.4	70.01	10.19	3.19	246.8	13.27
5. 0752			7.17	7,023.4	63.82	10.24	2.99	244.7	13.27
6. 0755			7.19	7,008.2	59.00	10.30	2.85	241.9	13.27
7. 0758		4.5	7.20	7,001.5	45.40	10.28	2.79	242.4	13.27
8. 0801			7.21	6,997.8	39.99	10.33	2.73	240.8	13.27
9. 0804			7.21	6,987.6	40.28	10.32	2.67	240.1	13.27
10. 0807		6.3	7.22	6,983.7	38.55	10.34	2.62	239.0	13.27
11. 0810	Sample	BPGP 65		(VOCs)					
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: BPGP 65 **SampleClarity/Color/Odor:** Clear / clear / none

Sample Time: 0810 **QAQC Samples Collected:** ☑ No ○ Yes: **If yes, QAQC IDs** _____

Analytical methods requested on COC:

Comments:

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-26 **WELL DIAMETER:** 2"
SAMPLER(S): JS / ST
DATE: 5/12/18
WEATHER CONDITIONS: Cloudy, Rain, 54°F

Sampling Device: Bladder Pump
Make/Model:
Serial Number: 10154

Water Quality Inst.:
Make/Model:
Serial Number:

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 32.64 **Total Well Depth (ft-bpm):** **Depth to Pump Inlet(ft-bmp):** 33.79

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	—	±10% or less than 0.2 mg/L	—	—
1.	Collected samples (VOC, SVOCs, VPH) @ 0834.								
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: MW-126 **SampleClarity/Color/Odor:** Cloudy / Light grey / None
Sample Time: 0834 **QAQC Samples Collected:** ☒ No O Yes: **If yes, QAQC IDs**
Analytical methods requested on COC:
Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-127 **WELL DIAMETER:** 2"
SAMPLER: ST / JS
DATE: 5/12/18
WEATHER CONDITIONS Rainy 59°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Bladder pump
Make/Model: Sample Pro
Serial Number: 10154

Water Quality Inst.: In Situ
Make/Model: Aqua Troll 600
Serial Number: 514817

Tubing Type: X Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 42.08 **Total Well Depth (ft-bpm):** 44.20 **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1	0744	Begin purge.								
2	0750	0.1	0.1	8.41	2,804.2	4,950.2	12.74	1.62	211.1	42.38
3	0753	↓	0.4	8.29	3,920.4	2,673.4	12.75	1.22	204.5	42.55
4	0756		0.7	8.15	2,930.6	2,605.0	13.02	1.59	202.3	42.49
5	0759		1.0	8.06	2,956.9	4,964.3	13.52	1.23	195.3	42.86
6	0802		1.3	8.15	2,869.4	5,619.3	13.68	1.01	191.6	—
7	0805		1.6	8.25	2,784.6	5,700.8	13.72	0.89	190.7	—
8										
9		Well was pumped dry @ 0805.								
10		Did not collect sample.								
11										
12										
13										
14										
15										
16										
17										
18										

Sample ID: MW-127 **SampleClarity/Color/Odor:**
Sample Time: **QAQC Samples Collected:** O No O Yes:
Comments:

BILLINGS PCE GROUNDWATER QA/QC SAMPLE LOG
BILLINGS, MONTANA

	QA/QC Sample Type	QA/QC Sample ID	Date	Time	Parent Sample (if duplicate)	Comments
1	Equipment Blank	20180507-B	5/7	—	—	Metals preserved w/ HNO3
2	Field Blank	20180507-A	"	—	—	Collected near solar
3	BPGP25MS/MSD	—	"	—	—	—
4	Field Dup	20180508-A	5/8	—	BPGP22	—
5	Field Blank	20180508-B	5/8	—	—	Collected near MW-123
6	Eqip. Bl.	20180508-C	↓	—	—	Bladder pump
7	Field Dup	20180509-A	5/9	—	MW-128	Full suite
8	Field blank	20180509-B	"	—	—	Collected downwind in 185,27th parking lot.
9	Eq Blank	20180509-C	"	—	—	Water level tape.
10	BPGP52MS/MSD	—	"	—	—	—
11	BMW-4MS/MSD	—	5/10	—	—	—
12	Field Dup	20180510-A	"	—	MW-121	—
13	Field Dup	20180510-B	"	—	BPGP80	—
14	Field Dup	20180510-C	"	—	MW-125	—
15	Field Blank	20180510-D	"	—	—	Collected downwind of MW-104
16	Eq. Blank	20180510-E	"	—	—	Water level tape.
17	BPGP61MS/MSD	—	5/11	—	—	—
18	Field DUP	20180511-A	"	—	PEP07	—
19	Field Blank	20180511-B	"	—	—	Collected in front of Metro Elec.
20	Eq. Blank	20180511-C	"	—	—	Water level tape
21	Field Blank	20180512-A	5/12	—	—	Solar
22	Eq Blank	20180512-B	"	—	—	Grab plate
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
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41						
42						

Decomed glove.

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.: BPGP50	WELL DIAMETER: 0.5"
SAMPLER: ST	
DATE: 5/21/18	
WEATHER CONDITIONS	Sunny 65°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Peristaltic / Bladder	Water Quality Inst.:	In Situ
Make/Model:	GeoTech GeoPump / QED Sample Pro	Make/Model:	Aqua Troll 600
Serial Number:	3204	Serial Number:	577180

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 14.29 Total Well Depth (ft-bpm):_____ Depth to Pump Inlet(ft-bmp):

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria									
1.	0819	Begin	Purge.							
2.	0823	0.225	0.8	7.01	4905	88.63	14.65	2.85	244	
3.	0826	0.225	1.4	7.04	4656	21.48	14.37	2.54	242	
4.	0829	0.225	2.0	7.05	4578	8.86	14.27	2.47	239	
5.	0832	0.225	2.6	7.06	4527	4.20	14.24	2.41	238.7	
6.	0835	0.225	3.2	7.06	4509	2.93	14.22	2.38	237.3	
7.		collect sample.								
8.										
9.										
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID:	BPGP50	SampleClarity/Color/Odor:	Clear / no odor
Sample Time:	0845	QAQC Samples Collected: O No ● Yes:	20180521-A - Blind Dup

Comments: VOCs only

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.: REGAL-I-01	WELL DIAMETER: 6
SAMPLER: ST	
DATE: 5/2V18	
WEATHER CONDITIONS	Sunny 80

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Peristaltic / Bladder	Water Quality Inst.:	In Situ
Make/Model:	GeoTech GeoPump / QED Sample Pro	Make/Model:	Aqua Troll 600
Serial Number:	3204	Serial Number:	577 180

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 15.24 **Total Well Depth (ft-bpm):**_____ **Depth to Pump Inlet(ft-bmp):**

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria									
1.	1445	Begin	Purge							
2.	1448	0.2	0.6	7.50	2090	45.05	18.23	0.45	-124.7	
3.	1451	0.2	1.2	7.56	2131	45.09	17.49	0.31	-132.5	
4.	1454	0.2	1.8	7.58	2140	51.00	16.76	0.27	-137.4	
5.	1457	0.2	2.4	7.59	2145	53.49	17.03	0.25	-140.3	
6.	1500	0.2	3.0	7.59	2145	51.11	16.92	0.23	-142.0	
7.	1503	0.2	3.6	7.59	2143	51.84	16.94	0.21	-143.8	
8.	1505	collect	sample							
9.										
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: REGAL-I-01	SampleClarity/Color/Odor:
Sample Time: 1505	QAQC Samples Collected: ⊗ No O Yes:

Comments: VOC

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.:	EMW-28
WELL DIAMETER:	4"
SAMPLER:	ST
DATE:	5/21/18
WEATHER CONDITIONS	Sunny 80°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Peristaltic / Bladder	Water Quality Inst.:	In Situ
Make/Model:	GeoTech GeoPump / QED Sample Pro	Make/Model:	Aqua Troll 600
Serial Number:	32024	Serial Number:	577 180

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 14.40 Total Well Depth (ft-bpm):_____ Depth to Pump Inlet(ft-bmp):

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.1	±3%	Change less than 10 NTU		Change less than 0.3 mg/L	±10	
1. 1639	Begin Purge								
2. 1642	0.1	–							
3. 1645	0.1	0.3	7.31	468	43.57	16.91	3.15	25.4	
4. 1648	0.1	0.6	7.30	460	40.21	15.05	3.27	35.6	
5. 1651	0.1	0.9	6.96	465	37.55	14.05	3.42	60.8	
6. 1654	0.1	1.2	6.85	467	38.13	13.73	3.67	72.3	
7. 1657	0.1	1.5	6.84	466	38.58	13.62	3.77	75.7	
8. 1700	0.1	1.8	6.84	466	41.96	13.46	3.83	78.9	
9. 1705	collect	sample.						Final	14.44
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID:	EMW-28	SampleClarity/Color/Odor:	
Sample Time:	1705	QAQC Samples Collected:	☒ No ○ Yes:

Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.:	BPGP 81
WELL DIAMETER:	~~0.5~~ 0.75"
SAMPLER:	ST
DATE:	5/21/18
WEATHER CONDITIONS	Sunny 80°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: ~~Peristaltic~~ / Bladder	Water Quality Inst.: In Situ
Make/Model: GeoTech GeoPump / QED Sample Pro	Make/Model: Aqua Troll 600
Serial Number: 3204	Serial Number: 577 180

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.64 Total Well Depth (ft-bpm):_____ Depth to Pump Inlet(ft-bmp):

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1.	1343	Begin purge.								
2.	1346	0.225	0.6	6.93	1949	23.72	14.21	2.58	100.1	
3.	1349	0.225	1.2	6.96	1948	20.58	13.33	2.57	104.4	
4.	1352	0.225	1.8	6.87	1957	16.13	12.80	2.65	112.6	
5.	1355	0.225	2.4	6.82	1967	12.01	12.38	2.71	118.1	
6.	1358	0.225	3.0	6.80	1971	9.34	12.34	2.76	121.0	
7.	1401	0.225	3.6	6.81	1977	8.38	12.26	2.81	121.7	
8.	1404	0.225	4.2	6.82	1980	6.80	12.11	2.84	123.0	
9.										
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: BPGP 81	SampleClarity/Color/Odor: Clear / no odor
Sample Time: 1410	QAQC Samples Collected: ☒ No ○ Yes:

Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.: BPGP93	WELL DIAMETER: 0.75
SAMPLER: ST	
DATE: 5/21/18	
WEATHER CONDITIONS	Sunny 80°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peristaltic / Bladder	Water Quality Inst.: In Situ
Make/Model: GeoTech GeoPump / QED Sample Pro	Make/Model: Aqua Troll 600
Serial Number: 32041	Serial Number: 577180

Tubing Type: ☒ Teflon ○ Poly ○ Other Decontamination: ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.51 Total Well Depth (ft-bpm): _____ Depth to Pump Inlet(ft-bmp):

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria									
1.	1256	Begin Purge								
2.	1259	0.2	0.6	7.05	2913	168.89	15.52	0.56	94.4	
3.	1302	0.2	1.2	7.04	2973	43.20	14.25	0.26	96.5	
4.	1305	0.2	1.8	6.98	3013	24.77	13.77	0.18	102.3	
5.	1308	0.2	2.4	6.96	3009	21.75	13.56	0.15	104.3	
6.	1311	0.2	3.0	6.94	3026	19.53	13.68	0.13	106.1	
7.	1314	0.2	3.6	6.95	3025	22.11	13.44	0.10	106.7	
8.	1317	0.2	4.2	6.96	3036	22.96	13.36	0.09	107.1	
9.	1320	Collect	Sample							
10.								Final	DTW	11.5
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: BPGP93	SampleClarity/Color/Odor: Clear / no odor
Sample Time: 1320	QAQC Samples Collected: ☒ No ○ Yes:

Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.: BPGP83	WELL DIAMETER: 0.75"
SAMPLER: ST	
DATE: 5/21/18	
WEATHER CONDITIONS	Sunny 80°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Peristaltic / Bladder	Water Quality Inst.:	In Situ
Make/Model:	GeoTech GeoPump / QED Sample Pro	Make/Model:	Aqua Troll 600
Serial Number:	3204	Serial Number:	577180

Tubing Type: Q Teflon O Poly O Other Decontamination: O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 12.28 Total Well Depth (ft-bpm):_____ Depth to Pump Inlet(ft-bmp):

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			±0.1	±3%	±10% or less than 10 NTUs		±10% or less than 10 mg/L	±10%	
1. 1209	Begin purge.								
2. 1212	0.15	0.45	7.09	1958	17.41	18.54	0.98	76.4	
3. 1215	0.15	0.9	7.08	1973	16.05	17.66	0.78	78.6	
4. 1218	0.15	1.35	7.10	1980	13.80	17.24	0.64	79.6	
5. 1221	0.15	1.80	7.10	1987	13.14	17.17	0.57	80.4	
6. 1224	0.15	2.25	7.12	1984	12.23	17.11	0.51	81.2	
7. 1227	0.15	2.70	7.12	1988	12.33	17.18	0.49	81.8	
8. 1230	0.15	3.15	7.11	1998	11.21	17.09	0.47	82.3	
9.	Collect sample								
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID:	BPGP83	SampleClarity/Color/Odor:	Clear / slight sulfur odor
Sample Time:	1235	QAQC Samples Collected:	Q No O Yes:

Comments: VOCs

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Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.:	BPG8 84
WELL DIAMETER:	0.5"
SAMPLER:	ST
DATE:	5/21/18
WEATHER CONDITIONS	Sunny 80°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Peristaltic / Bladder	Water Quality Inst.:	In Situ
Make/Model:	GeoTech GeoPump / QED Sample Pro	Make/Model:	Aqua Troll 600
Serial Number:	5204	Serial Number:	577180

Tubing Type: X Teflon O Poly O Other Decontamination: O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.09 Total Well Depth (ft-bpm):_____ Depth to Pump Inlet(ft-bmp):

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria									
1.	1115	Begin	Purge							
2.	1118	0.2	0.6							
3.	1119	0.2	0.8	7.08	2831	323.67	16.78	0.53	67.5	
4.	1122	0.2	1.4	7.09	2852	140.53	16.38	0.32	70.3	
5.	1125	0.2	2.0	7.11	2863	84.38	16.32	0.24	71.8	
6.	1128	0.2	2.6	7.10	2862	44.71	16.08	0.16	78.0	
7.	1131	0.2	3.2	7.10	2872	32.16	16.07	0.15	82.7	
8.	1134	0.2	3.8	7.11	2867	21.29	16.10	0.13	86.3	
9.	1137	0.2	4.4	7.09	2864	13.57	15.98	0.12	88.2	
10.	1140	0.2	5.0	7.09	2860	10.59	16.08	0.11	88.5	
11.	1143	0.2	5.6	7.09	2863	8.45	16.01	0.10	89.4	
12.	1146	0.2	6.2	7.10	2859	7.91	15.96	0.10	89.4	
13.	1149	0.2	6.8	7.10	2858	7.59	16.00	0.09	89.6	
14.		Collect	Sample						Final DTW	11.10
15.										
16.										
17.										
18.										

Sample ID:	BPG8 84	SampleClarity/Color/Odor:	Clear / no odor
Sample Time:	1155	QAQC Samples Collected:	X No O Yes:

Comments: VOCs.

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.:	BPGP12 WELL DIAMETER: 0.5
SAMPLER:	ST
DATE:	5/21/18
WEATHER CONDITIONS	Sunny 72°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Peristaltic / Bladder	Water Quality Inst.:	In Situ
Make/Model:	GeoTech GeoPump / QED Sample Pro	Make/Model:	Aqua Troll 600
Serial Number:	3204	Serial Number:	577140

Tubing Type: ⊗ Teflon O Poly O Other Decontamination: ⊗ Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.12 Total Well Depth (ft-bpm):_____ Depth to Pump Inlet(ft-bmp):

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria			±0.1	±3	Stabilize to 10 NTU		±0.3	±10	
1.	1030	Begin	Purge:							
2.	1033	0.25	0.75	7.09	2977	70.78	13.14	1.00	55.2	
3.	1036.	0.25	1.50	7.09	2976	19.54	12.77	0.65	60.9	
4.	1039	0.25	2.25	7.10	3001	4.99	12.63	0.52	64.1	
5.	1042	0.25	3.0	7.11	3001	2.24	12.60	0.47	66.2	
6.	1045	0.25	3.75	7.10	2999	1.63	12.40	0.45	67.7	
7.	1048	0.25	4.5	7.10	2996	1.78	12.51	0.43	68.4	
8.		Collect	Sample						Final	DTW 11.12
9.										
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID:	BPGP12	SampleClarity/Color/Odor:	Clear / no odor
Sample Time:	1050	QAQC Samples Collected:	⊗ No O Yes:

Comments: VOCs

0.0553
x 4

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.: BPGP94	WELL DIAMETER: 0.75"
SAMPLER: ST	
DATE: 5/21/14	
WEATHER CONDITIONS	Sunny 70°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peristaltic / Bladder	Water Quality Inst.: In Situ
Make/Model: GeoTech GeoPump / QED Sample Pro	Make/Model: Aqua Troll 600
Serial Number: 3204	Serial Number: 577180

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.43 Total Well Depth (ft-bpm): _____ Depth to Pump Inlet(ft-bmp):

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1	0940	Begin	purge.							
2	0943	0.25	0.75							
3	0944	0.25	1.0	7.20	2510	12.67	12.55	1.23	-72.1	
4	0947	0.25	1.75	7.21	2526	4.37	12.13	1.14	-42.5	
5	0950	0.25	2.5	7.21	2526	3.29	12.09	1.12	-26.2	
6	0953	0.25	3.25	7.21	2527	1.86	12.00	1.12	-10.0	
7	0956	0.25	4.0	7.21	2534	1.53	11.97	1.12	3.5	
8	0959	0.25	4.75	7.21	2532	1.65	11.89	1.12	13.6	
9	1002	0.25	5.5	7.21	2531	2.06	11.95	1.12	21.7	
10	1005	0.25	6.25	7.21	2539	1.65	11.94	1.12	28.5	
11	1008	0.25	7.0	7.21	2537	1.29	11.90	1.12	35.4	
12	Sample collected. More than 3 well volumes purged									
13	ORP slowly stabilizing, all other parameters stable									
14								Final	DTW	11.43
15										
16										
17										
18										

Sample ID: BPGP94	SampleClarity/Color/Odor: Clear / no odor
Sample Time: 1015	QAQC Samples Collected: ☒ No ○ Yes:

Comments: VOCs.

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: BPGP91 WELL DIAMETER: 0.75"
SAMPLER: SY
DATE: 5/21
WEATHER CONDITIONS Sunny 65°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Peristaltic / Bladder	Water Quality Inst.:	In Situ
Make/Model:	GeoTech GeoPump / QED Sample Pro	Make/Model:	Aqua Troll 600
Serial Number:	32041	Serial Number:	577180

Tubing Type: ☒ Teflon O Poly O Other Decontamination: O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 14.30 Total Well Depth (ft-bpm):_____ Depth to Pump Inlet(ft-bmp):

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria									
1	0858	Begin	purge							
2	0901	0.225	0.6	7.21	3473	4.15	13.90	0.57	-154.6	
3	0904	0.225	1.2	7.19	3591	2.25	13.40	0.29	-169.0	
4	0907	0.225	1.8	7.19	3604	2.09	13.50	0.22	-173.6	
5	0910	0.225	2.4	7.19	3628	2.23	13.41	0.21	-175.6	
6	0913	0.225	3.0	7.19	3629	1.81	13.42	0.21	-178.3	
7		collect	sample					Final	DTW	14.36
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										

Sample ID: BPGP91 SampleClarity/Color/Odor: Clear, no odor
Sample Time: 0925 QAQC Samples Collected: ☒ No O Yes:
Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-128 **WELL DIAMETER:** 2"
SAMPLER: S SEITZ
DATE: 5/22/18
WEATHER CONDITIONS Cloudy ≅ 78°F

Sampling Device:	Peristaltic / Bladder	**Water Quality Inst.:**	In Situ
Make/Model:	GeoTech GeoPump / QED Sample Pro	**Make/Model:**	Aqua Troll 600
Serial Number:	FA00261	**Serial Number:**	577180

Tubing Type: Ø Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 7.59 btoc **Total Well Depth (ft-bpm):** 23.5 ft btoc **Depth to Pump Inlet(ft-bmp):** ≅ 15 ft

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
				✓	✓	✓		✓	✓	
1	1625	200 mL/min	Ø	7.19	3370.1	203.09	18.62	2.46	237.5	7.69
2	1630	350 mL/min	≅ 2 L	7.06	3546.7	171.60	13.97	0.16	227.7	7.76
3	1635	220 mL/min	≅ 3.5 L	7.00	3561.7	187.75	14.75	0.16	221.2	7.61
4	1640	250 mL/min	≅ 4.5 L	7.00	3511.5	179.83	14.59	0.14	214.4	7.67
5	1645	250 mL/min	≅ 7 L	7.00	3481.5	172.68	14.20	0.12	201.5	7.67
6	1648	250 mL/min	≅ 8 L	7.00	3465.4	171.01	14.19	0.12	196.0	7.67
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										

Sample ID: MW-128 **SampleClarity/Color/Odor:** clear, no odor
Sample Time: 1700 **QAQC Samples Collected:** ☒ No O Yes:
Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.:	SYS - EMW-1 WELL DIAMETER: 2"
SAMPLER:	ST / SJS
DATE:	5/22/18
WEATHER CONDITIONS	Overcast 65.

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

~4 x 3 ≈ 9L

Sampling Device:	Bladder	Water Quality Inst.:	In Situ
Make/Model:	QED Sample Pro	Make/Model:	Aqua Troll 600
Serial Number:	12980	Serial Number:	577326

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 8.91 Total Well Depth (ft-bpm): 13.75 Depth to Pump Inlet(ft-bmp):

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria									
1.	1752	Begin	purge							
2.	1755	0.225	0.675	6.88	1483	863.46	16.64	0.36	-185.1	
3.	1758	0.225	1.35	6.57	1475	867.79	15.12	0.16	-177.1	
4.	1801	0.225	1.025	6.56	1353	652.51	14.47	0.12	-179.5	
5.	1804	0.225	1.7	6.61	1226	453.89	14.10	0.10	-179.6	
6.	1807	0.225	2.375	6.67	1167	325.66	14.05	0.09	-179.3	
7.	5.7 1810 ~~1808~~	0.225	3.050	6.68	1199	229.70	13.83	0.10	-172.3	
8.	1813	0.225	3.725	6.73	1186	165.39	13.79	0.10	-170.4	
9.	1816	0.225	4.4	6.78	1167	129.61	13.71	0.09	-168.4	
10.	1819	0.225	5.075	6.82	1170	110.54	13.72	0.08	-167.0	
11.	1822	0.225	5.75	6.87	1157	86.24	13.57	0.07	-164.5	
12.	1825	0.225	6.425	6.91	1157	81.23	13.64	0.07	-165.2	
13.	1828	0.225	7.1	6.95	1172	63.61	13.57	0.07	-162.1	
14.	1831	0.225	7.775	6.99	1165	53.47	13.54	0.06	-163.4	
15.	1834	0.225	8.450	7.02	1178	42.9	13.52	0.06	-162.4	
16.										
17.	1840	Collect	Sample							
18.										

Sample ID: SYS-EMW-3	SampleClarity/Color/Odor: Stronger odor/ dark color at first.
Sample Time: 1840	QAQC Samples Collected: O No O Yes:

Comments: VOCs - Well Turb. not stabilized. Purged 3 well volumes

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.: RH-MW-3	WELL DIAMETER: 2"
SAMPLER: ST	
DATE: 5/22/18	
WEATHER CONDITIONS	Sunny 65°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peristaltic / Bladder	Water Quality Inst.: In Situ
Make/Model: GeoTech GeoPump / QED Sample Pro	Make/Model: Aqua Troll 600
Serial Number: 12980	Serial Number: 577 236

Tubing Type: O Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.05 Total Well Depth (ft-bpm):_____ Depth to Pump Inlet(ft-bmp):

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization criteria									
1.	0837	Begin	purge							
2.	0840	0.15	0.45							13.05
3.	0843	0.15	0.9	7.06	3234	26.13	14.49	2.85	241.5	13.05
4.	0846	0.15	~~0.135~~ 1.35	7.04	3247	22.83	13.72	2.78	241.7	13.08
5.	0852	0.15	2.25	6.98	3271	14.96	13.21	2.81	243.1	13.08
6.	0855	0.15	2.7	6.97	3276	16.10	13.04	2.73	238.1	13.08
7.	0858	0.15	3.15	6.98	3283	16.79	13.07	2.72	232.5	13.08
8.	0901	0.15	3.6	6.99	3286	17.27	13.23	2.71	228.2	13.08
9.	0905	Collect	sample							
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: RH-MW-3	SampleClarity/Color/Odor: Clear, slight sulfur odor
Sample Time: 0905	QAQC Samples Collected: ☒ No O Yes:

Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.:	MW-114 WELL DIAMETER: 2"
SAMPLER:	JT
DATE:	5/22/18
WEATHER CONDITIONS	Sunny 65°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

0.617 × 10 ft × 3 = 18.5 L

Sampling Device:	Peristaltic / Bladder	Water Quality Inst.:	In Situ
Make/Model:	GeoTech GeoPump / QED Sample Pro	Make/Model:	Aqua Troll 600
Serial Number:	12980	Serial Number:	577236

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.98 Total Well Depth (ft-bpm): ~24 ft. Depth to Pump Inlet(ft-bmp):

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria			±0.1	±3%	±10% or 5 NTU		±10% or 0.2 mg/L	±10 mV	
1	0937	Begin	purge							
2	0943	0.2	1.2	7.26	3180	31.98	16.07	0.52	179.6	13.98
3	0946	0.2	1.8	7.27	3194	39.73	15.40	0.29	178.2	13.98
4	0949	0.2	2.4	7.27	3203	61.93	15.03	0.22	178.9	13.98
5	0952	0.2	3.0	7.26	3196	76.36	14.83	0.20	178.2	13.98
6	0955	0.2	3.6	7.26	3195	97.74	14.95	0.18	177.6	13.98
7	0958	0.2	4.2	7.26	3176	119.70	15.03	0.15	177.0	13.98
8	1004	0.2	5.4	7.27	3150	113.53	15.03	0.15	176.0	13.98
9	1007	0.2	6.0	7.27	3147	126.20	15.16	0.15	175.9	13.98
10	1010	0.2	6.6	7.27	3097	131.04	15.13	0.14	175.2	13.98
11	1013	0.2	7.2	7.26	3061	145.80	15.22	0.13	175.2	13.98
12	1021	0.2	5.7 ~~8.8~~	7.26	3001	206.89	15.28	0.12	174.2	13.98
13	5.8 1025	0.2	5.7 9.6	7.25	2972	95.85	15.31	0.12	174.3	13.98
14	1028	0.2	5.7 10.2	7.26	2955	106.30	15.34	0.11	173.9	13.98
15	1031	0.2	10.8 5.7	7.25	2942	110.99	15.49	0.11	173.7	13.98
16	1034	0.2	11.4	7.24	2919	112.65	15.49	0.11	173.0	13.98
17	1040	collect	sample							
18										

Sample ID:	MW-114	SampleClarity/Color/Odor:	Clear / no odor
Sample Time:	1040	QAQC Samples Collected:	○ No ☒ Yes: 20180522-A → Field Duplicate

Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.:	MW-113 cont'd. WELL DIAMETER:
SAMPLER:	ST
DATE:	5/22/18
WEATHER CONDITIONS	Sunny 75°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Peristaltic / Bladder	Water Quality Inst.:	In Situ
Make/Model:	GeoTech GeoPump / QED Sample Pro	Make/Model:	Aqua Troll 600
Serial Number:	12480	Serial Number:	577236

Tubing Type: O Teflon O Poly O Other Decontamination: O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ Total Well Depth (ft-bpm): _____ Depth to Pump Inlet(ft-bmp):

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria									
1.	1301	0.2	7.2	6.92	3740	80.64	13.52	0.10	167.0	2.48
2.	1304	0.2	7.8	6.91	3760	96.03	13.42	0.08	166.5	2.48
3.	1307	0.2	8.4	6.90	3749	122.66	13.35	0.08	165.7	2.48
4.	1310	0.2	9.0	6.90	3731	114.07	13.28	0.06	164.5	2.48
5.	1313	0.2	9.6	6.90	3726	67.19	13.35	0.06	163.5	2.48
6.	1318	0.2	10.6	6.91	3787	74.70	13.21	0.06	161.7	2.48
7.	1321	0.2	11.2	6.92	3778	72.23	13.23	0.06	160.6	2.48
8.	1325	Collect sample.								
9.										
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID:	MW-113	SampleClarity/Color/Odor:	Clear / no odor
Sample Time:	1325	QAQC Samples Collected:	☒No O Yes:

Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.: MW-113	WELL DIAMETER: 2"
SAMPLER: ST	
DATE: 5/22/18	
WEATHER CONDITIONS	Sunny 70°F ~~[illegible]~~ E 5mph

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Peristaltic / Bladder	Water Quality Inst.:	In Situ
Make/Model:	GeoTech GeoPump / QED Sample Pro	Make/Model:	Aqua Troll 600
Serial Number:	12940	Serial Number:	577 236

Tubing Type: Q Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 2.48 Total Well Depth (ft-bpm):_____ Depth to Pump Inlet(ft-bmp):

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria									
1	1207	0.125	—	Begin						
2	1210	0.125	0.375	7.00	3742	23.13	19.17	0.60	169.5	2.48
3	1213	0.125	0.750	6.92	3776	17.26	17.17	0.35	173.9	2.48
4	1216	0.125	1.125	6.82	3805	19.72	16.68	0.27	178.1	2.48
5	1219	0.125	1.50	6.79	3820	27.74	16.05	0.23	178.4	2.48
6	1222	0.125	1.875	6.79	3800	45.49	15.69	0.22	177.7	2.48
7	1225	0.125	2.250	6.79	3802	41.42	15.68	0.20	177.1	2.48
8	1228	0.125	2.625	6.80	3810	35.33	15.86	0.21	176.2	2.48
9	1231	0.125	3.000	6.81	3775	25.63	15.57	0.18	175.2	2.48
10	1234	0.125	3.375	6.83	3760	15.65	15.68	0.17	174.3	2.48
11	1237	0.125	3.750	6.84	3764	37.86	15.82	0.17	173.6	2.48
12	1240	0.125	4.125	6.86	3741	40.29	15.58	0.16	172.5	2.48
13	1243	0.125	4.500	6.87	3769	48.47	15.50	0.16	171.5	2.48
14	1246	0.125	4.875	6.89	3752	66.48	15.90	0.15	170.5	2.48
15	1249	0.125	5.250	6.91	3714	43.09	15.02	0.13	169.1	2.48
16	1252	0.125	5.625	6.91	3741	53.38	14.88	0.12	168.9	2.48
17	1255	0.125	6.000	6.91	3752	72.19	14.83	0.12	169.0	2.48
18	1258	~~0.125~~ 02	6.~~375~~ 600	6.92	3744	69.39	13.86	0.12	167.7	2.48

Sample ID:	MW-113	SampleClarity/Color/Odor:	Clear / no odor
Sample Time:	1325	QAQC Samples Collected:	X No O Yes:

Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.:	MW-115
WELL DIAMETER:	2"
SAMPLER:	ST
DATE:	5/22/18
WEATHER CONDITIONS	Sunny SW 5 mph

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Bladder	Water Quality Inst.:	In Situ
Make/Model:	QED Sample Pro	Make/Model:	Aqua Troll 600
Serial Number:	12980	Serial Number:	587236

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 9.14 Total Well Depth (ft-bpm):_____ Depth to Pump Inlet(ft-bmp):

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria									
ST 1428	Begin Purge								
1431	0.175	0.525	7.00	2856	211.67	18.21	0.56	167.8	9.14
1434	0.175	1.05	6.89	2906	281.78	16.56	0.32	173.2	9.14
1437	0.175	1.575 ST	6.78	2909	278.55	15.50	0.26	177.1	9.14
1440	0.225	2.25	6.75	2948	230.69	14.90	0.20	174.9	9.14
1443	0.225	2.475	6.75	2936	217.28	14.73	0.17	173.7	9.14
1446	0.225	2.70	6.75	2953	223.89	14.27	0.15	171.5	9.14
1450	collect	sample							
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID:	MW-115	SampleClarity/Color/Odor:	Clear / no odor
Sample Time:	1450	QAQC Samples Collected:	☒ No ○ Yes:

Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.:	ZPMW-1
WELL DIAMETER:	
SAMPLER:	ST
DATE:	5/22/18
WEATHER CONDITIONS	Overcast 75°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Bladder pump	Water Quality Inst.:	In Situ
Make/Model:	QED Sample Pro	Make/Model:	Aqua Troll 600
Serial Number:	12980	Serial Number:	577236

Tubing Type: O Teflon O Poly O Other Decontamination: O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 9.06 Total Well Depth (ft-bpm):_____ Depth to Pump Inlet(ft-bmp):

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria			±0.5	±10%	±10% or less if over 10 NTUs		±10% or less if over 1 mg/L	±10%	
1.	1532	Begin	Purge.							
2.	1535	0.2	0.6							
3.	1536	0.2	0.8	7.02	2669	157.14	16.00	0.22	157.8	9.06
4.	1539	0.2	1.4	6.75	2747	110.39	16.07	0.23	172.2	9.06
5.	1542	0.2	2.0	6.72	2748	92.58	15.90	0.21	172.7	9.06
6.	1545	0.2	2.6	6.72	2759	76.21	15.68	0.18	171.7	9.06
7.	1548	0.2	3.2	6.73	2736	59.31	15.02	0.17	170.6	9.21
8.	1551	0.2	3.8	6.73	2761	55.14	14.99	0.16	169.2	9.26
9.	1554	0.2	4.4	6.74	2759	53.03	14.75	0.15	167.2	9.27
10.	1600	Collect	Sample							
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: ZPMW-1	SampleClarity/Color/Odor:
Sample Time: 1600	QAQC Samples Collected: O No O Yes:

Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.:	RH-MW-3 WELL DIAMETER: 2"
SAMPLER:	S. SEITZ
DATE:	5/22/18
WEATHER CONDITIONS	Cool, ≅ 70°F, Sunny

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peristaltic / Bladder	Water Quality Inst.: In Situ
Make/Model: GeoTech GeoPump / QED Sample Pro	Make/Model: Aqua Troll 600
Serial Number:	Serial Number: 577100

Tubing Type: Ø Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 14.03 btoc Total Well Depth (ft-bpm): 20 btoc Depth to Pump Inlet(ft-bmp):

Time	Purge Rate (~~lpm~~) mL/min	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			✓	✓	✓		✓	✓	
1. 9:05		Ø	7.03	1587.6	483.58	15.78	5.52	235.0	(pump set ≅17' btoc
2. 9:10			7.00	1634.1	266.77	13.38	4.70	239.5	14.1' btoc
3. 9:15	285 mL/min	≅ 2L	6.91	1766.9	115.62	12.45	4.36	244.8	14.10' btoc
4. 9:20	290 mL/min		6.88	1910.6	78.83	12.19	3.88	247.4	14.16
5. 9:25	300 mL/min		6.88	1973.6	70.82	12.14	3.71	246.6	14.16
6. 9:28	270 mL/min		6.87	1974.6	53.19	12.12	3.61	246.6	14.16
7. 9:31	270 mL/min		6.91	2043.2	47.41	12.10	3.48	245.1	14.16
8. 9:34	290 mL/min	≅ 7L	6.92	2083.1	30.41	12.13	3.31	244.4	14.16
9. 9:37	—		6.94	2119.7	29.79	12.09	3.21	243.8	14.16
10. 9:40	300 mL/min		6.97	2145.6	16.02	12.11	3.05	243.3	14.16
11. 09:43	—		6.99	2198.5	10.67	12.10	2.95	242.5	14.16
12. 9:46	270 mL/min	≅ 12L	7.00	2214.3	9.92	12.13	2.90	240.3	14.16
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: RH-MW-3	SampleClarity/Color/Odor: Clear, no odor 5/22/18 SS
Sample Time: 0950	QAQC Samples Collected: ☒ No O Yes:

Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.: RH-MW-1	WELL DIAMETER: 2"
SAMPLER: S. SEITZ	
DATE: 5/22/18	
WEATHER CONDITIONS	Sunny, hot ≅ 75°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peristaltic / Bladder	Water Quality Inst.: In Situ
Make/Model: GeoTech GeoPump / QED Sample Pro	Make/Model: Aqua Troll 600
Serial Number:	Serial Number: 577180

Tubing Type: Ø Teflon O Poly O Other Decontamination: Ø Decontaminated Water Meter Ø Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 13.60 btoc Total Well Depth (ft-bpm): 20' btoc Depth to Pump Inlet(ft-bmp):

Time	Purge Rate mL/min (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria			✓	✓			✓	✓	
1. 10:35	330mL/min *	≅0.5L	7.13	2307.0	155.27	16.64	0.40	212.6	13.69
2. 10:40	240 mL/min	—	7.10	2346.7	123.67	15.41	0.19	220.9	13.63
3. 10:45	240mL/min	≅3L	7.05	2385.7	52.61	15.07	0.16	225.3	13.63
4. 10:50	270mL/min	≅4.5L	7.04	2399.1	30.26	14.91	0.14	227.5	13.63
5. 10:55	270mL/min	—	7.06	2408.8	24.15	14.83	0.13	228.3	13.63
6. 10:58	270mL/min	≅	7.07	2411.8	20.27	14.83	0.12	227.5	13.63
7. 11:01	—	≅7L	7.08	2417.0	16.86	14.85	0.11	227.3	13.63
8. 11:04	240mL/min	≅8L	7.09	2415.5	11.61	14.80	0.11	227.6	13.63
9. 11:07	—	≅9.5L	7.10	2419.7	9.92	14.82	0.10	226.7	13.63
10. 11:09	Stop log on data recorder for Aqua Troll								
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: RH-MW-1	SampleClarity/Color/Odor: clear, no odor 5/22/18 SS
Sample Time: 11:15	QAQC Samples Collected: Ø No O Yes:

Comments:

* slowed down pressure a little

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Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-112 **WELL DIAMETER:** 2"
SAMPLER: S. SEITZ
DATE: 5/22/18
WEATHER CONDITIONS Hot, partly Cloudy ≅ 75°F

Sampling Device: Peristaltic / Bladder	**Water Quality Inst.:** In Situ
Make/Model: GeoTech GeoPump / QED Sample Pro	**Make/Model:** Aqua Troll 600
Serial Number: FA002601	**Serial Number:** 577180

Tubing Type: ✓ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 6.02 ft btoc **Total Well Depth (ft-bpm):** 18.2 ft btoc **Depth to Pump Inlet(ft-bmp):** ≅ 10 ft btoc

Time	Purge Rate mL/min ~~(lpm)~~	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1. 1210	175 mL/min	—	6.94	3622.4	59.43	19.70	0.96	250.6	6.02
2. 1215	280 mL/min	—	6.90	3568.2	83.45	18.43	0.57	251.5	6.09
3. 1220	280 mL/min	≅2L	6.83	3680.1	65.44	16.01	0.18	247.4	6.12
4. 1225	250 mL/min	—	6.79	3692.1	47.73	15.73	0.14	247.5	6.09
5. 1230	250 mL/min	≅5L	6.79	3689.2	65.10	15.55	0.11	240.7	6.09
6. 1233	250 mL/min	—	6.80	3680.3	74.60	15.48	0.11	238.7	6.09
7. 1236	250 mL/min	—	6.83	3669.4	92.60	15.46	0.10	233.5	6.09
8. 1239	250 mL/min	≅7.5L	6.83	3666.2	105.01	15.49	0.10	229.7	6.09
9. 1242	250 mL/min	—	6.85	3662.1	129.24	15.61	0.10	224.5	6.09
10. 1245	250 mL/min	—	6.87	3653.0	48.84	15.61	0.09	219.0	6.09
11. 1250	250 mL/min		6.90	3624.1	51.23	15.63	0.09	210.4	6.09
12. 1253	250 mL/min	≅9.5L	6.91	3624.3	45.05	15.54	0.09	206.6	6.09
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: MW-112 **SampleClarity/Color/Odor:** clear, slightly cloudy, no odor
Sample Time: 12:55 **QAQC Samples Collected:** X No O Yes:
Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME:	Billings PCE Groundwater Facility
PROJECT NO.:	776-036-001
WELL NO.: MW-110	WELL DIAMETER: 2"
SAMPLER: S. SEITZ	
DATE: 5/22/18	
WEATHER CONDITIONS	Sunny ≅ 80°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peristaltic (Bladder)	Water Quality Inst.: In Situ
Make/Model: GeoTech GeoPump (QED Sample Pro)	Make/Model: Aqua Troll 600
Serial Number: FA002161	Serial Number: 577180

Tubing Type: Ø Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 16.01 b toc **Total Well Depth (ft-bpm):** 28. ft b toc **Depth to Pump Inlet(ft-bmp):** ≅ 20 ft

Time	Purge Rate mL/min ~~(lpm)~~	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria									
1. 1350	Unknown - talked w/property owner								
2. 1355	250 mL/min	≅ 1 L	6.96	3454.6	309.31	18.35	1.60	257.4	16.10
3. 1400	250 mL/min	≅ 2.5 L	6.84	3478.1	217.52	16.36	1.55	253.1	16.09
4. 1405	250 mL/min	—	6.81	3484.5	195.28	15.37	1.56	249.9	16.15
5. 1410	250 mL/min	≅ 5 L	6.81	3494.1	174.74	15.42	1.54	247.4	16.10
6. 1415	250 mL/min	—	6.82	3519.1	163.18	15.45	1.57	244.4	16.10
7. 1418	250 mL/min	≅ 7 L	6.82	3524.1	159.83	15.34	1.54	242.2	16.10
8.									
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: MW-110	SampleClarity/Color/Odor: clear, no odor
Sample Time: 14:25	QAQC Samples Collected: ☒ No O Yes:

Comments:

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-109 **WELL DIAMETER:** 2"
SAMPLER: ~~S. SEITZ~~ S. SEITZ
DATE: 5/22/18
WEATHER CONDITIONS ≅ 80°F, Sunny, partial cloudy to N

Sampling Device:	Peristaltic / Bladder	**Water Quality Inst.:**	In Situ
Make/Model:	GeoTech GeoPump / QED Sample Pro	**Make/Model:**	Aqua Troll 600
Serial Number:	FA002161	**Serial Number:**	577180

Tubing Type: Ø Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 16.63 ft btoc **Total Well Depth (ft-bpm):** 28.7 ft btoc **Depth to Pump Inlet(ft-bmp):** ≅ 21 ft btoc

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria									
1 1505	245 mL/min	~~0~~	7.11	2748.9	141.71	21.14	3.22	252.8	16.83
2 1510	250 mL/min	—	6.97	2873.6	78.39	14.78	0.51	226.0	16.82
3 1515	260 mL/min	≅ 2.5L	6.95	2887.8	75.39	14.40	~~1.48~~ 1.03	205.0	16.81
4 1520	260 mL/min	—	6.96	2901.2	61.91	14.17	0.38	164.2	16.81
5 1525	260 mL/min	≅ 6L	6.97	2907.2	61.44	14.09	0.33	137.3	16.81
6 1530	260 mL/min	—	6.97	2908.0	~~70~~ 62.88	14.31	0.33	120.3	16.81
7 1533	260 mL/min	—	6.99	2914.3	63.90	14.45	0.32	112.7	16.81
8 1536	260 mL/min	≅ 8.5L	~~6~~ 7.00	2919.7	58.82	14.51	0.32	109.2	16.81
9.									
10.									
11.									
12.									
13.									
14.									
15.									
16.									
17.									
18.									

Sample ID: MW-109 **SampleClarity/Color/Odor:** clear, no odor
Sample Time: 15:40 **QAQC Samples Collected:** ☒ No O Yes:
Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-129 **WELL DIAMETER:**
SAMPLER(S): ST
DATE: 5/23/18

WEATHER CONDITIONS: Cloudy, rain 60°F

Sampling Device:	Bladder	**Water Quality Inst.:**	In Situ
Make/Model:	QED Sample Pro	**Make/Model:**	Aqua Troll 600
Serial Number:	12990	**Serial Number:**	577 236

Tubing Type: ☒ Teflon ○ Poly ○ Other **Decontamination:** ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 12.70 **Total Well Depth (ft-bpm):** 26.03 **Depth to Pump Inlet(ft-bmp):**

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's		±10% or less than 0.2 mg/L		
1. 1312	Begin purge.								
2. 1314	0.25	0.50	7.16	2762	311	13.75	0.77	-289	
3. 1319	0.25	1.75	7.16	2788	531	13.32	0.35	-351	
4. 1324	0.25	3	7.16	2790	642	12.99	0.24	-378	
5. 1329	0.25	4.25	7.15	2801	560	12.96	0.20	-387	
6. 1334	0.25	5.5	7.14	2826	467	12.89	0.19	-390	
* 7. 1339	0.25	6.75	7.14	2814	487.39	13.23	0.24	-371*	
8. 1344	0.25	8	7.15	2847	525	12.86	0.18	-385	
9. 1349	0.25	9.25	7.12	2818	621	12.87	0.18	-408	
10. 1352	0.25	10.0	7.12	2829	489	12.84	0.16	-404	
11. 1355	0.25	10.75	7.12	2826	507	12.83	0.16	-400	
12. 1358	0.25	11.5	7.12	2809	426	12.71	0.15	-398	
13. 1401	0.25	12.25	7.12	2818	344	12.7	0.14	-399	
14. 1406	0.25	13.5	7.12	2823	317	12.7	0.14	-395	
15. 1411	0.25	14.75	7.11	2829	~~304~~	12.7	0.13	-393	** J23
16. 1415	collect	sample.							
17.									
18.									

Sample ID: MW-129 **SampleClarity/Color/Odor:**
Sample Time: 1415 **QAQC Samples Collected:** ☒ No ○ Yes: **If yes, QAQC IDs**
Analytical methods requested on COC: VOCs + EPH/VPH

Comments: * Battery died, looked up to truck, but lost flow for 1-2 min.

Trihydro CORPORATION

GROUNDWATER FIELD FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

22.6 L

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-130 WELL DIAMETER: 2"
SAMPLER(S): ST
DATE: 5/23/18
WEATHER CONDITIONS: Cloudy, light rain 59°F

Sampling Device:	Bladder pump	Water Quality Inst.:	In Situ
Make/Model:	QED Sample Pro	Make/Model:	Aqua Troll 600
Serial Number:	12980	Serial Number:	577236

Tubing Type: ☒ Teflon ○ Poly ○ Other Decontamination: ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 11.42 Total Well Depth (ft-bpm): 23.63 Depth to Pump Inlet(ft-bmp): _____

Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	-	±10% or less than 0.2 mg/L	-	
1. 1058	Begin	Purge							
2. 1103	adjust	purge	rate	to 0.25	LPM				
3. 1105	0.25	1.25	7.45	981	4760	12.03	7.84	104.1	
4. 1108	0.25	2.0	7.41	1041	849	11.79	8	132.7	
5. 1111	0.25	2.75	7.39	1138	475	11.73	7.69	147.3	
6. 1114	0.25	3.50	7.41	1084	373	11.66	7.87	157.4	
7. 1117	0.25	4.25	7.42	1084	319	11.67	7.89	163.1	
8. 1121	0.25	5.25	7.43	1072	307	11.72	7.94	169.2	
9. 1124	0.25	6	7.43	1065	283	11.72	7.94	173.7	
10. 1127	0.25	6.75	7.45	1058	248	11.69	8	178.3	
11. 1130	0.25	7.5	7.45	1040	224	11.71	8.05	181.2	
12. 1133	0.25	8.25	7.46	1043	190	11.81	8	183.9	
13. 1136	0.25	9	7.46	1067	67.6	11.91	7.9	185.7	
14. 1141	0.25	10.25	7.46	1089	113	11.91	7.86	189.4	
15. 1142	cleaned out	WQ Meter	to	improve	Turbidity				
16. 1146	0.25	11.5	7.49	1039	114	12.74	7.88	184.4	
17. 1151	0.25	12.75	7.47	1051	61.4	12.21	7.99	190.9	
18. 1156	0.25	14	7.47	1056	52.1	12.10	8.02	193.8	

Sample ID: MW-130 SampleClarity/Color/Odor: Clear
Sample Time: 1225 QAQC Samples Collected: ○ No ○ Yes: If yes, QAQC IDs _____
Analytical methods requested on COC: VOCs

Comments:

Trihydro CORPORATION

Perf Table

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-130 WELL DIAMETER: 2
SAMPLER(S): JT
DATE: 5/23

WEATHER CONDITIONS: rain, 59°F

Sampling Device:	Water Quality Inst.:
Make/Model:	Make/Model:
Serial Number:	Serial Number:

Tubing Type: O Teflon O Poly O Other Decontamination: O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): _____ Total Well Depth (ft-bpm): _____ Depth to Pump Inlet(ft-bmp): _____

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria:			±0.5	±10%	±10% or less than 10 NTU's	--	±10% or less than 0.2 mg/L	--	--
1.	1201	0.25	15.25	7.47	1056	71.47	12.02	8.01	196.9	
2.	1206	0.25	16.5	7.48	1051	44.4	11.99	8.01	200.5	
3.	1211	0.25	17.75	7.47	1052	66.04	11.85	8.03	203.5	
4.	1216	0.25	19	7.48	1048	43.82	11.79	8.02	205.8	
5.	1219	0.25	19.75	7.47	1055	42.27	11.76	8.00	207.7	
6.	1222	0.25	20.5	7.47	1050	44.94	11.78	8.04	209.5	
7.	1225	collect	sample							
8.										
9.										
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: MW-130 SampleClarity/Color/Odor:
Sample Time: 1225 QAQC Samples Collected: O No O Yes: If yes, QAQC IDs _____
Analytical methods requested on COC:

Comments:

Trihydro CORPORATION

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.0102	0.039
1	0.041	0.155
2	0.163	0.617
3	0.367	1.39
4	0.653	2.470

GROUNDWATER FIELD FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-134 **WELL DIAMETER:** 2"
SAMPLER(S): ST
DATE: 5/23/19

WEATHER CONDITIONS: Rainy 59°F

Sampling Device:	Bladder	**Water Quality Inst.:**	In Situ
Make/Model:	QED Sample Pro	**Make/Model:**	Aqua Troll 600
Serial Number:	12910	**Serial Number:**	577 236

Tubing Type: ⊗ Teflon O Poly O Other **Decontamination:** O Decontaminated Water Meter O Decontaminated Flow Through Cell

Depth to Water (ft-bmp): 7.80 **Total Well Depth (ft-bpm):** 18.81 **Depth to Pump Inlet(ft-bmp):** _____

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (mS/m)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria			± 0.5	±10%	±10% or less than 10 NTUs	–	±10% or less than 0.2 mg/L	–	
1.	0953	0.225								
2.	0957	0.225	0.9	7.25	2458	575.1	12.24	0.63	-274	
3.	1000	0.225	1.575	7.21	2445	321.06	12.14	0.43	-283.3	
4.	1003	0.225	2.25	7.20	2435	227.88	11.95	0.34	-284.8	
5.	1006	0.225	2.925	7.19	2438	219.72	11.98	0.32	-287.3	
6.	1009	0.225	3.6							
7.	1011	0.225	4.05	7.19	2425	163.65	12.09	0.28	-290.1	
8.	1014	0.225	4.725	7.19	2410	156.97	12.05	0.25	-286.2	
9.	1017	0.225	5.4	7.20	2405	160.58	12.06	0.24	-285.9	
10.	1020	Collect	sample.							
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: MW-134 **SampleClarity/Color/Odor:** slightly turbid, no odor.
Sample Time: **QAQC Samples Collected:** ⊗ No O Yes: **If yes, QAQC IDs** _____
Analytical methods requested on COC:

Comments: VOCs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-132 WELL DIAMETER: 2"
SAMPLER: ST
DATE: 5/23/18
WEATHER CONDITIONS Rainy, 58°F calm

Sampling Device:	Bladder	Water Quality Inst.:	In Situ
Make/Model:	QED Sample Pro	Make/Model:	Aqua Troll 600
Serial Number:	12980	Serial Number:	577236

Tubing Type: ☒ Teflon ○ Poly ○ Other Decontamination: ○ Decontaminated Water Meter ○ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 10.88 Total Well Depth (ft-bpm): 22.15 Depth to Pump Inlet(ft-bmp):

	Time	Purge Rate (lpm)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria									
1	0834	Begin	purge							
2	0837	0.175	0.525							
3	0838	0.175	0.7	7.19	2700	363.24	13.25	1.21	189.0	
4	0841	0.175	0.225	7.12	2710	406.75	12.50	0.84	104.0	
5	0844	0.175	1.8	7.00	2782	266.58	12.02	0.70	17.9	10.92
6	0847	0.175	2.325	6.99	2735	232.51	11.92	0.65	-96.6	10.92
7	0850	0.175	2.850	6.97	2737	190.87	11.77	0.65	-169.6	10.92
8	0853	0.175	3.375	6.97	2743	228.46	11.68	0.64	-203.0	10.92
9	0856	0.175	3.9	6.98	2735	228.48	11.60	0.63	-219.9	10.92
10	0859	0.175	4.425	6.98	2746	211.51	11.59	0.61	-239.4	10.92
11	~~0902~~ 0902	0.175	4.95	6.98	2740	152.74	11.51	061	-255.9	10.92
12	~~0905~~ 0905	0.175	5.475	6.99	2739	151.41	11.51	0.61	-252.4	10.92
13	0908	0.175	6	6.99	2736	158.83	11.44	0.61	-258.8	10.92
14	0910	collect	sample							
15										
16										
17										
18										

Sample ID: MW-132 SampleClarity/Color/Odor: Cloudy, no odor.
Sample Time: QAQC Samples Collected: ☒ No ~~☐ Yes:~~ ~~MS/MSD~~ S.T.
Comments: VOCs + PCBs

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-135 **WELL DIAMETER:** 2"
SAMPLER: S. SEITZ
DATE: 5/23/18
WEATHER CONDITIONS Rainy, partly sunny ≅ 60°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device:	Peristaltic Bladder	**Water Quality Inst.:**	In Situ
Make/Model:	GeoTech GeoPump / QED Sample Pro	**Make/Model:**	Aqua Troll 600
Serial Number:	FS	**Serial Number:**	577180

Tubing Type: Ø Teflon O Poly O Other **Decontamination:** Ø Decontaminated Water Meter Ø Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 11.36 ft btoc **Total Well Depth (ft-bpm):** 20 ft btoc **Depth to Pump Inlet(ft-bmp):** ≅ 18 ft

	Time	Purge Rate mL/min (~~lpm~~)	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
	Stabilization Criteria									ft b toc
1.	1325	250 mL/min	.500 L	7.13	2766.4	139.45	15.15	1.32	106.5	11.41
2.	1330	250 mL/min	≅1 L	6.95	2851.9	241.69	13.37	0.99	-54 mV	11.41
3.	left purging to get sample glassware -									
4.	See Aqua troll log									
5.	1415	250 mL/min	≅15L-20L	6.99	2885.9	72.55	12.86	0.29	-93.2	11.35
6.	1418	250 mL/min	—	7.01	2947.0	~~82.55~~ 73.01	13.27	0.27	-91.7	11.35
7.	1421									
8.	1421	250 mL/min	—	7.01	2945.4	75.62	13.25	0.26	-95.1	11.35
9.	1424	250 mL/min	≅20.5L	7.04	2948.6	78.62	13.38	0.25	-91.6	11.35
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										

Sample ID: MW-135 **SampleClarity/Color/Odor:** Clear v. slightly cloudy, no odor
Sample Time: 1425 **QAQC Samples Collected:** ~~X~~ No O Yes QA MS/MSD
Comments: MW-135 MS, MW-135 MSD > collected VOCs for these

Trihydro CORPORATION

LOW - FLOW GROUNDWATER PURGING /SAMPLING FORM

PROJECT NAME: Billings PCE Groundwater Facility
PROJECT NO.: 776-036-001
WELL NO.: MW-133 WELL DIAMETER: 2"
SAMPLER: S. SEITZ
DATE: 5/23/19
WEATHER CONDITIONS Cool, Raining, ≅ 55°F

Casing Diameter"	Gallons per Foot	Liters per Foot
0.5	0.00649	0.0246
0.75	0.0146	0.0553
2	0.163	0.617
4	0.653	8.110

Sampling Device: Peristaltic / Bladder	Water Quality Inst.: In Situ
Make/Model: GeoTech GeoPump / QED Sample Pro	Make/Model: Aqua Troll 600
Serial Number: FA 002601	Serial Number:

Tubing Type: ☒ Teflon ○ Poly ○ Other Decontamination: ☒ Decontaminated Water Meter ☒ Decontaminated Flow Through Cell
Depth to Water (ft-bmp): 10.28' btoc Total Well Depth (ft-bpm): ≅ 22ft btoc Depth to Pump Inlet(ft-bmp): ≅ 15' btoc

	Time	Purge Rate mL/min ~~(lpm)~~	Volume Purged (Liters)	pH	Cond. (µS/cm)	Turbidity (NTUs)	Temp (°C)	DO (mg/L)	ORP (mV)	DTW (ft-bmp)
1	0935	200 mL/min	~~0~~	7.14	3186.0	542.12	14.03	0.83	243.4	10.38
2	0940	200 mL/min	≅ 2L	7.15	3209.9	397.45	13.18	0.37	241.7	10.62
3	0945	—	≅ 3L	7.14	3235.8	281.32	12.62	0.26	243.4	10.38
4	0950	250mL/min	—	7.14	3267.9	243.08	12.52	0.27	237.0	10.38
5	0953	200mL/min	≅ —	7.14	3276.3	188.15	12.48	0.24	240.0	10.38
6	0955	—	≅ 6L	7.14	3285.2	182.67	12.43	0.26	241.9	10.38
7	0958	250 mL/min	—	7.14	3297.9	179.58	12.42	0.25	241.5	10.38
8										
9	Sampled @ 0905 for VOCs and PCBs									
10										
11										
12										
13										
14										
15.										
16.										
17.										
18.										

Sample ID: MW-133 SampleClarity/Color/Odor: Slightly cloudy, no odor
Sample Time: 0905 QAQC Samples Collected: ○ No ☒ Yes: MS/MSD VOAs 3 for each, 2 ambers
Comments: ~~20190523-A~~ * MS - 3 VOAs for VOCs, 2 unpreserved ambers for PCB
~~20190523-B~~ MSD - 3 VOAs for VOCs, 2 unpreserved ambers for PCB
S/L *named MW-133 MS and MW-133 MSD

BILLINGS PCE GROUNDWATER QA/QC SAMPLE LOG
BILLINGS, MONTANA

	QA/QC Sample Type	QA/QC Sample ID	Date	Time	Parent Sample (if duplicate)	Comments
1	F. Duplicate	20180521-A	5/21	/	BPGP50	—
2	F. Blank	20180521-B	5/21	/	/	@ Solar
3	F. Blank	20180521-C	5/21	/	/	W/ Probe.
4	F. Duplicate	20180522-A	5/22	/	MW-114	—
5	F. Blank	20180522-B	5/22	—	—	5 of MW-128
6	Eq. Blank	20180522-C	"	—	—	
7	MS/MSD	—	5/23	—	MW-133	—
8	MS/MSD	—	5/23	—	MW-133	—
9	20180523-A	Field Blank	5/23	—	—	upwind of MW-135
10	20180523-B	Eq. Blank	5/23	—	—	Bladder pump.
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
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42						

Low-Flow Test Report:

Test Date / Time: 9/14/2018 12:04:58 PM
Project: BMW - 1
Operator Name: PL/RM

Location Name: BMW - 1 **Well Diameter: 2 in** **Casing Type: PVC** **Total Depth: 20.15 ft** **Initial Depth to Water: 12.8 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 17.5 ft** **Estimated Total Volume Pumped: 10800 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.02 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/14/2018 12:04 PM	00:00	6.71 pH	17.55 °C	2,695.9 µS/cm	0.65 mg/L	151.91 NTU	78.3 mV	12.80 ft	300.00 ml/min
9/14/2018 12:07 PM	03:00	6.71 pH	16.16 °C	2,733.3 µS/cm	0.19 mg/L	113.95 NTU	77.5 mV	12.80 ft	300.00 ml/min
9/14/2018 12:10 PM	06:00	6.70 pH	15.92 °C	2,740.9 µS/cm	0.15 mg/L	73.03 NTU	77.7 mV	12.82 ft	300.00 ml/min
9/14/2018 12:13 PM	09:00	6.70 pH	15.74 °C	2,745.6 µS/cm	0.11 mg/L	75.84 NTU	76.9 mV	12.82 ft	300.00 ml/min
9/14/2018 12:16 PM	12:00	6.70 pH	15.58 °C	2,743.4 µS/cm	0.08 mg/L	48.71 NTU	77.0 mV	12.82 ft	300.00 ml/min
9/14/2018 12:19 PM	15:00	6.69 pH	15.72 °C	2,739.1 µS/cm	0.07 mg/L	38.05 NTU	77.3 mV	12.82 ft	300.00 ml/min
9/14/2018 12:22 PM	18:00	6.70 pH	15.59 °C	2,748.7 µS/cm	0.07 mg/L	25.09 NTU	76.2 mV	12.82 ft	300.00 ml/min
9/14/2018 12:25 PM	21:00	6.71 pH	15.49 °C	2,748.2 µS/cm	0.08 mg/L	23.76 NTU	75.6 mV	12.82 ft	300.00 ml/min
9/14/2018 12:28 PM	24:00	6.71 pH	15.62 °C	2,748.3 µS/cm	0.09 mg/L	21.44 NTU	75.2 mV	12.82 ft	300.00 ml/min
9/14/2018 12:31 PM	27:00	6.71 pH	15.55 °C	2,747.8 µS/cm	0.07 mg/L	15.14 NTU	75.8 mV	12.82 ft	300.00 ml/min
9/14/2018 12:34 PM	30:00	6.71 pH	15.54 °C	2,754.3 µS/cm	0.09 mg/L	9.16 NTU	75.6 mV	12.82 ft	300.00 ml/min
9/14/2018 12:37 PM	33:00	6.71 pH	15.53 °C	2,753.7 µS/cm	0.09 mg/L	8.01 NTU	75.8 mV	12.82 ft	300.00 ml/min
9/14/2018 12:40 PM	36:00	6.71 pH	15.49 °C	2,751.8 µS/cm	0.09 mg/L	6.13 NTU	76.0 mV	12.82 ft	300.00 ml/min

Samples

Sample ID:	Description:
BMW - 1	Collected @ 1242 No odor, no sheen, cloudy VOCs, metals, MNA

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/14/2018 2:35:56 PM
Project: BMW - 4
Operator Name: PL/RM

Location Name: BMW - 4 **Well Diameter: 2 in** **Casing Type: PVC** **Total Depth: 19.85 ft** **Initial Depth to Water: 15.33 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 17 ft** **Estimated Total Volume Pumped: 7200 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/14/2018 2:35 PM	00:00	6.73 pH	14.59 °C	3,830.5 µS/cm	0.51 mg/L	37.85 NTU	98.9 mV	15.33 ft	300.00 ml/min
9/14/2018 2:38 PM	03:00	6.73 pH	13.91 °C	3,869.7 µS/cm	0.35 mg/L	21.72 NTU	96.5 mV	15.33 ft	300.00 ml/min
9/14/2018 2:41 PM	06:00	6.72 pH	13.62 °C	3,879.6 µS/cm	0.30 mg/L	16.65 NTU	95.8 mV	15.33 ft	300.00 ml/min
9/14/2018 2:44 PM	09:00	6.72 pH	13.48 °C	3,887.5 µS/cm	0.26 mg/L	9.50 NTU	95.4 mV	15.33 ft	300.00 ml/min
9/14/2018 2:47 PM	12:00	6.72 pH	13.41 °C	3,891.5 µS/cm	0.23 mg/L	7.80 NTU	94.9 mV	15.33 ft	300.00 ml/min
9/14/2018 2:50 PM	15:00	6.73 pH	13.38 °C	3,891.3 µS/cm	0.21 mg/L	3.59 NTU	94.3 mV	15.33 ft	300.00 ml/min
9/14/2018 2:53 PM	18:00	6.73 pH	13.37 °C	3,892.6 µS/cm	0.19 mg/L	3.46 NTU	93.8 mV	15.33 ft	300.00 ml/min
9/14/2018 2:56 PM	21:00	6.73 pH	13.33 °C	3,892.4 µS/cm	0.19 mg/L	2.53 NTU	93.5 mV	15.33 ft	300.00 ml/min
9/14/2018 2:59 PM	24:00	6.74 pH	13.31 °C	3,895.8 µS/cm	0.18 mg/L	4.72 NTU	93.3 mV	15.33 ft	300.00 ml/min

Samples

Sample ID:	Description:
BMW - 4	Collected @ 1502 No odor, no sheen , clear VOCs

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/14/2018 1:22:22 PM
Project: BMW07 - 1
Operator Name: PL/RM

Location Name: BMW07 - 1 **Well Diameter: 2 in** **Casing Type: PVC** **Total Depth: 23.5 ft** **Initial Depth to Water: 15.42 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 21 ft** **Estimated Total Volume Pumped: 14400 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.02 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/14/2018 1:22 PM	00:00	6.63 pH	17.16 °C	3,626.2 µS/cm	0.70 mg/L	5,726.6 NTU	71.7 mV	15.42 ft	300.00 ml/min
9/14/2018 1:25 PM	03:00	6.63 pH	16.01 °C	3,693.0 µS/cm	0.28 mg/L	1,060.9 NTU	72.7 mV	15.44 ft	300.00 ml/min
9/14/2018 1:28 PM	06:00	6.63 pH	15.64 °C	3,714.7 µS/cm	0.22 mg/L	382.59 NTU	74.8 mV	15.44 ft	300.00 ml/min
9/14/2018 1:31 PM	09:00	6.63 pH	15.52 °C	3,711.1 µS/cm	0.22 mg/L	174.02 NTU	76.2 mV	15.44 ft	300.00 ml/min
9/14/2018 1:34 PM	12:00	6.63 pH	15.54 °C	3,714.4 µS/cm	0.22 mg/L	46.64 NTU	77.3 mV	15.44 ft	300.00 ml/min
9/14/2018 1:37 PM	15:00	6.63 pH	15.50 °C	3,717.5 µS/cm	0.18 mg/L	37.12 NTU	78.1 mV	15.44 ft	300.00 ml/min
9/14/2018 1:40 PM	18:00	6.63 pH	15.50 °C	3,722.0 µS/cm	0.15 mg/L	22.00 NTU	78.7 mV	15.44 ft	300.00 ml/min
9/14/2018 1:43 PM	21:00	6.63 pH	15.46 °C	3,721.3 µS/cm	0.13 mg/L	21.84 NTU	79.2 mV	15.44 ft	300.00 ml/min
9/14/2018 1:46 PM	24:00	6.64 pH	15.44 °C	3,721.6 µS/cm	0.10 mg/L	16.27 NTU	79.7 mV	15.44 ft	300.00 ml/min
9/14/2018 1:49 PM	27:00	6.64 pH	15.44 °C	3,723.6 µS/cm	0.09 mg/L	26.90 NTU	80.1 mV	15.44 ft	300.00 ml/min
9/14/2018 1:52 PM	30:00	6.64 pH	15.40 °C	3,718.0 µS/cm	0.08 mg/L	15.73 NTU	80.7 mV	15.44 ft	300.00 ml/min
9/14/2018 1:55 PM	33:00	6.64 pH	15.40 °C	3,736.6 µS/cm	0.07 mg/L	11.92 NTU	81.3 mV	15.44 ft	300.00 ml/min
9/14/2018 1:58 PM	36:00	6.65 pH	15.41 °C	3,727.8 µS/cm	0.07 mg/L	15.00 NTU	81.8 mV	15.44 ft	300.00 ml/min
9/14/2018 2:01 PM	39:00	6.64 pH	15.36 °C	3,724.4 µS/cm	0.06 mg/L	12.11 NTU	82.1 mV	15.44 ft	300.00 ml/min
9/14/2018 2:04 PM	42:00	6.64 pH	15.32 °C	3,724.5 µS/cm	0.06 mg/L	7.51 NTU	82.5 mV	15.44 ft	300.00 ml/min

9/14/2018 2:07 PM	45:00	6.64 pH	15.30 °C	3,728.2 µS/cm	0.05 mg/L	5.68 NTU	83.0 mV	15.44 ft	300.00 ml/min
9/14/2018 2:10 PM	48:00	6.64 pH	15.32 °C	3,726.7 µS/cm	0.06 mg/L	16.94 NTU	83.4 mV	15.44 ft	300.00 ml/min

Samples

Sample ID:	Description:
BMW07 - 1	Collected @ 1412 Very brown at first then cleared up. No odor and no sheen. VOCs

Low-Flow Test Report:

Test Date / Time: 9/13/2018 8:24:12 AM
Project: BNMW-8
Operator Name: BW/ST

Location Name: BNMW-8 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 10 ft** **Total Depth: 19.9 ft** **Initial Depth to Water: 14.69 ft**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 17 ft** **Estimated Total Volume Pumped: 5580 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 310 ml/min** **Final Draw Down: 0.02 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:
Water in well vault

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/13/2018 8:24 AM	00:00	6.91 pH	14.81 °C	3,685.2 µS/cm	6.71 mg/L	31.67 NTU	239.4 mV	14.69 ft	310.00 ml/min
9/13/2018 8:27 AM	03:00	6.85 pH	14.66 °C	3,708.1 µS/cm	1.31 mg/L	17.86 NTU	243.4 mV	14.71 ft	310.00 ml/min
9/13/2018 8:30 AM	06:00	6.85 pH	14.63 °C	3,712.3 µS/cm	0.96 mg/L	9.14 NTU	244.2 mV	14.70 ft	310.00 ml/min
9/13/2018 8:33 AM	09:00	6.85 pH	14.63 °C	3,711.9 µS/cm	0.98 mg/L	5.14 NTU	244.3 mV	14.70 ft	310.00 ml/min
9/13/2018 8:36 AM	12:00	6.85 pH	14.63 °C	3,714.5 µS/cm	0.88 mg/L	3.34 NTU	243.4 mV	14.70 ft	310.00 ml/min
9/13/2018 8:39 AM	15:00	6.85 pH	14.62 °C	3,714.2 µS/cm	0.93 mg/L	2.06 NTU	243.3 mV	14.70 ft	310.00 ml/min
9/13/2018 8:42 AM	18:00	6.85 pH	14.63 °C	3,712.1 µS/cm	0.88 mg/L	1.69 NTU	244.1 mV	14.71 ft	310.00 ml/min

Samples

Sample ID:	Description:
BNMW-8	Clear. No odor. VOC only. Sample time 0845

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/13/2018 10:02:23 AM
Project: BNMW9
Operator Name: JS/RM

Location Name: BNMW9 **Well Diameter: 2 in** **Casing Type: PVC** **Total Depth: 20.8 ft** **Initial Depth to Water: 14.19 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 17.5 ft** **Estimated Total Volume Pumped: 9000 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 250 ml/min** **Final Draw Down: 14.2 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:

Weather Conditions:
Overcast, 60° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/13/2018 10:02 AM	00:00	6.92 pH	17.42 °C	3,563.4 µS/cm	1.04 mg/L	49.89 NTU	-78.6 mV	14.19 ft	250.00 ml/min
9/13/2018 10:05 AM	03:00	6.99 pH	15.98 °C	3,669.5 µS/cm	0.40 mg/L	25.84 NTU	-51.3 mV	14.20 ft	250.00 ml/min
9/13/2018 10:08 AM	06:00	6.99 pH	15.71 °C	3,684.8 µS/cm	0.15 mg/L	7.55 NTU	-43.5 mV	14.20 ft	250.00 ml/min
9/13/2018 10:11 AM	09:00	6.99 pH	15.51 °C	3,696.3 µS/cm	0.09 mg/L	0.76 NTU	-38.6 mV	14.20 ft	250.00 ml/min
9/13/2018 10:14 AM	12:00	6.98 pH	15.39 °C	3,704.5 µS/cm	0.08 mg/L	0.99 NTU	-34.7 mV	14.20 ft	250.00 ml/min
9/13/2018 10:17 AM	15:00	6.97 pH	15.29 °C	3,704.4 µS/cm	0.06 mg/L	0.62 NTU	-31.4 mV	14.20 ft	250.00 ml/min
9/13/2018 10:20 AM	18:00	6.98 pH	15.13 °C	3,711.2 µS/cm	0.05 mg/L	0.56 NTU	-28.6 mV	14.20 ft	250.00 ml/min
9/13/2018 10:23 AM	21:00	6.97 pH	15.06 °C	3,719.6 µS/cm	0.05 mg/L	0.62 NTU	-26.1 mV	14.20 ft	250.00 ml/min
9/13/2018 10:26 AM	24:00	6.98 pH	15.03 °C	3,719.9 µS/cm	0.05 mg/L	0.62 NTU	-23.8 mV	14.20 ft	250.00 ml/min
9/13/2018 10:29 AM	27:00	6.97 pH	15.01 °C	3,723.8 µS/cm	0.05 mg/L	0.64 NTU	-21.1 mV	14.20 ft	250.00 ml/min
9/13/2018 10:32 AM	30:00	6.97 pH	14.98 °C	3,724.4 µS/cm	0.05 mg/L	0.70 NTU	-18.9 mV	14.20 ft	250.00 ml/min
9/13/2018 10:35 AM	33:00	6.98 pH	14.97 °C	3,725.6 µS/cm	0.05 mg/L	0.75 NTU	-17.3 mV	14.20 ft	250.00 ml/min
9/13/2018 10:38 AM	36:00	6.98 pH	14.97 °C	3,725.4 µS/cm	0.04 mg/L	0.65 NTU	-15.5 mV	14.20 ft	250.00 ml/min

Samples

Sample ID:	Description:
BNMW9	VOCS

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/13/2018 8:26:46 AM
Project: BNMW17
Operator Name: JS/RM

Location Name: BNMW17 **Well Diameter: 4 in** **Casing Type: PVC** **Total Depth: 19.29 ft** **Initial Depth to Water: 15.15 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 17.2 ft** **Estimated Total Volume Pumped: 8413.333 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 230 ml/min** **Final Draw Down: 15.94 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:

Weather Conditions:
Overcast, 59° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/13/2018 8:26 AM	00:00	7.27 pH	14.07 °C	0.88 µS/cm	9.03 mg/L	0.18 NTU	79.3 mV	15.15 ft	230.00 ml/min
9/13/2018 8:29 AM	03:00	7.26 pH	14.22 °C	0.91 µS/cm	8.26 mg/L	0.15 NTU	78.9 mV	15.15 ft	300.00 ml/min
9/13/2018 8:32 AM	06:00	6.79 pH	14.62 °C	3,761.1 µS/cm	0.34 mg/L	89.91 NTU	-161.2 mV	15.30 ft	230.00 ml/min
9/13/2018 8:35 AM	09:00	6.80 pH	14.68 °C	3,742.8 µS/cm	0.18 mg/L	100.85 NTU	-170.2 mV	15.40 ft	230.00 ml/min
9/13/2018 8:38 AM	12:00	6.81 pH	14.71 °C	3,737.4 µS/cm	0.16 mg/L	111.90 NTU	-173.7 mV	15.45 ft	230.00 ml/min
9/13/2018 8:41 AM	15:00	6.81 pH	14.75 °C	3,764.6 µS/cm	0.17 mg/L	96.04 NTU	-173.8 mV	15.40 ft	230.00 ml/min
9/13/2018 8:44 AM	17:40	6.81 pH	14.78 °C	3,736.4 µS/cm	0.29 mg/L	90.47 NTU	-166.4 mV	15.52 ft	230.00 ml/min
9/13/2018 8:47 AM	20:40	6.82 pH	14.79 °C	3,762.0 µS/cm	0.18 mg/L	76.25 NTU	-169.6 mV	15.50 ft	230.00 ml/min
9/13/2018 8:50 AM	23:40	6.82 pH	14.80 °C	3,729.1 µS/cm	0.14 mg/L	100.05 NTU	-170.1 mV	15.63 ft	230.00 ml/min
9/13/2018 8:53 AM	26:40	6.82 pH	14.79 °C	3,749.0 µS/cm	0.14 mg/L	114.71 NTU	-170.1 mV	15.70 ft	230.00 ml/min
9/13/2018 8:56 AM	29:40	6.83 pH	14.80 °C	3,736.8 µS/cm	0.16 mg/L	102.69 NTU	-169.2 mV	15.73 ft	230.00 ml/min
9/13/2018 8:59 AM	32:40	6.84 pH	14.81 °C	3,732.5 µS/cm	0.17 mg/L	100.98 NTU	-167.5 mV	15.80 ft	230.00 ml/min
9/13/2018 9:02 AM	35:40	6.85 pH	14.80 °C	3,712.6 µS/cm	0.16 mg/L	101.94 NTU	-166.0 mV	15.82 ft	230.00 ml/min

Samples

Sample ID:	Description:
BNMW17	VOCs, EPH/VPH, Metals

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/13/2018 10:54:04 AM
Project: BNMW-20
Operator Name: BW/ST

Location Name: BNMW-20 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 12.58 ft** **Total Depth: 22.58 ft** **Initial Depth to Water: 13.78 ft**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 18.2 ft** **Estimated Total Volume Pumped: 16320 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 320 ml/min** **Final Draw Down: 0.07 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:
Clear no odor

Weather Conditions:
65 F. Cloudy

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/13/2018 10:54 AM	00:00	6.97 pH	16.85 °C	3,079.3 µS/cm	4.33 mg/L	419.09 NTU	210.0 mV	13.78 ft	320.00 ml/min
9/13/2018 10:57 AM	03:00	6.97 pH	14.97 °C	3,132.2 µS/cm	2.08 mg/L	449.61 NTU	216.7 mV	13.78 ft	320.00 ml/min
9/13/2018 11:00 AM	06:00	6.91 pH	14.56 °C	3,157.9 µS/cm	2.06 mg/L	396.92 NTU	223.9 mV	13.82 ft	320.00 ml/min
9/13/2018 11:03 AM	09:00	6.88 pH	14.43 °C	3,184.8 µS/cm	2.08 mg/L	210.07 NTU	225.9 mV	13.83 ft	320.00 ml/min
9/13/2018 11:06 AM	12:00	6.88 pH	14.34 °C	3,211.2 µS/cm	2.06 mg/L	92.05 NTU	227.6 mV	13.83 ft	320.00 ml/min
9/13/2018 11:09 AM	15:00	6.89 pH	14.29 °C	3,209.0 µS/cm	2.03 mg/L	41.36 NTU	227.7 mV	13.84 ft	320.00 ml/min
9/13/2018 11:12 AM	18:00	6.90 pH	14.24 °C	3,210.1 µS/cm	2.03 mg/L	41.28 NTU	228.5 mV	13.84 ft	320.00 ml/min
9/13/2018 11:15 AM	21:00	6.92 pH	14.24 °C	3,213.6 µS/cm	2.02 mg/L	27.84 NTU	226.5 mV	13.84 ft	320.00 ml/min
9/13/2018 11:18 AM	24:00	6.92 pH	14.21 °C	3,210.2 µS/cm	2.02 mg/L	26.98 NTU	227.0 mV	13.82 ft	320.00 ml/min
9/13/2018 11:21 AM	27:00	6.93 pH	14.18 °C	3,217.6 µS/cm	2.01 mg/L	21.41 NTU	226.5 mV	13.82 ft	320.00 ml/min
9/13/2018 11:24 AM	30:00	6.94 pH	14.14 °C	3,216.1 µS/cm	2.01 mg/L	20.28 NTU	225.3 mV	13.82 ft	320.00 ml/min
9/13/2018 11:27 AM	33:00	6.94 pH	14.11 °C	3,214.8 µS/cm	2.01 mg/L	18.40 NTU	224.1 mV	13.83 ft	320.00 ml/min
9/13/2018 11:30 AM	36:00	6.95 pH	14.11 °C	3,216.8 µS/cm	2.01 mg/L	14.52 NTU	222.8 mV	13.83 ft	320.00 ml/min

9/13/2018 11:33 AM	39:00	6.95 pH	14.12 °C	3,216.5 µS/cm	2.01 mg/L	13.72 NTU	221.7 mV	13.83 ft	320.00 ml/min
9/13/2018 11:36 AM	42:00	6.96 pH	14.13 °C	3,211.3 µS/cm	2.00 mg/L	10.50 NTU	221.1 mV	13.83 ft	320.00 ml/min
9/13/2018 11:39 AM	45:00	6.97 pH	14.15 °C	3,210.4 µS/cm	1.99 mg/L	8.84 NTU	220.3 mV	13.84 ft	320.00 ml/min
9/13/2018 11:42 AM	48:00	6.97 pH	14.16 °C	3,208.2 µS/cm	1.98 mg/L	8.74 NTU	219.3 mV	13.84 ft	320.00 ml/min
9/13/2018 11:45 AM	51:00	6.97 pH	14.16 °C	3,208.6 µS/cm	1.98 mg/L	8.34 NTU	219.1 mV	13.85 ft	320.00 ml/min

Samples

Sample ID:	Description:
BNMW-30	VOCs

Low-Flow Test Report:

Test Date / Time: 9/13/2018 9:32:43 AM
Project: BNMW-21
Operator Name: BW/ST

Location Name: BNMW-21 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 8.3 ft** **Total Depth: 18.3 ft** **Initial Depth to Water: 14.17 ft**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 16.2 ft** **Estimated Total Volume Pumped: 11724 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 328 ml/min** **Final Draw Down: 0.01 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:

Weather Conditions:
Cloudy 69 F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/13/2018 9:32 AM	00:00	6.93 pH	15.52 °C	3,253.8 µS/cm	5.88 mg/L	449.08 NTU	222.4 mV	14.17 ft	300.00 ml/min
9/13/2018 9:35 AM	03:00	6.89 pH	14.53 °C	3,291.2 µS/cm	1.50 mg/L	362.21 NTU	231.3 mV	14.17 ft	328.00 ml/min
9/13/2018 9:38 AM	06:00	6.89 pH	14.42 °C	3,308.5 µS/cm	1.12 mg/L	87.79 NTU	234.1 mV	14.18 ft	328.00 ml/min
9/13/2018 9:41 AM	09:00	6.89 pH	14.40 °C	3,307.3 µS/cm	1.10 mg/L	43.49 NTU	235.0 mV	14.18 ft	328.00 ml/min
9/13/2018 9:44 AM	12:00	6.89 pH	14.38 °C	3,314.1 µS/cm	1.05 mg/L	36.86 NTU	235.3 mV	14.18 ft	328.00 ml/min
9/13/2018 9:47 AM	15:00	6.90 pH	14.38 °C	3,318.1 µS/cm	1.05 mg/L	27.32 NTU	234.6 mV	14.18 ft	328.00 ml/min
9/13/2018 9:50 AM	18:00	6.90 pH	14.38 °C	3,318.8 µS/cm	1.01 mg/L	20.91 NTU	234.2 mV	14.18 ft	328.00 ml/min
9/13/2018 9:53 AM	21:00	6.90 pH	14.37 °C	3,320.5 µS/cm	1.01 mg/L	15.29 NTU	233.5 mV	14.17 ft	328.00 ml/min
9/13/2018 9:56 AM	24:00	6.91 pH	14.41 °C	3,321.9 µS/cm	1.00 mg/L	12.24 NTU	232.8 mV	14.17 ft	328.00 ml/min
9/13/2018 9:59 AM	27:00	6.91 pH	14.44 °C	3,323.0 µS/cm	1.01 mg/L	10.21 NTU	232.4 mV	14.17 ft	328.00 ml/min
9/13/2018 10:02 AM	30:00	6.91 pH	14.48 °C	3,323.0 µS/cm	1.00 mg/L	8.30 NTU	231.5 mV	14.18 ft	328.00 ml/min
9/13/2018 10:05 AM	33:00	6.91 pH	14.50 °C	3,324.1 µS/cm	1.00 mg/L	7.12 NTU	230.7 mV	14.18 ft	328.00 ml/min
9/13/2018 10:08 AM	36:00	6.92 pH	14.46 °C	3,316.2 µS/cm	1.01 mg/L	7.42 NTU	229.9 mV	14.18 ft	328.00 ml/min

Samples

Sample ID:	Description:
BNMW-21	Clear. No odor. VOC only. Sample time 1010

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/13/2018 8:49:07 AM
Project: BNMW-23
Operator Name: PL/JR

Location Name: BNMW-23 **Well Diameter: 1 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 10 ft** **Total Depth: 19.68 ft** **Initial Depth to Water: 12.95 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 16.3 ft** **Estimated Total Volume Pumped: 3.81 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.13 l/min** **Final Draw Down: 0.26 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Weather Conditions:
Cloudy, 60 F, winds 5 mph

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/13/2018 8:49 AM	00:00	7.05 pH	15.62 °C	2,324.2 µS/cm	6.72 mg/L	6.17 NTU	193.3 mV	12.95 ft	0.13 l/min
9/13/2018 8:52 AM	03:00	6.87 pH	15.87 °C	3,395.1 µS/cm	1.10 mg/L	1.36 NTU	-36.8 mV	13.05 ft	0.13 l/min
9/13/2018 8:55 AM	06:00	6.88 pH	15.74 °C	3,354.9 µS/cm	0.54 mg/L	0.32 NTU	-55.1 mV	13.18 ft	0.13 l/min
9/13/2018 8:58 AM	09:00	6.87 pH	15.71 °C	3,346.9 µS/cm	0.44 mg/L	1.04 NTU	-63.7 mV	13.20 ft	0.13 l/min
9/13/2018 9:01 AM	12:00	6.86 pH	15.74 °C	3,350.3 µS/cm	0.34 mg/L	0.15 NTU	-60.9 mV	13.20 ft	0.13 l/min
9/13/2018 9:04 AM	15:00	6.86 pH	15.73 °C	3,345.2 µS/cm	0.28 mg/L	0.44 NTU	-64.3 mV	13.20 ft	0.13 l/min
9/13/2018 9:07 AM	18:00	6.87 pH	15.75 °C	3,341.7 µS/cm	0.25 mg/L	0.14 NTU	-69.3 mV	13.20 ft	0.13 l/min
9/13/2018 9:10 AM	21:00	6.87 pH	15.74 °C	3,334.6 µS/cm	0.23 mg/L	0.19 NTU	-72.5 mV	13.20 ft	0.13 l/min
9/13/2018 9:13 AM	24:00	6.87 pH	15.73 °C	3,335.8 µS/cm	0.21 mg/L	0.16 NTU	-73.8 mV	13.20 ft	0.13 l/min
9/13/2018 9:16 AM	27:00	6.87 pH	15.74 °C	3,331.9 µS/cm	0.19 mg/L	0.19 NTU	-75.3 mV	13.21 ft	0.13 l/min
9/13/2018 9:19 AM	30:00	6.88 pH	15.73 °C	3,333.6 µS/cm	0.19 mg/L	0.13 NTU	-75.6 mV	13.21 ft	0.13 l/min

Samples

Sample ID:	Description:
BNMW-23	Collected @ 920 No odor, no sheen , clear

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/11/2018 2:21:09 PM
Project: BPGP17
Operator Name: JR/BW

Location Name: BOGP17 **Well Diameter: 0.75 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 12.28 ft** **Total Depth: 22.28 ft** **Initial Depth to Water: 11.66 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 17 ft** **Estimated Total Volume Pumped: 2.4 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.2 l/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5
9/11/2018 2:21 PM	00:00	6.96 pH	22.98 °C	4,813.9 µS/cm	0.45 mg/L	16.99 NTU	176.9 mV	11.66 ft
9/11/2018 2:24 PM	03:00	6.96 pH	19.54 °C	4,427.9 µS/cm	0.79 mg/L	8.08 NTU	-78.1 mV	11.66 ft
9/11/2018 2:27 PM	06:00	6.97 pH	18.73 °C	4,379.3 µS/cm	0.49 mg/L	4.18 NTU	-99.7 mV	11.66 ft
9/11/2018 2:30 PM	09:00	6.98 pH	18.40 °C	4,349.0 µS/cm	0.42 mg/L	3.59 NTU	-103.9 mV	11.66 ft
9/11/2018 2:33 PM	12:00	6.98 pH	18.47 °C	4,331.8 µS/cm	0.33 mg/L	3.50 NTU	-104.8 mV	11.66 ft

Samples

Sample ID:	Description:
BPGP17	Clear. No odor. VOC only. Sample time 1435

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/14/2018 10:15:28 AM
Project: BPGP02
Operator Name: JS/JR

Location Name: BPGP02 **Well Diameter: 0.5 in** **Casing Type: PVC** **Total Depth: 19.98 ft** **Initial Depth to Water: 11.65 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 15.8 ft** **Estimated Total Volume Pumped: 3.42 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.19 l/min** **Final Draw Down: 12.15 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:
HC odor

Weather Conditions:
Overcast, 56° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/14/2018 10:15 AM	00:00	7.18 pH	17.07 °C	2,918.1 µS/cm	2.59 mg/L	21.46 NTU	-107.6 mV	11.65 ft	0.19 l/min
9/14/2018 10:18 AM	03:00	7.11 pH	15.93 °C	2,940.7 µS/cm	0.48 mg/L	3.49 NTU	-123.2 mV	11.65 ft	0.19 l/min
9/14/2018 10:21 AM	06:00	7.10 pH	15.74 °C	2,962.2 µS/cm	0.28 mg/L	0.95 NTU	-133.0 mV	11.65 ft	0.19 l/min
9/14/2018 10:24 AM	09:00	7.09 pH	15.67 °C	2,967.4 µS/cm	0.23 mg/L	0.40 NTU	-137.6 mV	11.65 ft	0.19 l/min
9/14/2018 10:27 AM	12:00	7.08 pH	15.61 °C	2,967.2 µS/cm	0.21 mg/L	0.47 NTU	-141.2 mV	11.65 ft	0.19 l/min
9/14/2018 10:30 AM	15:00	7.07 pH	15.62 °C	2,969.9 µS/cm	0.20 mg/L	0.26 NTU	-144.4 mV	11.65 ft	0.19 l/min
9/14/2018 10:33 AM	18:00	7.07 pH	15.61 °C	2,970.2 µS/cm	0.18 mg/L	2.42 NTU	-147.1 mV	11.65 ft	0.19 l/min

Samples

Sample ID:	Description:
BPGP-02	VOCs, EPH/VPH, MNA

Low-Flow Test Report:

Test Date / Time: 9/12/2018 10:48:12 AM
Project: BPGP08
Operator Name: JS/JR

Location Name: BPGP08 **Well Diameter: 0.5 in** **Casing Type: PVC** **Total Depth: 19.88 ft** **Initial Depth to Water: 11.61 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 15.7 ft** **Estimated Total Volume Pumped: 1.92 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.1 l/min** **Final Draw Down: 11.61 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Weather Conditions:
Partly cloudy, 73° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/12/2018 10:48 AM	00:00	7.03 pH	18.94 °C	3,654.5 µS/cm	0.94 mg/L	0.47 NTU	209.6 mV	11.61 ft	0.14 l/min
9/12/2018 10:51 AM	03:00	6.94 pH	17.71 °C	3,677.6 µS/cm	0.78 mg/L	21.47 NTU	210.7 mV	11.61 ft	0.14 l/min
9/12/2018 10:54 AM	06:00	6.96 pH	16.86 °C	3,567.3 µS/cm	0.41 mg/L	4.13 NTU	209.3 mV	11.61 ft	0.10 l/min
9/12/2018 10:57 AM	09:00	6.97 pH	16.56 °C	3,534.3 µS/cm	0.27 mg/L	1.84 NTU	207.7 mV	11.61 ft	0.10 l/min
9/12/2018 11:00 AM	12:00	6.97 pH	16.42 °C	3,520.8 µS/cm	0.23 mg/L	3.71 NTU	206.7 mV	11.61 ft	0.10 l/min
9/12/2018 11:03 AM	15:00	6.98 pH	16.31 °C	3,503.4 µS/cm	0.21 mg/L	2.21 NTU	205.1 mV	11.61 ft	0.10 l/min
9/12/2018 11:06 AM	18:00	6.98 pH	16.26 °C	3,514.2 µS/cm	0.19 mg/L	0.39 NTU	204.3 mV	11.61 ft	0.10 l/min
9/12/2018 11:09 AM	21:00	6.98 pH	16.26 °C	3,503.5 µS/cm	0.20 mg/L	0.22 NTU	203.2 mV	11.61 ft	0.10 l/min

Samples

Sample ID:	Description:
BPGP85	VOCs

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/12/2018 9:38:20 AM
Project: BPGP12
Operator Name: JS/JR

Location Name: BPGP12 **Well Diameter: 0.5 in** **Casing Type: PVC** **Total Depth: 23.67 m** **Initial Depth to Water: 11.72 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 17.7 ft** **Estimated Total Volume Pumped: 3.57 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.17 l/min** **Final Draw Down: 11.68 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Weather Conditions:
Partly cloudy, 64° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/12/2018 9:38 AM	00:00	7.10 pH	15.76 °C	3,011.6 µS/cm	0.79 mg/L	0.14 NTU	232.2 mV	11.72 ft	0.17 l/min
9/12/2018 9:41 AM	03:00	6.98 pH	14.89 °C	3,571.0 µS/cm	1.22 mg/L	2.43 NTU	232.1 mV	11.72 ft	0.17 l/min
9/12/2018 9:44 AM	06:00	6.98 pH	14.67 °C	3,605.5 µS/cm	0.92 mg/L	0.20 NTU	231.6 mV	11.72 ft	0.17 l/min
9/12/2018 9:47 AM	09:00	6.98 pH	14.72 °C	3,612.7 µS/cm	0.78 mg/L	6.12 NTU	230.4 mV	11.72 ft	0.17 l/min
9/12/2018 9:50 AM	12:00	6.98 pH	14.57 °C	3,605.4 µS/cm	0.68 mg/L	2.63 NTU	229.0 mV	11.72 ft	0.17 l/min
9/12/2018 9:53 AM	15:00	6.98 pH	14.50 °C	3,609.6 µS/cm	0.63 mg/L	0.15 NTU	228.2 mV	11.72 ft	0.17 l/min
9/12/2018 9:56 AM	18:00	6.99 pH	14.61 °C	3,614.9 µS/cm	0.60 mg/L	0.44 NTU	227.2 mV	11.72 ft	0.17 l/min
9/12/2018 9:59 AM	21:00	6.99 pH	14.71 °C	3,612.8 µS/cm	0.58 mg/L	0.05 NTU	226.0 mV	11.72 ft	0.17 l/min

Samples

Sample ID:	Description:
BPGP12	VOCs, MNA

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/11/2018 3:49:46 PM
Project: BPGP15
Operator Name: JR/BW

Location Name: BPGP15 **Well Diameter: 0.75 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 9.57 ft** **Total Depth: 19.57 ft** **Initial Depth to Water: 11.01 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 15.3 ft** **Estimated Total Volume Pumped: 3.9 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.13 l/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/11/2018 3:49 PM	00:00	6.85 pH	18.38 °C	4,047.2 µS/cm	0.43 mg/L	4.38 NTU	-7.5 mV	11.01 ft	0.13 l/min
9/11/2018 3:52 PM	03:00	6.87 pH	16.62 °C	3,751.5 µS/cm	2.31 mg/L	9.36 NTU	23.6 mV	11.01 ft	0.13 l/min
9/11/2018 3:55 PM	06:00	6.88 pH	15.94 °C	3,773.1 µS/cm	2.31 mg/L	4.25 NTU	42.7 mV	11.01 ft	0.13 l/min
9/11/2018 3:58 PM	09:00	6.88 pH	15.66 °C	3,770.6 µS/cm	2.20 mg/L	0.45 NTU	54.5 mV	11.01 ft	0.13 l/min
9/11/2018 4:01 PM	12:00	6.87 pH	15.63 °C	3,766.8 µS/cm	2.08 mg/L	0.34 NTU	63.3 mV	11.01 ft	0.13 l/min
9/11/2018 4:04 PM	15:00	6.87 pH	15.58 °C	3,776.9 µS/cm	2.15 mg/L	1.25 NTU	70.5 mV	11.01 ft	0.13 l/min
9/11/2018 4:07 PM	18:00	6.87 pH	15.53 °C	3,782.5 µS/cm	2.17 mg/L	0.91 NTU	76.1 mV	11.01 ft	0.13 l/min
9/11/2018 4:10 PM	21:00	6.87 pH	15.41 °C	3,780.9 µS/cm	2.13 mg/L	0.12 NTU	81.0 mV	11.01 ft	0.13 l/min
9/11/2018 4:13 PM	24:00	6.87 pH	15.34 °C	3,769.5 µS/cm	2.10 mg/L	0.17 NTU	85.4 mV	11.01 ft	0.13 l/min
9/11/2018 4:16 PM	27:00	6.87 pH	15.28 °C	3,766.1 µS/cm	2.11 mg/L	0.12 NTU	89.3 mV	11.01 ft	0.13 l/min
9/11/2018 4:19 PM	30:00	6.86 pH	15.26 °C	3,768.3 µS/cm	2.09 mg/L	0.11 NTU	92.9 mV	11.01 ft	0.13 l/min

Samples

Sample ID:	Description:
BPGP15	No color. No odor. VOC only. Sample time 1620

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/11/2018 12:52:31 PM
Project: BPGP16
Operator Name: JR/BW

Location Name: BPGP16 **Well Diameter: 0.75 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 9.39 ft** **Total Depth: 19.39 ft** **Initial Depth to Water: 12.64 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 16 ft** **Estimated Total Volume Pumped: 1.98 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.14 l/min** **Final Draw Down: 0.04 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/11/2018 12:52 PM	00:00	7.08 pH	26.32 °C	2,326.7 µS/cm	1.21 mg/L	13.98 NTU	168.7 mV	12.64 ft	0.10 l/min
9/11/2018 12:55 PM	03:05	7.28 pH	24.03 °C	1,874.7 µS/cm	2.41 mg/L	18.93 NTU	169.3 mV	12.64 ft	0.10 l/min
9/11/2018 12:58 PM	06:05	7.50 pH	20.60 °C	1,611.0 µS/cm	3.58 mg/L	16.90 NTU	161.2 mV	12.64 ft	0.14 l/min
9/11/2018 1:01 PM	09:05	7.56 pH	18.18 °C	1,563.1 µS/cm	3.94 mg/L	10.09 NTU	161.4 mV	12.64 ft	0.14 l/min
9/11/2018 1:04 PM	12:05	7.57 pH	17.53 °C	1,575.6 µS/cm	3.91 mg/L	8.05 NTU	161.3 mV	12.64 ft	0.14 l/min
9/11/2018 1:07 PM	15:05	7.58 pH	17.31 °C	1,590.9 µS/cm	3.98 mg/L	7.09 NTU	161.4 mV	12.64 ft	0.14 l/min
9/11/2018 1:10 PM	18:05	7.58 pH	17.43 °C	1,600.3 µS/cm	4.00 mg/L	7.37 NTU	161.5 mV	12.64 ft	0.14 l/min

Samples

Sample ID:	Description:
BPGP16	Clear. No odor. VOC only. Sample time 1310. Collected dupe 20180911-02

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/14/2018 8:39:03 AM
Project: BPGP22
Operator Name: JS/JR

Location Name: BPGP22 **Well Diameter: 0.5 in** **Casing Type: PVC** **Total Depth: 21.99 ft** **Initial Depth to Water: 11.32 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 16.7 ft** **Estimated Total Volume Pumped: 0.6 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.17 l/min** **Final Draw Down: 11.34 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Weather Conditions:
Overcast, 56° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/14/2018 8:39 AM	00:00	6.89 pH	15.03 °C	3,693.8 µS/cm	4.79 mg/L	57.59 NTU	250.8 mV	11.32 ft	0.10 l/min
9/14/2018 8:42 AM	03:00	6.90 pH	14.76 °C	3,700.8 µS/cm	2.11 mg/L	6.21 NTU	252.4 mV	11.32 ft	0.10 l/min
9/14/2018 8:45 AM	06:00	6.89 pH	14.73 °C	3,694.1 µS/cm	1.81 mg/L	1.49 NTU	252.8 mV	11.32 ft	0.00 l/min
9/14/2018 8:48 AM	09:00	6.89 pH	14.71 °C	3,680.4 µS/cm	1.68 mg/L	0.80 NTU	251.4 mV	11.32 ft	0.00 l/min
9/14/2018 8:51 AM	12:00	6.88 pH	14.70 °C	3,669.5 µS/cm	1.61 mg/L	0.41 NTU	249.8 mV	11.32 ft	0.00 l/min
9/14/2018 8:54 AM	15:00	6.88 pH	14.71 °C	3,650.7 µS/cm	1.54 mg/L	0.09 NTU	247.6 mV	11.32 ft	0.00 l/min

Samples

Sample ID:	Description:
BPGP22	VOCs, Metals

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/11/2018 10:41:14 AM
Project: BPGP25
Operator Name: JR/BW

Location Name: BPGP25 **Well Diameter: 0.75 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 11.5 ft** **Total Depth: 21.44 ft** **Initial Depth to Water: 12 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 16.7 ft** **Estimated Total Volume Pumped: 3.15 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.15 l/min** **Final Draw Down: 11.89 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/11/2018 10:41 AM	00:00	7.12 pH	22.83 °C	3,720.2 µS/cm	1.85 mg/L	10.42 NTU	183.0 mV	12.00 ft	0.15 l/min
9/11/2018 10:44 AM	03:00	7.19 pH	16.98 °C	3,278.3 µS/cm	1.38 mg/L	29.34 NTU	183.8 mV	12.00 ft	0.15 l/min
9/11/2018 10:47 AM	06:00	7.20 pH	15.89 °C	3,303.2 µS/cm	1.35 mg/L	11.74 NTU	183.3 mV	12.00 ft	0.15 l/min
9/11/2018 10:50 AM	09:00	7.21 pH	15.46 °C	3,312.5 µS/cm	1.34 mg/L	16.18 NTU	182.7 mV	12.00 ft	0.15 l/min
9/11/2018 10:53 AM	12:00	7.22 pH	15.28 °C	3,307.0 µS/cm	1.32 mg/L	11.04 NTU	182.1 mV	12.00 ft	0.15 l/min
9/11/2018 10:56 AM	15:00	7.22 pH	15.17 °C	3,310.7 µS/cm	1.31 mg/L	2.90 NTU	181.6 mV	12.00 ft	0.15 l/min
9/11/2018 10:59 AM	18:00	7.22 pH	15.08 °C	3,313.5 µS/cm	1.32 mg/L	3.89 NTU	181.3 mV	12.00 ft	0.15 l/min
9/11/2018 11:02 AM	21:00	7.22 pH	14.95 °C	3,302.9 µS/cm	1.31 mg/L	0.88 NTU	181.3 mV	12.00 ft	0.15 l/min

Samples

Sample ID:	Description:
BPGP25	Clear. No odor. VOC only. Sample time 1105

Low-Flow Test Report:

Test Date / Time: 9/11/2018 11:29:08 AM
Project: BPGP27 (2)
Operator Name: JR/BW

Location Name: BPGP27 **Well Diameter: 0.75 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 11.5 ft** **Total Depth: 21.44 ft** **Initial Depth to Water: 11.38 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 16.4 ft** **Estimated Total Volume Pumped: 2.25 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.15 l/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:
Actual BPGP27 data

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/11/2018 11:29 AM	00:00	7.16 pH	20.81 °C	3,457.0 µS/cm	1.48 mg/L	20.32 NTU	177.1 mV	11.38 ft	0.00 l/min
9/11/2018 11:32 AM	03:00	7.07 pH	17.16 °C	3,791.3 µS/cm	0.72 mg/L	4.30 NTU	182.5 mV	11.38 ft	0.00 l/min
9/11/2018 11:35 AM	06:00	7.08 pH	16.25 °C	3,779.3 µS/cm	0.54 mg/L	2.59 NTU	182.3 mV	11.38 ft	0.00 l/min
9/11/2018 11:38 AM	09:00	7.08 pH	16.08 °C	3,768.6 µS/cm	0.47 mg/L	1.37 NTU	181.6 mV	11.38 ft	0.00 l/min
9/11/2018 11:41 AM	12:00	7.09 pH	15.98 °C	3,755.4 µS/cm	0.43 mg/L	0.31 NTU	180.9 mV	11.38 ft	0.00 l/min
9/11/2018 11:44 AM	15:00	7.09 pH	16.06 °C	3,753.7 µS/cm	0.44 mg/L	0.19 NTU	180.8 mV	11.38 ft	0.00 l/min

Samples

Sample ID:	Description:
BPGP27	Actual BPGB27 data. No color or odor. VOC only. Sample time 1145

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/11/2018 4:41:38 PM
Project: BPGP29
Operator Name: JR/BW

Location Name: BPGP29 **Well Diameter: 0.75 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 11.67 ft** **Total Depth: 21.67 ft** **Initial Depth to Water: 11.9 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 16.8 ft** **Estimated Total Volume Pumped: 2.4 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.16 l/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/11/2018 4:41 PM	00:00	6.95 pH	19.76 °C	2,974.8 µS/cm	2.25 mg/L	2.82 NTU	97.2 mV	11.90 ft	0.00 l/min
9/11/2018 4:44 PM	03:00	7.10 pH	16.41 °C	2,638.1 µS/cm	0.63 mg/L	1.34 NTU	95.9 mV	11.90 ft	0.00 l/min
9/11/2018 4:47 PM	06:00	7.11 pH	15.90 °C	2,652.9 µS/cm	0.33 mg/L	0.61 NTU	96.6 mV	11.90 ft	0.00 l/min
9/11/2018 4:50 PM	09:00	7.12 pH	15.80 °C	2,654.5 µS/cm	0.23 mg/L	0.46 NTU	97.4 mV	11.90 ft	0.00 l/min
9/11/2018 4:53 PM	12:00	7.12 pH	15.59 °C	2,656.0 µS/cm	0.23 mg/L	0.34 NTU	98.1 mV	11.90 ft	0.00 l/min

Samples

Sample ID:	Description:
BPGP29	No color. No odor. VOCs only. Sample time 1655

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/11/2018 1:39:28 PM
Project: BPGP31
Operator Name: JR/BW

Location Name: BPGP31 **Well Diameter: 0.75 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 11.44 ft** **Total Depth: 21.44 ft** **Initial Depth to Water: 11.91 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 16.7 ft** **Estimated Total Volume Pumped: 2.7 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.15 l/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5
9/11/2018 1:39 PM	00:00	7.50 pH	24.79 °C	1,731.2 µS/cm	3.83 mg/L	5.29 NTU	166.6 mV	11.91 ft
9/11/2018 1:42 PM	03:00	6.98 pH	18.63 °C	4,582.9 µS/cm	0.67 mg/L	11.46 NTU	186.7 mV	11.91 ft
9/11/2018 1:45 PM	06:00	6.99 pH	17.37 °C	4,733.3 µS/cm	0.41 mg/L	9.61 NTU	185.8 mV	11.91 ft
9/11/2018 1:48 PM	09:00	6.99 pH	17.12 °C	4,730.9 µS/cm	0.31 mg/L	10.74 NTU	185.1 mV	11.91 ft
9/11/2018 1:51 PM	12:00	7.00 pH	16.75 °C	4,743.1 µS/cm	0.27 mg/L	6.93 NTU	184.4 mV	11.91 ft
9/11/2018 1:54 PM	15:00	7.00 pH	16.48 °C	4,777.5 µS/cm	0.25 mg/L	4.83 NTU	183.9 mV	11.91 ft
9/11/2018 1:57 PM	18:00	7.00 pH	16.18 °C	4,767.1 µS/cm	0.21 mg/L	5.26 NTU	183.4 mV	11.91 ft

Samples

Sample ID:	Description:
BPGP31	Clear. No odor. VOC only. Sample time 1400

Low-Flow Test Report:

Test Date / Time: 9/10/2018 3:26:41 PM
Project: BPGP41
Operator Name: JS/JR

Location Name: BPGP41 **Well Diameter: 0.5 in** **Casing Type: PVC** **Total Depth: 13.62 ft** **Initial Depth to Water: 11.96 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 13 ft** **Estimated Total Volume Pumped: 3.195 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.15 l/min** **Final Draw Down: 11.75 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Weather Conditions:
Sunny, 81° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 5	
9/10/2018 3:26 PM	00:00	7.23 pH	7.05 mS/cm	1.72 mg/L	2.70 NTU	-77.2 mV	11.96 ft	0.15 l/min
9/10/2018 3:29 PM	03:00	7.01 pH	8.73 mS/cm	3.03 mg/L	3.38 NTU	9.6 mV	11.96 ft	0.15 l/min
9/10/2018 3:32 PM	06:00	7.03 pH	8.77 mS/cm	3.14 mg/L	4.81 NTU	31.0 mV	11.96 ft	0.15 l/min
9/10/2018 3:35 PM	09:00	7.05 pH	8.73 mS/cm	3.12 mg/L	0.84 NTU	43.1 mV	11.96 ft	0.15 l/min
9/10/2018 3:38 PM	12:00	7.06 pH	8.69 mS/cm	3.11 mg/L	0.94 NTU	51.7 mV	11.96 ft	0.02 l/min
9/10/2018 3:41 PM	15:00	7.07 pH	8.64 mS/cm	3.08 mg/L	2.98 NTU	58.6 mV	11.96 ft	0.15 l/min
9/10/2018 3:44 PM	18:00	7.07 pH	8.62 mS/cm	3.08 mg/L	1.95 NTU	64.5 mV	11.96 ft	0.15 l/min
9/10/2018 3:47 PM	21:00	7.07 pH	8.57 mS/cm	3.04 mg/L	0.33 NTU	69.8 mV	11.96 ft	0.10 l/min
9/10/2018 3:50 PM	24:00	7.05 pH	8.55 mS/cm	3.04 mg/L	0.65 NTU	74.9 mV	11.96 ft	0.10 l/min
9/10/2018 3:53 PM	27:00	7.02 pH	8.51 mS/cm	3.02 mg/L	0.45 NTU	80.1 mV	11.96 ft	0.15 l/min
9/10/2018 3:56 PM	30:00	6.99 pH	8.47 mS/cm	2.99 mg/L	0.23 NTU	85.0 mV	11.96 ft	0.15 l/min

Samples

Sample ID:	Description:
BPGP41	VOCs, Blind DUP

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/10/2018 4:44:53 PM
Project: BPGP42
Operator Name: JS/JR

Location Name: BPGP42 **Well Diameter: 0.5 in** **Casing Type: PVC** **Total Depth: 20.75 ft** **Initial Depth to Water: 11.47 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 16.1 ft** **Estimated Total Volume Pumped: 4.8 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.2 l/min** **Final Draw Down: 13.19 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Weather Conditions:
Partly cloudy, 75° F, calm/no wind

Low-Flow Readings:

Date Time	Elapsed Time	pH	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 5	
9/10/2018 4:44 PM	00:00	7.01 pH	8.73 mS/cm	2.65 mg/L	5.41 NTU	67.3 mV	11.47 ft	0.20 l/min
9/10/2018 4:47 PM	03:00	7.27 pH	5.34 mS/cm	0.87 mg/L	0.78 NTU	69.0 mV	11.47 ft	0.20 l/min
9/10/2018 4:50 PM	06:00	7.29 pH	5.45 mS/cm	0.40 mg/L	0.17 NTU	69.9 mV	11.47 ft	0.20 l/min
9/10/2018 4:53 PM	09:00	7.31 pH	5.49 mS/cm	0.24 mg/L	0.12 NTU	69.8 mV	11.47 ft	0.20 l/min
9/10/2018 4:56 PM	12:00	7.31 pH	5.52 mS/cm	0.17 mg/L	0.11 NTU	70.2 mV	11.47 ft	0.20 l/min
9/10/2018 4:59 PM	15:00	7.27 pH	5.54 mS/cm	0.15 mg/L	0.02 NTU	72.6 mV	11.47 ft	0.20 l/min
9/10/2018 5:02 PM	18:00	7.20 pH	5.55 mS/cm	0.13 mg/L	0.04 NTU	76.6 mV	11.47 ft	0.20 l/min
9/10/2018 5:05 PM	21:00	7.14 pH	5.55 mS/cm	0.12 mg/L	0.21 NTU	80.3 mV	11.47 ft	0.20 l/min
9/10/2018 5:08 PM	24:00	7.10 pH	5.56 mS/cm	0.11 mg/L	0.09 NTU	82.5 mV	11.47 ft	0.20 l/min

Samples

Sample ID:	Description:

BPGP42	VOCs, MNA

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/10/2018 12:56:30 PM
Project: BPGP44
Operator Name: JS/JR

Location Name: BPGP44 **Well Diameter: 0.5 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 11.5 ft** **Total Depth: 21.23 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 17.1 ft** **Estimated Total Volume Pumped: 9006.667 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 200 ml/min** **Final Draw Down: 12.83 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:
ORP did not stabilize. Took sample after 45 min of purging. Purged 3 gal from well.

Weather Conditions:
Sunny, 80 F, calm

Low-Flow Readings:

Date Time	Elapsed Time	pH	Specific Conductivity	RDO Concentration	Turbidity	ORP	Flow
		+/- 1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	
9/10/2018 12:56 PM	00:00	7.29 pH	7.45 mS/cm	1.05 mg/L	1.36 NTU	-85.7 mV	200.00 ml/min
9/10/2018 12:59 PM	03:02	7.29 pH	7.47 mS/cm	1.15 mg/L	1.30 NTU	-73.0 mV	200.00 ml/min
9/10/2018 1:02 PM	06:02	7.26 pH	5.81 mS/cm	2.45 mg/L	6.57 NTU	-11.5 mV	200.00 ml/min
9/10/2018 1:05 PM	09:02	7.27 pH	5.95 mS/cm	2.62 mg/L	0.54 NTU	4.6 mV	200.00 ml/min
9/10/2018 1:08 PM	12:02	7.28 pH	5.98 mS/cm	2.65 mg/L	0.88 NTU	2.0 mV	200.00 ml/min
9/10/2018 1:11 PM	15:02	7.29 pH	6.02 mS/cm	2.68 mg/L	0.21 NTU	10.1 mV	200.00 ml/min
9/10/2018 1:14 PM	18:02	7.30 pH	6.01 mS/cm	2.72 mg/L	0.29 NTU	19.0 mV	200.00 ml/min
9/10/2018 1:17 PM	21:02	7.30 pH	6.04 mS/cm	2.72 mg/L	0.20 NTU	27.9 mV	200.00 ml/min
9/10/2018 1:20 PM	24:02	7.29 pH	6.06 mS/cm	2.74 mg/L	0.18 NTU	35.7 mV	200.00 ml/min
9/10/2018 1:23 PM	27:02	7.29 pH	6.05 mS/cm	2.73 mg/L	0.28 NTU	42.8 mV	200.00 ml/min
9/10/2018 1:26 PM	30:02	7.27 pH	6.05 mS/cm	2.73 mg/L	0.18 NTU	49.3 mV	200.00 ml/min
9/10/2018 1:29 PM	33:02	7.26 pH	6.06 mS/cm	2.74 mg/L	0.24 NTU	55.6 mV	200.00 ml/min
9/10/2018 1:32 PM	36:02	7.24 pH	6.06 mS/cm	2.73 mg/L	0.19 NTU	61.4 mV	200.00 ml/min

9/10/2018 1:35 PM	39:02	7.22 pH	6.07 mS/cm	2.73 mg/L	0.24 NTU	66.6 mV	200.00 ml/min
9/10/2018 1:38 PM	42:02	7.20 pH	6.08 mS/cm	2.73 mg/L	0.30 NTU	71.6 mV	200.00 ml/min
9/10/2018 1:41 PM	45:02	7.20 pH	6.10 mS/cm	2.70 mg/L	0.30 NTU	74.3 mV	200.00 ml/min

Samples

Sample ID:	Description:
BPGP44	VOCs

Low-Flow Test Report:

Test Date / Time: 9/15/2018 8:37:53 AM
Project: BPGP46
Operator Name: ST

Location Name: BPGP46 **Well Diameter: 0.75 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 11 ft** **Total Depth: 21.54 ft**	**Pump Type: Peristaltic** **Tubing Type: Teflon** **Pump Intake From TOC: 17.6 ft** **Estimated Total Volume Pumped: 8.55 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.15 ml/min** **Final Draw Down: 13.69 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/15/2018 8:37 AM	00:00	7.21 pH	14.01 °C	2,130.9 µS/cm	1.01 mg/L	13.32 NTU	177.0 mV	13.69 ft	0.15 ml/min
9/15/2018 8:40 AM	03:00	7.16 pH	15.22 °C	2,054.7 µS/cm	1.30 mg/L	16.40 NTU	-59.5 mV	13.60 ft	0.15 ml/min
9/15/2018 8:43 AM	06:00	7.15 pH	15.78 °C	2,037.2 µS/cm	0.53 mg/L	9.73 NTU	-108.5 mV	13.69 ft	0.15 ml/min
9/15/2018 8:46 AM	09:00	7.15 pH	16.00 °C	2,027.1 µS/cm	0.36 mg/L	10.14 NTU	-115.9 mV	13.69 ft	0.15 ml/min
9/15/2018 8:49 AM	12:00	7.15 pH	16.11 °C	2,020.8 µS/cm	0.26 mg/L	11.73 NTU	-116.8 mV	13.69 ft	0.15 ml/min
9/15/2018 8:52 AM	15:00	7.15 pH	16.21 °C	2,018.4 µS/cm	0.23 mg/L	12.62 NTU	-115.6 mV	13.69 ft	0.15 ml/min
9/15/2018 8:55 AM	18:00	7.15 pH	16.26 °C	2,013.3 µS/cm	0.20 mg/L	13.94 NTU	-114.7 mV	13.69 ft	0.15 ml/min
9/15/2018 8:58 AM	21:00	7.15 pH	16.33 °C	2,009.9 µS/cm	0.17 mg/L	17.08 NTU	-112.4 mV	13.69 ft	0.15 ml/min
9/15/2018 9:01 AM	24:00	7.15 pH	16.36 °C	2,008.0 µS/cm	0.16 mg/L	20.94 NTU	-109.9 mV	13.69 ft	0.15 ml/min
9/15/2018 9:04 AM	27:00	7.15 pH	16.40 °C	2,006.4 µS/cm	0.17 mg/L	23.04 NTU	-107.2 mV	13.69 ft	0.15 ml/min
9/15/2018 9:07 AM	30:00	7.15 pH	16.39 °C	2,004.3 µS/cm	0.15 mg/L	26.59 NTU	-104.1 mV	13.69 ft	0.15 ml/min
9/15/2018 9:10 AM	33:00	7.15 pH	16.43 °C	2,000.4 µS/cm	0.14 mg/L	29.40 NTU	-102.4 mV	13.69 ft	0.15 ml/min
9/15/2018 9:13 AM	36:00	7.15 pH	16.44 °C	1,998.8 µS/cm	0.14 mg/L	33.83 NTU	-101.2 mV	13.69 ft	0.15 ml/min
9/15/2018 9:16 AM	39:00	7.15 pH	16.46 °C	1,998.0 µS/cm	0.13 mg/L	39.20 NTU	-100.1 mV	13.69 ft	0.15 ml/min
9/15/2018 9:19 AM	42:00	7.15 pH	16.48 °C	1,997.4 µS/cm	0.13 mg/L	46.49 NTU	-98.8 mV	13.69 ft	0.15 ml/min

9/15/2018 9:22 AM	45:00	7.15 pH	16.47 °C	1,998.9 µS/cm	0.13 mg/L	49.94 NTU	-97.9 mV	13.69 ft	0.15 ml/min
9/15/2018 9:25 AM	48:00	7.15 pH	16.50 °C	1,996.0 µS/cm	0.14 mg/L	62.09 NTU	-97.7 mV	13.69 ft	0.15 ml/min
9/15/2018 9:28 AM	51:00	7.15 pH	16.49 °C	1,991.4 µS/cm	0.13 mg/L	71.16 NTU	-97.6 mV	13.69 ft	0.15 ml/min
9/15/2018 9:31 AM	54:00	7.15 pH	16.49 °C	1,991.6 µS/cm	0.14 mg/L	68.31 NTU	-97.3 mV	13.69 ft	0.15 ml/min
9/15/2018 9:34 AM	57:00	7.15 pH	16.37 °C	1,995.5 µS/cm	0.16 mg/L	70.61 NTU	-89.8 mV	13.69 ft	0.15 ml/min

Samples

Sample ID:	Description:
BPGP46	

Low-Flow Test Report:

Test Date / Time: 9/10/2018 5:40:20 PM
Project: BPGP47
Operator Name: JS/JR

Location Name: BPGP47 **Well Diameter: 0.5 in** **Casing Type: PVC** **Total Depth: 20.96 ft** **Initial Depth to Water: 12.02 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 16.5 ft** **Estimated Total Volume Pumped: 3.28 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.2 l/min** **Final Draw Down: 10.75 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Weather Conditions:
Partly cloudy, 72° F, calm/no wind

Low-Flow Readings:

Date Time	Elapsed Time	pH	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 5	
9/10/2018 5:40 PM	00:00	7.10 pH	5.73 mS/cm	0.32 mg/L	18.15 NTU	63.0 mV	12.02 ft	0.20 l/min
9/10/2018 5:43 PM	03:00	7.11 pH	5.77 mS/cm	2.32 mg/L	2.50 NTU	77.4 mV	12.02 ft	0.20 l/min
9/10/2018 5:46 PM	06:00	7.13 pH	5.79 mS/cm	2.58 mg/L	3.33 NTU	85.7 mV	12.02 ft	0.20 l/min
9/10/2018 5:49 PM	09:00	7.12 pH	5.80 mS/cm	2.61 mg/L	0.47 NTU	92.4 mV	12.02 ft	0.20 l/min
9/10/2018 5:52 PM	12:00	7.11 pH	5.81 mS/cm	2.61 mg/L	0.59 NTU	98.1 mV	12.02 ft	0.20 l/min
9/10/2018 5:55 PM	15:00	7.10 pH	5.81 mS/cm	2.61 mg/L	0.57 NTU	102.8 mV	12.02 ft	0.20 l/min
9/10/2018 5:55 PM	15:09	7.10 pH	5.81 mS/cm	2.61 mg/L	0.20 NTU	103.1 mV	12.02 ft	0.20 l/min
9/10/2018 5:56 PM	16:24	7.10 pH	5.81 mS/cm	2.62 mg/L	0.39 NTU	104.6 mV	12.02 ft	0.20 l/min

Samples

Sample ID:	Description:
BPGP47	VOCs

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/11/2018 9:57:09 AM
Project: BPGP48
Operator Name: JS/JR

Location Name: BPGP48 **Well Diameter: 0.5 in** **Casing Type: PVC** **Total Depth: 21.74 ft** **Initial Depth to Water: 10.7 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 16.2 ft** **Estimated Total Volume Pumped: 2.83 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.17 l/min** **Final Draw Down: 10.66 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Weather Conditions:
Partly cloudy, slight breeze NW, 72° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/11/2018 9:57 AM	00:00	7.18 pH	20.75 °C	2,699.1 µS/cm	2.23 mg/L	0.43 NTU	199.2 mV	10.70 ft	0.20 l/min
9/11/2018 10:00 AM	03:00	7.08 pH	17.99 °C	3,723.5 µS/cm	1.94 mg/L	5.71 NTU	202.3 mV	10.70 ft	0.20 l/min
9/11/2018 10:03 AM	06:00	7.07 pH	16.84 °C	3,829.9 µS/cm	1.76 mg/L	0.30 NTU	202.6 mV	10.70 ft	0.20 l/min
9/11/2018 10:06 AM	09:00	7.08 pH	16.55 °C	3,854.1 µS/cm	1.66 mg/L	1.49 NTU	201.7 mV	10.70 ft	0.20 l/min
9/11/2018 10:08 AM	11:09	7.07 pH	16.43 °C	3,868.2 µS/cm	1.61 mg/L	0.34 NTU	201.2 mV	10.70 ft	0.20 l/min
9/11/2018 10:11 AM	14:09	7.08 pH	16.42 °C	3,880.4 µS/cm	1.53 mg/L	0.22 NTU	200.1 mV	10.70 ft	0.20 l/min

Samples

Sample ID:	Description:
BPGP48	Clear purge no odor, VOCs collected

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/14/2018 11:47:31 AM
Project: BPGP49
Operator Name: JS/JR

Location Name: BPGP49 **Well Diameter: 0.5 in** **Casing Type: PVC** **Total Depth: 21.61 m** **Initial Depth to Water: 13.76 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 17.7 ft** **Estimated Total Volume Pumped: 1.92 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.16 l/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:
Lots of debris in purge water. HC odor.

Weather Conditions:
Mostly cloudy, 57° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/14/2018 11:47 AM	00:00	6.96 pH	17.47 °C	4,714.2 µS/cm	0.17 mg/L	0.89 NTU	-86.4 mV	13.76 ft	0.16 l/min
9/14/2018 11:50 AM	03:00	6.98 pH	17.60 °C	3,166.7 µS/cm	1.27 mg/L	6.63 NTU	-55.0 mV	13.76 ft	0.16 l/min
9/14/2018 11:53 AM	06:00	7.04 pH	17.29 °C	2,888.3 µS/cm	1.60 mg/L	8.45 NTU	-48.3 mV	13.76 ft	0.16 l/min
9/14/2018 11:56 AM	09:00	7.04 pH	17.33 °C	2,843.3 µS/cm	1.36 mg/L	7.87 NTU	-44.9 mV	13.76 ft	0.00 l/min
9/14/2018 11:59 AM	12:00	7.05 pH	17.35 °C	2,847.8 µS/cm	1.17 mg/L	3.49 NTU	-41.0 mV	13.76 ft	0.00 l/min
9/14/2018 12:02 PM	15:00	7.05 pH	17.32 °C	2,804.3 µS/cm	1.08 mg/L	6.69 NTU	-39.5 mV	13.76 ft	0.00 l/min
9/14/2018 12:05 PM	18:00	7.05 pH	17.38 °C	2,778.9 µS/cm	1.00 mg/L	13.32 NTU	-36.4 mV	13.76 ft	0.00 l/min
9/14/2018 12:06 PM	19:16	7.06 pH	17.33 °C	2,767.0 µS/cm	0.94 mg/L	5.35 NTU	-35.1 mV	13.76 ft	0.00 l/min
9/14/2018 12:09 PM	22:16	7.06 pH	17.31 °C	2,749.6 µS/cm	0.92 mg/L	9.66 NTU	-32.3 mV	13.76 ft	0.00 l/min
9/14/2018 12:10 PM	23:25	7.06 pH	17.26 °C	2,740.2 µS/cm	0.89 mg/L	5.90 NTU	-32.1 mV	13.76 ft	0.00 l/min
9/14/2018 12:13 PM	26:25	7.06 pH	17.26 °C	2,730.9 µS/cm	0.87 mg/L	13.57 NTU	-29.6 mV	13.76 ft	0.00 l/min

Samples

Sample ID:	Description:
BPGP49	VOCs

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/10/2018 10:28:49 AM
Project:
Operator Name: JS/JR

Location Name: BPGP50 **Well Diameter: 0.5 in** **Casing Type: PVC** **Total Depth: 19.59 m** **Initial Depth to Water: 14.47 m**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 17 ft** **Estimated Total Volume Pumped: 3600 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 200 ml/min** **Final Draw Down: 0 m**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %		
9/10/2018 10:28 AM	00:00	7.27 pH	7.24 mS/cm	4.47 mg/L	25.44 NTU	194.9 mV	14.47 m	200.00 ml/min
9/10/2018 10:31 AM	03:00	7.24 pH	7.25 mS/cm	0.98 mg/L	9.23 NTU	191.5 mV	14.47 m	200.00 ml/min
9/10/2018 10:34 AM	06:00	7.22 pH	7.27 mS/cm	0.97 mg/L	1.06 NTU	191.0 mV	14.47 m	200.00 ml/min
9/10/2018 10:37 AM	09:00	7.19 pH	7.28 mS/cm	0.98 mg/L	0.21 NTU	192.0 mV	14.47 m	200.00 ml/min
9/10/2018 10:40 AM	12:00	7.16 pH	7.28 mS/cm	0.98 mg/L	0.13 NTU	193.4 mV	14.47 m	200.00 ml/min
9/10/2018 10:43 AM	15:00	7.13 pH	7.28 mS/cm	0.98 mg/L	0.40 NTU	194.7 mV	14.47 m	200.00 ml/min
9/10/2018 10:46 AM	18:00	7.14 pH	7.28 mS/cm	1.00 mg/L	0.19 NTU	194.7 mV	14.47 m	200.00 ml/min

Samples

Sample ID:	Description:
BPGP50	VOCs, MNA

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/15/2018 7:42:44 AM
Project: BPGP51
Operator Name: ST

Location Name: BPGP51 **Well Diameter: 0.5 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 11.83 ft** **Total Depth: 21.83 ft** **Initial Depth to Water: 13.73 ft**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 17.75 ft** **Estimated Total Volume Pumped: 3600 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:
Clear no odor

Weather Conditions:
55 F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/15/2018 7:42 AM	00:00	7.19 pH	16.04 °C	2,175.4 µS/cm	1.47 mg/L	7.96 NTU	182.3 mV	13.73 ft	300.00 ml/min
9/15/2018 7:45 AM	03:00	7.20 pH	16.35 °C	2,163.6 µS/cm	0.97 mg/L	3.92 NTU	178.1 mV	13.73 ft	300.00 ml/min
9/15/2018 7:48 AM	06:00	7.20 pH	16.47 °C	2,154.5 µS/cm	0.85 mg/L	2.04 NTU	176.4 mV	13.73 ft	300.00 ml/min
9/15/2018 7:51 AM	09:00	7.20 pH	16.49 °C	2,147.3 µS/cm	0.80 mg/L	1.03 NTU	175.6 mV	13.73 ft	300.00 ml/min
9/15/2018 7:54 AM	12:00	7.20 pH	16.52 °C	2,141.1 µS/cm	0.76 mg/L	1.78 NTU	175.5 mV	13.73 ft	300.00 ml/min

Samples

Sample ID:	Description:
BPGP51	VOCs

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/14/2018 8:15:37 PM
Project: BPGP51B
Operator Name: ST

Location Name: BPGP51B **Well Diameter: 0.75 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 17.57 ft** **Total Depth: 27.57 ft** **Initial Depth to Water: 13.45 ft**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 17.25 ft** **Estimated Total Volume Pumped: 3600 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:
Clear no odor.

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/14/2018 8:15 PM	00:00	7.18 pH	16.23 °C	1,711.8 µS/cm	2.35 mg/L	115.98 NTU	71.5 mV	13.45 ft	300.00 ml/min
9/14/2018 8:18 PM	03:00	7.18 pH	15.95 °C	1,798.1 µS/cm	0.26 mg/L	26.65 NTU	64.3 mV	13.45 ft	300.00 ml/min
9/14/2018 8:21 PM	06:00	7.19 pH	15.86 °C	1,799.8 µS/cm	0.16 mg/L	18.09 NTU	60.5 mV	13.45 ft	300.00 ml/min
9/14/2018 8:24 PM	09:00	7.19 pH	15.84 °C	1,798.5 µS/cm	0.12 mg/L	17.05 NTU	58.1 mV	13.45 ft	300.00 ml/min
9/14/2018 8:27 PM	12:00	7.19 pH	15.83 °C	1,798.0 µS/cm	0.12 mg/L	18.35 NTU	55.7 mV	13.45 ft	300.00 ml/min

Samples

Sample ID:	Description:
BPGP51B	VOCs

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/14/2018 1:10:02 PM
Project: BPGP53
Operator Name: JS/JR

Location Name: BPGP53 **Well Diameter: 0.5 in** **Casing Type: PVC** **Total Depth: 27.2 ft** **Initial Depth to Water: 13.6 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 20.4 ft** **Estimated Total Volume Pumped: 2.52 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.14 l/min** **Final Draw Down: 13.58 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Weather Conditions:
Mostly cloudy, 60° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/14/2018 1:10 PM	00:00	7.47 pH	22.45 °C	0.90 µS/cm	6.66 mg/L	0.12 NTU	15.7 mV	13.60 ft	0.14 l/min
9/14/2018 1:13 PM	03:00	7.09 pH	18.10 °C	2,632.4 µS/cm	0.51 mg/L	60.62 NTU	30.9 mV	13.60 ft	0.14 l/min
9/14/2018 1:16 PM	06:00	7.09 pH	16.64 °C	2,653.1 µS/cm	0.37 mg/L	18.83 NTU	33.6 mV	13.60 ft	0.14 l/min
9/14/2018 1:19 PM	09:00	7.10 pH	16.05 °C	2,673.5 µS/cm	0.36 mg/L	6.66 NTU	34.3 mV	13.60 ft	0.14 l/min
9/14/2018 1:22 PM	12:00	7.10 pH	15.96 °C	2,686.0 µS/cm	0.29 mg/L	3.04 NTU	34.8 mV	13.60 ft	0.14 l/min
9/14/2018 1:25 PM	15:00	7.10 pH	16.20 °C	2,690.5 µS/cm	0.28 mg/L	1.09 NTU	34.8 mV	13.60 ft	0.14 l/min
9/14/2018 1:28 PM	18:00	7.09 pH	16.05 °C	2,687.7 µS/cm	0.28 mg/L	0.68 NTU	34.1 mV	13.60 ft	0.14 l/min

Samples

Sample ID:	Description:
BPGP53	VOCs

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/14/2018 1:49:46 PM
Project: BPGP59
Operator Name: JS/JR

Location Name: BPGP59 **Well Diameter: 0.5 in** **Casing Type: PVC** **Total Depth: 22.25 ft** **Initial Depth to Water: 13.36 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 17.8 ft** **Estimated Total Volume Pumped: 4.08 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.17 l/min** **Final Draw Down: 13.36 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Weather Conditions:
Mostly cloudy, 62° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/14/2018 1:49 PM	00:00	7.02 pH	20.12 °C	1,505.1 µS/cm	2.68 mg/L	21.82 NTU	74.3 mV	13.36 ft	0.17 l/min
9/14/2018 1:52 PM	03:00	7.02 pH	18.23 °C	1,993.9 µS/cm	1.75 mg/L	5.03 NTU	74.4 mV	13.36 ft	0.17 l/min
9/14/2018 1:55 PM	06:00	7.02 pH	17.88 °C	2,085.6 µS/cm	1.49 mg/L	4.17 NTU	73.1 mV	13.36 ft	0.17 l/min
9/14/2018 1:58 PM	09:00	7.02 pH	17.89 °C	2,143.1 µS/cm	1.25 mg/L	3.06 NTU	72.4 mV	13.36 ft	0.17 l/min
9/14/2018 2:01 PM	12:00	7.03 pH	17.52 °C	2,174.1 µS/cm	1.05 mg/L	1.95 NTU	72.5 mV	13.36 ft	0.17 l/min
9/14/2018 2:04 PM	15:00	7.03 pH	17.15 °C	2,206.4 µS/cm	1.03 mg/L	1.78 NTU	72.2 mV	13.36 ft	0.17 l/min
9/14/2018 2:07 PM	18:00	7.03 pH	16.91 °C	2,228.8 µS/cm	0.92 mg/L	0.82 NTU	72.7 mV	13.36 ft	0.17 l/min
9/14/2018 2:10 PM	21:00	7.03 pH	16.77 °C	2,252.9 µS/cm	0.88 mg/L	2.29 NTU	73.3 mV	13.36 ft	0.17 l/min
9/14/2018 2:13 PM	24:00	7.03 pH	16.71 °C	2,265.5 µS/cm	0.86 mg/L	1.14 NTU	73.6 mV	13.36 ft	0.17 l/min

Samples

Sample ID:	Description:

BPGP59	VOCs, EPH/VPH, Metals, MNA

Low-Flow Test Report:

Test Date / Time: 9/14/2018 3:44:18 PM
Project: BPGP60
Operator Name: JS/JR

Location Name: BPGP60 **Well Diameter: 0.5 in** **Casing Type: PVC** **Total Depth: 22.33 ft** **Initial Depth to Water: 13.7 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 18.2 ft** **Estimated Total Volume Pumped: 2.04 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.17 l/min** **Final Draw Down: 13.36 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Weather Conditions:
Partly cloudy, NNW wind, 65° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/14/2018 3:44 PM	00:00	7.13 pH	19.19 °C	2,683.7 µS/cm	1.09 mg/L	123.61 NTU	74.7 mV	13.70 ft	0.17 l/min
9/14/2018 3:47 PM	03:00	6.89 pH	16.57 °C	2,112.5 µS/cm	2.53 mg/L	22.73 NTU	87.3 mV	13.70 ft	0.17 l/min
9/14/2018 3:50 PM	06:00	6.88 pH	16.25 °C	2,108.0 µS/cm	2.75 mg/L	9.97 NTU	93.6 mV	13.70 ft	0.17 l/min
9/14/2018 3:53 PM	09:00	6.87 pH	16.11 °C	2,116.5 µS/cm	2.78 mg/L	6.76 NTU	98.4 mV	13.70 ft	0.17 l/min
9/14/2018 3:56 PM	12:00	6.85 pH	16.03 °C	2,125.2 µS/cm	2.75 mg/L	4.75 NTU	102.3 mV	13.70 ft	0.17 l/min

Samples

Sample ID:	Description:
BPGP60	VOCs

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/14/2018 11:10:27 AM
Project: BPGP61
Operator Name: JS/JR

Location Name: BPGP61 **Well Diameter: 0.5 in** **Casing Type: PVC** **Total Depth: 17.63 m** **Initial Depth to Water: 13.94 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 15.8 ft** **Estimated Total Volume Pumped: 0.51 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.18 l/min** **Final Draw Down: 14.1 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Weather Conditions:
Overcast, 57° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/14/2018 11:10 AM	00:00	6.96 pH	17.32 °C	4,734.3 µS/cm	0.29 mg/L	8.66 NTU	-146.5 mV	13.94 ft	0.17 l/min
9/14/2018 11:13 AM	03:00	6.95 pH	16.58 °C	4,976.2 µS/cm	0.21 mg/L	1.79 NTU	-116.8 mV	13.94 ft	0.00 l/min
9/14/2018 11:16 AM	06:00	6.95 pH	16.46 °C	4,888.2 µS/cm	0.17 mg/L	0.70 NTU	-107.5 mV	13.94 ft	0.00 l/min
9/14/2018 11:19 AM	09:00	6.95 pH	16.37 °C	4,835.6 µS/cm	0.14 mg/L	1.67 NTU	-101.3 mV	13.94 ft	0.00 l/min
9/14/2018 11:22 AM	12:00	6.94 pH	16.31 °C	4,790.5 µS/cm	0.13 mg/L	1.60 NTU	-95.3 mV	13.94 ft	0.00 l/min
9/14/2018 11:25 AM	15:00	6.94 pH	16.29 °C	4,743.0 µS/cm	0.11 mg/L	1.12 NTU	-90.8 mV	13.94 ft	0.00 l/min
9/14/2018 11:28 AM	18:00	6.94 pH	16.30 °C	4,709.2 µS/cm	0.10 mg/L	1.03 NTU	-86.8 mV	13.94 ft	0.00 l/min
9/14/2018 11:31 AM	21:00	6.93 pH	16.27 °C	4,677.0 µS/cm	0.09 mg/L	1.02 NTU	-84.6 mV	13.94 ft	0.00 l/min

Samples

Sample ID:	Description:
BPGP61	VOCs

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/14/2018 6:35:13 PM
Project: BPGP63
Operator Name: ST

Location Name: BPGP63 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 9.96 ft** **Total Depth: 19.96 ft** **Initial Depth to Water: 14.25 ft**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 17.25 ft** **Estimated Total Volume Pumped: 9900 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.04 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:
Clear. No odor. No sheen well the not stabilize but was closed. Sampled after 3 volumes purged.

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/14/2018 6:35 PM	00:00	7.25 pH	15.71 °C	1,508.6 µS/cm	1.47 mg/L	41.36 NTU	178.7 mV	14.25 ft	300.00 ml/min
9/14/2018 6:38 PM	03:00	7.25 pH	15.35 °C	1,533.3 µS/cm	0.50 mg/L	23.57 NTU	172.8 mV	14.27 ft	300.00 ml/min
9/14/2018 6:41 PM	06:00	7.25 pH	15.20 °C	1,559.3 µS/cm	0.33 mg/L	13.77 NTU	169.8 mV	14.27 ft	300.00 ml/min
9/14/2018 6:44 PM	09:00	7.25 pH	15.13 °C	1,571.3 µS/cm	0.30 mg/L	12.43 NTU	167.8 mV	14.31 ft	300.00 ml/min
9/14/2018 6:47 PM	12:00	7.25 pH	15.09 °C	1,572.7 µS/cm	0.27 mg/L	9.18 NTU	166.3 mV	14.31 ft	300.00 ml/min
9/14/2018 6:50 PM	15:00	7.25 pH	15.06 °C	1,573.9 µS/cm	0.21 mg/L	10.81 NTU	165.1 mV	14.31 ft	300.00 ml/min
9/14/2018 6:53 PM	18:00	7.25 pH	15.03 °C	1,573.8 µS/cm	0.21 mg/L	14.51 NTU	163.9 mV	14.29 ft	300.00 ml/min
9/14/2018 6:56 PM	21:00	7.26 pH	15.05 °C	1,575.1 µS/cm	1.74 mg/L	12.60 NTU	162.9 mV	14.29 ft	300.00 ml/min
9/14/2018 6:59 PM	24:00	7.26 pH	15.01 °C	1,575.3 µS/cm	0.20 mg/L	24.16 NTU	162.2 mV	14.29 ft	300.00 ml/min
9/14/2018 7:02 PM	27:00	7.26 pH	15.01 °C	1,575.4 µS/cm	0.19 mg/L	14.92 NTU	161.3 mV	14.29 ft	300.00 ml/min
9/14/2018 7:05 PM	30:00	7.26 pH	14.99 °C	1,576.6 µS/cm	0.16 mg/L	9.56 NTU	160.7 mV	14.29 ft	300.00 ml/min
9/14/2018 7:08 PM	33:00	7.26 pH	14.99 °C	1,576.5 µS/cm	0.18 mg/L	12.05 NTU	160.1 mV	14.29 ft	300.00 ml/min

Samples

Sample ID:	Description:

BPGP63	VOCs

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/14/2018 5:49:14 PM
Project: BPGP65
Operator Name: BW/ST

Location Name: BPGP65 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 8.81 ft** **Total Depth: 18.81 ft**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 15.5 ft** **Estimated Total Volume Pumped: 11655 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:

Weather Conditions:
65F. Sunny, breezy

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/14/2018 5:49 PM	00:00	7.34 pH	17.48 °C	1,536.4 µS/cm	7.29 mg/L	204.06 NTU	182.0 mV	1.32 ft	300.00 ml/min
9/14/2018 5:52 PM	03:00	7.26 pH	15.68 °C	1,822.3 µS/cm	5.04 mg/L	105.40 NTU	185.4 mV	1,335.0 ft	300.00 ml/min
9/14/2018 5:55 PM	05:51	7.20 pH	15.35 °C	1,978.8 µS/cm	4.26 mg/L	90.58 NTU	187.3 mV	13.35 ft	300.00 ml/min
9/14/2018 5:58 PM	08:51	7.18 pH	15.18 °C	2,072.6 µS/cm	4.10 mg/L	90.06 NTU	187.7 mV	13.33 ft	300.00 ml/min
9/14/2018 6:01 PM	11:51	7.17 pH	15.01 °C	2,129.1 µS/cm	3.78 mg/L	55.33 NTU	187.3 mV	13.36 ft	300.00 ml/min
9/14/2018 6:04 PM	14:51	7.16 pH	14.96 °C	2,147.2 µS/cm	3.80 mg/L	35.95 NTU	186.8 mV	13.36 ft	300.00 ml/min
9/14/2018 6:07 PM	17:51	7.16 pH	14.95 °C	2,172.3 µS/cm	3.73 mg/L	33.00 NTU	186.3 mV	13.34 ft	300.00 ml/min
9/14/2018 6:10 PM	20:51	7.16 pH	15.05 °C	2,190.4 µS/cm	3.60 mg/L	22.96 NTU	185.8 mV	13.34 ft	300.00 ml/min
9/14/2018 6:13 PM	23:51	7.16 pH	14.90 °C	2,227.7 µS/cm	3.37 mg/L	37.14 NTU	185.7 mV	13.34 ft	300.00 ml/min
9/14/2018 6:16 PM	26:51	7.16 pH	14.87 °C	2,202.1 µS/cm	3.36 mg/L	30.02 NTU	185.2 mV	13.36 ft	300.00 ml/min
9/14/2018 6:19 PM	29:51	7.16 pH	14.89 °C	2,207.8 µS/cm	3.41 mg/L	34.09 NTU	185.2 mV	13.36 ft	300.00 ml/min
9/14/2018 6:22 PM	32:51	7.15 pH	14.79 °C	2,260.4 µS/cm	3.38 mg/L	21.31 NTU	185.4 mV	13.36 ft	300.00 ml/min
9/14/2018 6:25 PM	35:51	7.15 pH	14.77 °C	2,247.7 µS/cm	3.35 mg/L	20.13 NTU	185.3 mV	13.37 ft	300.00 ml/min
9/14/2018 6:28 PM	38:51	7.15 pH	14.72 °C	2,250.3 µS/cm	3.39 mg/L	19.66 NTU	185.2 mV	13.37 ft	300.00 ml/min

Samples

Sample ID:	Description:
BPGP65	Slightly cloudy. No odor. VOC only. Sample time 1830

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/14/2018 4:19:02 PM
Project: BPGP67
Operator Name: JS/JR

Location Name: BPGP67 **Well Diameter: 0.5 cm** **Casing Type: PVC** **Total Depth: 25.91 m** **Initial Depth to Water: 13.04 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 19.5 ft** **Estimated Total Volume Pumped: 2.94 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.14 l/min** **Final Draw Down: 13.04 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Weather Conditions:
Partly cloudy, 64° F, slight N breeze

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/14/2018 4:19 PM	00:00	6.86 pH	22.92 °C	2,161.5 µS/cm	2.64 mg/L	6.52 NTU	92.6 mV	13.04 ft	0.14 l/min
9/14/2018 4:22 PM	03:00	7.01 pH	19.73 °C	2,334.0 µS/cm	0.70 mg/L	5.07 NTU	54.2 mV	13.04 ft	0.14 l/min
9/14/2018 4:25 PM	06:00	7.02 pH	18.20 °C	2,352.1 µS/cm	0.30 mg/L	9.44 NTU	45.9 mV	13.04 ft	0.14 l/min
9/14/2018 4:28 PM	09:00	7.03 pH	17.83 °C	2,374.7 µS/cm	0.20 mg/L	9.96 NTU	47.0 mV	13.04 ft	0.14 l/min
9/14/2018 4:31 PM	12:00	7.03 pH	17.55 °C	2,372.7 µS/cm	0.14 mg/L	6.94 NTU	50.6 mV	13.04 ft	0.14 l/min
9/14/2018 4:34 PM	15:00	7.03 pH	17.45 °C	2,375.9 µS/cm	0.11 mg/L	10.83 NTU	54.4 mV	13.04 ft	0.14 l/min
9/14/2018 4:37 PM	18:00	7.03 pH	17.33 °C	2,384.6 µS/cm	0.10 mg/L	10.19 NTU	57.2 mV	13.04 ft	0.14 l/min
9/14/2018 4:40 PM	21:00	7.03 pH	17.35 °C	2,379.9 µS/cm	0.09 mg/L	9.80 NTU	59.6 mV	13.04 ft	0.14 l/min

Samples

Sample ID:	Description:
BPGP67	VOCs

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/15/2018 6:21:40 AM
Project: BPGP74
Operator Name: ST

Location Name: BPGP74 **Well Diameter: 0.75 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 11.56 ft** **Total Depth: 21.56 ft** **Initial Depth to Water: 12.89 ft**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 17.25 ft** **Estimated Total Volume Pumped: 9000 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:
Clear no odor

Weather Conditions:
50 F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/15/2018 6:21 AM	00:00	7.09 pH	15.05 °C	1,783.9 µS/cm	1.89 mg/L	301.87 NTU	162.5 mV	12.89 ft	300.00 ml/min
9/15/2018 6:24 AM	03:00	7.23 pH	14.49 °C	1,540.9 µS/cm	0.78 mg/L	102.30 NTU	161.3 mV	12.89 ft	300.00 ml/min
9/15/2018 6:27 AM	06:00	7.24 pH	14.39 °C	1,519.4 µS/cm	0.36 mg/L	73.13 NTU	161.7 mV	12.89 ft	300.00 ml/min
9/15/2018 6:30 AM	09:00	7.25 pH	14.33 °C	1,513.8 µS/cm	0.21 mg/L	65.29 NTU	162.2 mV	12.89 ft	300.00 ml/min
9/15/2018 6:33 AM	12:00	7.26 pH	14.23 °C	1,507.5 µS/cm	0.17 mg/L	61.59 NTU	162.6 mV	12.89 ft	300.00 ml/min
9/15/2018 6:36 AM	15:00	7.26 pH	14.25 °C	1,507.1 µS/cm	0.14 mg/L	57.10 NTU	162.9 mV	12.89 ft	300.00 ml/min
9/15/2018 6:39 AM	18:00	7.27 pH	14.19 °C	1,506.3 µS/cm	0.13 mg/L	45.87 NTU	163.3 mV	12.89 ft	300.00 ml/min
9/15/2018 6:42 AM	21:00	7.27 pH	14.16 °C	1,506.8 µS/cm	0.13 mg/L	45.75 NTU	163.6 mV	12.89 ft	300.00 ml/min
9/15/2018 6:45 AM	24:00	7.27 pH	14.18 °C	1,504.8 µS/cm	0.12 mg/L	39.52 NTU	163.9 mV	12.89 ft	300.00 ml/min
9/15/2018 6:48 AM	27:00	7.27 pH	14.14 °C	1,506.5 µS/cm	0.12 mg/L	40.74 NTU	164.2 mV	12.89 ft	300.00 ml/min
9/15/2018 6:51 AM	30:00	7.28 pH	14.10 °C	1,503.7 µS/cm	0.11 mg/L	38.91 NTU	164.2 mV	12.89 ft	300.00 ml/min

Samples

Sample ID:	Description:
BPGP74	VOCS

Low-Flow Test Report:

Test Date / Time: 9/15/2018 7:02:06 AM
Project: BPGP76
Operator Name: ST

Location Name: BPGP76 **Well Diameter: 0.5 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 11.55 ft** **Total Depth: 21.55 ft** **Initial Depth to Water: 12.65 ft**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 17 ft** **Estimated Total Volume Pumped: 42 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 225 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:
Clear no odor. Pump Freight 250 ml permanent. Approximately 1.75 gallons purged prior to stabilizing

Weather Conditions:
50 F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/15/2018 7:02 AM	00:00	6.98 pH	15.14 °C	1,618.1 µS/cm	1.29 mg/L	41.22 NTU	171.2 mV	12.65 ft	2.00 ml/min
9/15/2018 7:05 AM	03:00	7.00 pH	15.77 °C	1,607.1 µS/cm	2.45 mg/L	26.60 NTU	175.1 mV	12.65 ft	2.00 ml/min
9/15/2018 7:08 AM	06:00	7.00 pH	15.84 °C	1,603.1 µS/cm	2.64 mg/L	19.79 NTU	178.0 mV	12.65 ft	2.00 ml/min
9/15/2018 7:11 AM	09:00	7.00 pH	15.81 °C	1,599.2 µS/cm	2.62 mg/L	18.28 NTU	179.8 mV	12.65 ft	2.00 ml/min
9/15/2018 7:14 AM	12:00	7.00 pH	15.89 °C	1,599.8 µS/cm	2.59 mg/L	11.06 NTU	181.0 mV	12.65 ft	2.00 ml/min
9/15/2018 7:17 AM	15:00	7.00 pH	15.94 °C	1,599.0 µS/cm	2.56 mg/L	9.51 NTU	182.0 mV	12.65 ft	2.00 ml/min
9/15/2018 7:20 AM	18:00	7.00 pH	15.92 °C	1,596.8 µS/cm	2.54 mg/L	4.88 NTU	182.8 mV	12.65 ft	2.00 ml/min
9/15/2018 7:23 AM	21:00	7.00 pH	15.96 °C	1,595.7 µS/cm	2.48 mg/L	1.35 NTU	181.0 mV	12.65 ft	2.00 ml/min

Samples

Sample ID:	Description:
BPGP76	VOCs

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/14/2018 5:03:00 PM
Project: BPGP78
Operator Name: JS/JR

Location Name: BPGP78 **Well Diameter: 0.5 in** **Casing Type: PVC** **Total Depth: 22.17 ft** **Initial Depth to Water: 12.77 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 17.5 ft** **Estimated Total Volume Pumped: 8.16 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.17 l/min** **Final Draw Down: 12.72 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Weather Conditions:
Partly cloudy, breezy N, 67° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/14/2018 5:03 PM	00:00	7.02 pH	23.71 °C	2,462.8 µS/cm	0.69 mg/L	119.96 NTU	58.9 mV	12.77 ft	0.17 l/min
9/14/2018 5:06 PM	03:00	6.83 pH	19.27 °C	3,563.3 µS/cm	0.64 mg/L	25.38 NTU	-76.6 mV	12.77 ft	0.17 l/min
9/14/2018 5:09 PM	06:00	6.85 pH	18.64 °C	3,545.9 µS/cm	0.39 mg/L	23.07 NTU	-93.8 mV	12.77 ft	0.17 l/min
9/14/2018 5:12 PM	09:00	6.87 pH	18.42 °C	3,516.7 µS/cm	0.29 mg/L	25.12 NTU	-100.8 mV	12.77 ft	0.17 l/min
9/14/2018 5:15 PM	12:00	6.89 pH	18.09 °C	3,499.8 µS/cm	0.25 mg/L	26.04 NTU	-104.6 mV	12.77 ft	0.17 l/min
9/14/2018 5:18 PM	15:00	6.90 pH	17.95 °C	3,476.5 µS/cm	0.22 mg/L	29.34 NTU	-107.5 mV	12.77 ft	0.17 l/min
9/14/2018 5:21 PM	18:00	6.91 pH	17.94 °C	3,449.2 µS/cm	0.20 mg/L	35.28 NTU	-109.4 mV	12.77 ft	0.17 l/min
9/14/2018 5:24 PM	21:00	6.91 pH	17.93 °C	3,439.4 µS/cm	0.20 mg/L	251.68 NTU	-110.7 mV	12.77 ft	0.17 l/min
9/14/2018 5:27 PM	24:00	6.92 pH	17.72 °C	3,390.5 µS/cm	0.19 mg/L	89.67 NTU	-111.8 mV	12.77 ft	0.17 l/min
9/14/2018 5:30 PM	27:00	6.92 pH	17.61 °C	3,364.6 µS/cm	0.19 mg/L	27.09 NTU	-112.2 mV	12.77 ft	0.17 l/min
9/14/2018 5:33 PM	30:00	6.92 pH	17.62 °C	3,362.6 µS/cm	0.18 mg/L	25.54 NTU	-112.8 mV	12.77 ft	0.17 l/min
9/14/2018 5:36 PM	33:00	6.93 pH	17.58 °C	3,351.3 µS/cm	0.18 mg/L	21.50 NTU	-113.1 mV	12.77 ft	0.17 l/min
9/14/2018 5:39 PM	36:00	6.93 pH	17.54 °C	3,340.0 µS/cm	0.18 mg/L	26.88 NTU	-113.8 mV	12.77 ft	0.17 l/min

9/14/2018 5:42 PM	39:00	6.93 pH	17.52 °C	3,342.3 µS/cm	0.18 mg/L	23.59 NTU	-114.3 mV	12.77 ft	0.17 l/min
9/14/2018 5:45 PM	42:00	6.93 pH	17.53 °C	3,331.9 µS/cm	0.18 mg/L	25.99 NTU	-114.8 mV	12.77 ft	0.17 l/min
9/14/2018 5:48 PM	45:00	6.92 pH	17.53 °C	3,325.3 µS/cm	0.17 mg/L	26.95 NTU	-115.4 mV	12.77 ft	0.17 l/min
9/14/2018 5:51 PM	48:00	6.92 pH	17.50 °C	3,316.4 µS/cm	0.18 mg/L	27.12 NTU	-115.7 mV	12.77 ft	0.17 l/min

Samples

Sample ID:	Description:
BPGP-78	VOCs, SVOCs, EPH/VPH, Metals, MNA

Low-Flow Test Report:

Test Date / Time: 9/13/2018 4:35:39 PM
Project: BPGP80
Operator Name: PL/JR

Location Name: BPGP80 **Well Diameter: 1 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 10 ft** **Total Depth: 20.02 ft** **Initial Depth to Water: 12.13 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 16.1 ft** **Estimated Total Volume Pumped: 2.7 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.15 l/min** **Final Draw Down: 0.1 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Weather Conditions:
Cloudy, 70 F, winds 5 mph

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/13/2018 4:35 PM	00:00	6.96 pH	21.89 °C	2,087.9 µS/cm	0.95 mg/L	14.18 NTU	85.6 mV	12.13 ft	0.15 l/min
9/13/2018 4:38 PM	03:00	6.97 pH	18.82 °C	3,008.8 µS/cm	0.69 mg/L	33.22 NTU	91.0 mV	12.23 ft	0.15 l/min
9/13/2018 4:41 PM	06:00	6.98 pH	17.78 °C	2,984.4 µS/cm	0.43 mg/L	22.90 NTU	91.2 mV	12.23 ft	0.15 l/min
9/13/2018 4:44 PM	09:00	6.99 pH	17.53 °C	2,972.0 µS/cm	0.35 mg/L	20.38 NTU	93.1 mV	12.23 ft	0.15 l/min
9/13/2018 4:47 PM	12:00	6.99 pH	17.30 °C	2,981.7 µS/cm	0.29 mg/L	18.54 NTU	95.4 mV	12.23 ft	0.15 l/min
9/13/2018 4:50 PM	15:00	6.98 pH	17.12 °C	2,955.1 µS/cm	0.29 mg/L	18.98 NTU	97.7 mV	12.23 ft	0.15 l/min
9/13/2018 4:53 PM	18:00	6.97 pH	17.00 °C	2,979.7 µS/cm	0.28 mg/L	19.11 NTU	100.1 mV	12.23 ft	0.15 l/min

Samples

Sample ID:	Description:
BPGP 80	Collected @ 1655 Clear, no sheen, no odor

Low-Flow Test Report:

Test Date / Time: 9/13/2018 3:54:07 PM
Project: BPGP81
Operator Name: PL/JR

Location Name: BPGP81 **Well Diameter: 1 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 10 ft** **Total Depth: 18.42 ft** **Initial Depth to Water: 11.93 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 15.2 ft** **Estimated Total Volume Pumped: 2.25 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.15 l/min** **Final Draw Down: 0.03 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Weather Conditions:
Cloudy, 75 f, winds 5 mph

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/13/2018 3:54 PM	00:00	6.99 pH	25.02 °C	2,658.3 µS/cm	1.04 mg/L	12.35 NTU	74.1 mV	11.93 ft	0.15 l/min
9/13/2018 3:57 PM	03:00	6.97 pH	18.82 °C	1,375.8 µS/cm	1.26 mg/L	18.69 NTU	73.3 mV	11.95 ft	0.15 l/min
9/13/2018 4:00 PM	06:00	6.97 pH	17.38 °C	1,997.9 µS/cm	1.14 mg/L	18.72 NTU	83.0 mV	11.96 ft	0.15 l/min
9/13/2018 4:03 PM	09:00	6.99 pH	16.85 °C	2,040.9 µS/cm	0.97 mg/L	14.69 NTU	87.4 mV	11.96 ft	0.15 l/min
9/13/2018 4:06 PM	12:00	6.99 pH	16.56 °C	2,049.7 µS/cm	0.92 mg/L	13.56 NTU	90.6 mV	11.96 ft	0.15 l/min
9/13/2018 4:09 PM	15:00	7.00 pH	16.34 °C	2,055.6 µS/cm	0.93 mg/L	13.86 NTU	92.8 mV	11.96 ft	0.15 l/min

Samples

Sample ID:	Description:
BPGP 81	Collected @ 1610 20180913-02 Clear, no odor, no sheen

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/14/2018 9:15:44 AM
Project: BPGP83
Operator Name: JS/JR

Location Name: BPGP83 **Well Diameter: 0.75 in** **Casing Type: PVC** **Total Depth: 22.65 m** **Initial Depth to Water: 12.62 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 17.6 ft** **Estimated Total Volume Pumped: 2.22 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.16 l/min** **Final Draw Down: 0.03 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Weather Conditions:
Overcast, 57° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/14/2018 9:15 AM	00:00	6.93 pH	15.90 °C	3,038.1 µS/cm	2.25 mg/L	0.96 NTU	237.6 mV	12.62 ft	0.10 l/min
9/14/2018 9:18 AM	03:00	6.93 pH	15.82 °C	2,013.3 µS/cm	1.71 mg/L	0.16 NTU	233.6 mV	12.63 ft	0.16 l/min
9/14/2018 9:21 AM	06:00	6.93 pH	15.75 °C	1,970.3 µS/cm	1.38 mg/L	0.13 NTU	233.0 mV	12.64 ft	0.16 l/min
9/14/2018 9:24 AM	09:00	6.92 pH	15.76 °C	1,967.1 µS/cm	1.22 mg/L	0.11 NTU	231.3 mV	12.65 ft	0.16 l/min
9/14/2018 9:27 AM	12:00	6.92 pH	15.74 °C	1,954.8 µS/cm	1.17 mg/L	0.12 NTU	229.8 mV	12.65 ft	0.16 l/min
9/14/2018 9:30 AM	15:00	6.92 pH	15.67 °C	1,950.2 µS/cm	1.13 mg/L	0.13 NTU	228.4 mV	12.65 ft	0.16 l/min

Samples

Sample ID:	Description:
BPGP83	VOCs

Low-Flow Test Report:

Test Date / Time: 9/12/2018 8:33:21 AM
Project: BPGP84
Operator Name: JS/JR

Location Name: BPGP84 **Well Diameter: 0.75 in** **Casing Type: PVC** **Total Depth: 20.89 m** **Initial Depth to Water: 11.66 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 16.3 ft** **Estimated Total Volume Pumped: 3.84 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.16 l/min** **Final Draw Down: 11.67 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Weather Conditions:
Partly cloudy, 63° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/12/2018 8:33 AM	00:00	7.03 pH	13.85 °C	3,139.9 µS/cm	6.99 mg/L	0.00 NTU	247.0 mV	11.66 ft	0.16 l/min
9/12/2018 8:36 AM	03:00	7.05 pH	14.57 °C	3,059.2 µS/cm	0.46 mg/L	0.36 NTU	250.0 mV	11.66 ft	0.16 l/min
9/12/2018 8:39 AM	06:00	7.04 pH	14.73 °C	3,043.4 µS/cm	0.33 mg/L	0.04 NTU	250.0 mV	11.66 ft	0.16 l/min
9/12/2018 8:42 AM	09:00	7.03 pH	14.81 °C	3,034.0 µS/cm	0.28 mg/L	0.02 NTU	250.5 mV	11.66 ft	0.16 l/min
9/12/2018 8:45 AM	12:00	7.02 pH	14.87 °C	3,029.7 µS/cm	0.23 mg/L	0.07 NTU	250.2 mV	11.67 ft	0.16 l/min
9/12/2018 8:48 AM	15:00	7.02 pH	14.88 °C	3,023.4 µS/cm	0.23 mg/L	0.14 NTU	248.1 mV	11.67 ft	0.16 l/min
9/12/2018 8:51 AM	18:00	7.02 pH	14.87 °C	3,022.0 µS/cm	0.19 mg/L	0.07 NTU	249.6 mV	11.67 ft	0.16 l/min
9/12/2018 8:54 AM	21:00	7.02 pH	14.87 °C	3,017.2 µS/cm	0.19 mg/L	0.00 NTU	248.9 mV	11.67 ft	0.16 l/min
9/12/2018 8:57 AM	24:00	7.02 pH	14.88 °C	3,019.1 µS/cm	0.17 mg/L	0.02 NTU	248.2 mV	11.67 ft	0.16 l/min

Samples

Sample ID:	Description:
BPGP84	VOCs

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/12/2018 11:36:47 AM
Project: BPGP85 (2)
Operator Name: JS/JR

Location Name: BPGP85 (2) **Well Diameter: 0.75 in** **Casing Type: PVC** **Total Depth: 19.88 ft** **Initial Depth to Water: 11.09 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 15.7 ft** **Estimated Total Volume Pumped: 2.55 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.17 l/min** **Final Draw Down: 11.12 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Weather Conditions:
Partly cloudy, 74° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/12/2018 11:36 AM	00:00	6.98 pH	20.70 °C	3,553.1 µS/cm	0.52 mg/L	0.57 NTU	194.5 mV	11.09 ft	0.17 l/min
9/12/2018 11:39 AM	03:00	6.97 pH	15.96 °C	3,757.1 µS/cm	0.52 mg/L	5.69 NTU	197.3 mV	11.09 ft	0.17 l/min
9/12/2018 11:42 AM	06:00	6.96 pH	15.27 °C	3,829.8 µS/cm	0.39 mg/L	2.31 NTU	197.6 mV	11.00 ft	0.17 l/min
9/12/2018 11:45 AM	09:00	6.95 pH	15.30 °C	3,851.1 µS/cm	0.37 mg/L	0.55 NTU	197.5 mV	11.12 ft	0.17 l/min
9/12/2018 11:48 AM	12:00	6.96 pH	15.62 °C	3,833.0 µS/cm	0.38 mg/L	2.91 NTU	196.4 mV	11.12 ft	0.17 l/min
9/12/2018 11:51 AM	15:00	6.95 pH	15.02 °C	3,872.9 µS/cm	0.30 mg/L	0.50 NTU	195.9 mV	11.12 ft	0.17 l/min

Samples

Sample ID:	Description:
BPGP85	Clear, no odor, duplicate collected (20180912-02)

Low-Flow Test Report:

Test Date / Time: 9/11/2018 9:18:11 AM
Project: BPGP86
Operator Name: JS/JR

Location Name: BPGP86 **Well Diameter: 0.75 ft** **Casing Type: PVC** **Total Depth: 22.44 m** **Initial Depth to Water: 11.88 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 17.2 ft** **Estimated Total Volume Pumped: 23.403 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 1.7 l/min** **Final Draw Down: 11.99 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Weather Conditions:
Sunny, clear, 72° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/11/2018 9:18 AM	00:00	7.21 pH	16.44 °C	2,986.7 µS/cm	2.01 mg/L	2.08 NTU	213.4 mV	11.88 ft	1.70 l/min
9/11/2018 9:21 AM	03:00	7.20 pH	15.72 °C	2,660.7 µS/cm	2.26 mg/L	1.27 NTU	212.8 mV	11.96 ft	1.70 l/min
9/11/2018 9:24 AM	06:00	7.20 pH	15.62 °C	2,669.6 µS/cm	2.08 mg/L	0.10 NTU	211.7 mV	11.96 ft	1.70 l/min
9/11/2018 9:28 AM	10:46	7.20 pH	15.49 °C	2,666.3 µS/cm	2.05 mg/L	0.05 NTU	211.2 mV	11.98 ft	1.70 l/min
9/11/2018 9:31 AM	13:46	7.20 pH	15.56 °C	2,664.7 µS/cm	1.99 mg/L	0.47 NTU	210.0 mV	11.99 ft	1.70 l/min

Samples

Sample ID:	Description:
BPGP86	VOCs

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/13/2018 2:57:21 PM
Project: BPGP87
Operator Name: PL/JR

Location Name: BPGP87 **Well Diameter: 1 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 12 ft** **Total Depth: 21.62 ft** **Initial Depth to Water: 13.01 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 17.3 ft** **Estimated Total Volume Pumped: 3.12 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.13 l/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Weather Conditions:
Cloudy, temp 70 F, winds 5 mph

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/13/2018 2:57 PM	00:00	7.00 pH	24.81 °C	3,276.2 µS/cm	0.36 mg/L	11.24 NTU	53.7 mV	13.01 ft	0.13 l/min
9/13/2018 3:00 PM	03:00	7.00 pH	20.77 °C	2,491.0 µS/cm	1.08 mg/L	12.60 NTU	58.5 mV	13.01 ft	0.13 l/min
9/13/2018 3:03 PM	06:00	7.01 pH	19.00 °C	2,487.3 µS/cm	0.85 mg/L	13.97 NTU	65.2 mV	13.01 ft	0.13 l/min
9/13/2018 3:06 PM	09:00	7.02 pH	18.50 °C	2,523.8 µS/cm	0.76 mg/L	13.00 NTU	69.5 mV	13.01 ft	0.13 l/min
9/13/2018 3:09 PM	12:00	7.02 pH	18.31 °C	2,545.7 µS/cm	0.72 mg/L	14.66 NTU	72.4 mV	13.01 ft	0.13 l/min
9/13/2018 3:12 PM	15:00	7.03 pH	18.09 °C	2,535.9 µS/cm	0.70 mg/L	15.21 NTU	75.3 mV	13.01 ft	0.13 l/min
9/13/2018 3:15 PM	18:00	7.03 pH	17.73 °C	2,541.7 µS/cm	0.69 mg/L	16.61 NTU	78.2 mV	13.01 ft	0.13 l/min
9/13/2018 3:18 PM	21:00	7.03 pH	17.73 °C	2,551.3 µS/cm	0.67 mg/L	17.18 NTU	80.6 mV	13.01 ft	0.13 l/min
9/13/2018 3:21 PM	24:00	7.02 pH	17.81 °C	2,555.9 µS/cm	0.65 mg/L	18.33 NTU	82.3 mV	13.01 ft	0.13 l/min

Samples

Sample ID:	Description:

BPGP 87	Collected @ 1525 No odor, no sheen , clear

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/10/2018 2:15:52 PM
Project: BPGP89
Operator Name: JS/JR

Location Name: BPGP89 **Well Diameter: 0.75 ft** **Casing Type: PVC** **Total Depth: 20.86 ft** **Initial Depth to Water: 13.86 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 16.4 ft** **Estimated Total Volume Pumped: 6 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.2 l/min** **Final Draw Down: 13.9 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Weather Conditions:
Sunny, 78° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 5	
9/10/2018 2:15 PM	00:00	7.24 pH	6.31 mS/cm	2.76 mg/L	1.73 NTU	57.8 mV	13.86 ft	0.20 l/min
9/10/2018 2:18 PM	03:00	7.39 pH	5.94 mS/cm	0.69 mg/L	0.92 NTU	-120.7 mV	13.88 ft	0.20 l/min
9/10/2018 2:21 PM	06:00	7.42 pH	6.15 mS/cm	0.28 mg/L	4.21 NTU	-140.0 mV	13.89 ft	0.20 l/min
9/10/2018 2:24 PM	09:00	7.43 pH	6.24 mS/cm	0.20 mg/L	0.54 NTU	-146.4 mV	13.89 ft	0.20 l/min
9/10/2018 2:27 PM	12:00	7.43 pH	6.20 mS/cm	0.18 mg/L	0.57 NTU	-148.3 mV	13.89 ft	0.20 l/min
9/10/2018 2:30 PM	15:00	7.43 pH	6.31 mS/cm	0.18 mg/L	0.75 NTU	-150.3 mV	13.89 ft	0.20 l/min
9/10/2018 2:33 PM	18:00	7.45 pH	6.26 mS/cm	0.15 mg/L	1.78 NTU	-156.6 mV	13.89 ft	0.20 l/min
9/10/2018 2:36 PM	21:00	7.45 pH	6.29 mS/cm	0.10 mg/L	2.92 NTU	-160.9 mV	13.89 ft	0.20 l/min
9/10/2018 2:39 PM	24:00	7.46 pH	6.30 mS/cm	0.09 mg/L	5.57 NTU	-163.9 mV	13.90 ft	0.20 l/min
9/10/2018 2:42 PM	27:00	7.45 pH	6.30 mS/cm	0.09 mg/L	9.66 NTU	-165.8 mV	13.90 ft	0.20 l/min
9/10/2018 2:45 PM	30:00	7.44 pH	6.33 mS/cm	0.09 mg/L	15.81 NTU	-166.2 mV	13.90 ft	0.20 l/min

Samples

Sample ID:	Description:
BPGP89	VOCs, VPH, EPH

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/10/2018 11:27:43 AM
Project: BPGP91
Operator Name: JS/JR

Location Name: BPGP91 **Well Diameter: 0.75 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 15 ft** **Total Depth: 24.72 ft** **Initial Depth to Water: 14.64 m**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 19.7 ft** **Estimated Total Volume Pumped: 6253.333 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 200 ml/min** **Final Draw Down: 14.79 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Weather Conditions:
Sunny, 73 F, 3 mph winds

Low-Flow Readings:

Date Time	Elapsed Time	pH	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %		
9/10/2018 11:27 AM	00:00	7.25 pH	7.35 mS/cm	2.32 mg/L	0.96 NTU	101.9 mV	14.64 m	200.00 ml/min
9/10/2018 11:29 AM	01:36	7.34 pH	6.39 mS/cm	0.50 mg/L	6.35 NTU	-135.6 mV	14.64 m	200.00 ml/min
9/10/2018 11:30 AM	02:25	7.35 pH	6.58 mS/cm	0.29 mg/L	2.70 NTU	-144.7 mV	14.64 m	200.00 ml/min
9/10/2018 11:30 AM	02:40	7.35 pH	6.63 mS/cm	0.28 mg/L	3.14 NTU	-146.0 mV	14.64 m	200.00 ml/min
9/10/2018 11:30 AM	02:52	7.35 pH	6.66 mS/cm	0.27 mg/L	2.82 NTU	-147.5 mV	14.64 m	200.00 ml/min
9/10/2018 11:31 AM	03:37	7.34 pH	6.81 mS/cm	0.29 mg/L	1.28 NTU	-151.0 mV	14.64 m	200.00 ml/min
9/10/2018 11:34 AM	06:37	7.34 pH	7.01 mS/cm	0.38 mg/L	1.00 NTU	-152.6 mV	14.64 m	200.00 ml/min
9/10/2018 11:37 AM	09:37	7.34 pH	7.10 mS/cm	0.41 mg/L	0.93 NTU	-150.0 mV	14.64 m	200.00 ml/min
9/10/2018 11:40 AM	12:37	7.34 pH	7.16 mS/cm	0.43 mg/L	2.79 NTU	-146.9 mV	14.64 m	200.00 ml/min
9/10/2018 11:43 AM	15:37	7.34 pH	7.13 mS/cm	0.43 mg/L	1.55 NTU	-144.4 mV	14.64 m	200.00 ml/min
9/10/2018 11:46 AM	18:37	7.34 pH	7.14 mS/cm	0.44 mg/L	1.92 NTU	-141.4 mV	14.64 m	200.00 ml/min
9/10/2018 11:49 AM	21:37	7.34 pH	7.14 mS/cm	0.45 mg/L	3.67 NTU	-139.2 mV	14.64 m	200.00 ml/min
9/10/2018 11:52 AM	24:37	7.33 pH	7.14 mS/cm	0.46 mg/L	3.67 NTU	-137.4 mV	14.64 m	200.00 ml/min

9/10/2018 11:55 AM	27:37	7.33 pH	7.15 mS/cm	0.46 mg/L	4.34 NTU	-135.7 mV	14.64 m	200.00 ml/min
9/10/2018 11:58 AM	30:37	7.33 pH	7.15 mS/cm	0.47 mg/L	7.41 NTU	-134.8 mV	14.64 m	200.00 ml/min
9/10/2018 11:58 AM	31:16	7.33 pH	7.15 mS/cm	0.47 mg/L	7.97 NTU	-134.6 mV	14.64 m	200.00 ml/min

Samples

Sample ID:	Description:
BPGP91	VOCs

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/11/2018 2:57:48 PM
Project: BPGP92
Operator Name: JR/BW

Location Name: BPGP92 **Well Diameter: 0.75 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 10.68 ft** **Total Depth: 20.68 ft** **Initial Depth to Water: 10.9 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 15.8 ft** **Estimated Total Volume Pumped: 3.75 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.21 l/min** **Final Draw Down: 0.01 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/11/2018 2:57 PM	00:00	7.03 pH	23.64 °C	3,653.1 µS/cm	3.23 mg/L	64.90 NTU	53.8 mV	10.90 ft	0.20 l/min
9/11/2018 3:00 PM	03:00	7.02 pH	16.27 °C	3,886.7 µS/cm	2.28 mg/L	33.84 NTU	45.1 mV	10.90 ft	0.00 l/min
9/11/2018 3:03 PM	06:00	7.01 pH	15.29 °C	3,932.3 µS/cm	0.73 mg/L	4.75 NTU	19.5 mV	10.90 ft	0.21 l/min
9/11/2018 3:06 PM	09:00	7.01 pH	15.00 °C	3,938.0 µS/cm	0.37 mg/L	1.55 NTU	1.9 mV	10.90 ft	0.21 l/min
9/11/2018 3:09 PM	12:00	7.00 pH	14.69 °C	3,945.5 µS/cm	0.29 mg/L	0.81 NTU	-8.4 mV	10.90 ft	0.00 l/min
9/11/2018 3:12 PM	15:00	6.96 pH	14.56 °C	3,937.1 µS/cm	0.25 mg/L	0.38 NTU	-14.5 mV	10.91 ft	0.21 l/min
9/11/2018 3:15 PM	18:00	6.92 pH	14.56 °C	3,937.4 µS/cm	0.22 mg/L	0.09 NTU	-16.9 mV	10.91 ft	0.21 l/min
9/11/2018 3:18 PM	21:00	6.87 pH	14.39 °C	3,938.0 µS/cm	0.20 mg/L	0.34 NTU	-18.1 mV	10.91 ft	0.21 l/min
9/11/2018 3:21 PM	24:00	6.84 pH	14.39 °C	3,934.1 µS/cm	0.18 mg/L	0.10 NTU	-18.2 mV	10.91 ft	0.21 l/min

Samples

Sample ID:	Description:
BPGP92	No color. No odor. VOCs and MNA. Sample time 1525

Low-Flow Test Report:

Test Date / Time: 9/13/2018 1:54:38 PM
Project: BPGP93
Operator Name: PL/JR

Location Name: BPGP93 **Well Diameter: 0.5 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 12 ft** **Total Depth: 22.05 ft** **Initial Depth to Water: 11.85 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 17 ft** **Estimated Total Volume Pumped: 4.65 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.1 l/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/13/2018 1:54 PM	00:00	6.94 pH	28.38 °C	2,554.9 µS/cm	0.77 mg/L	2.05 NTU	-67.3 mV	11.85 ft	0.15 l/min
9/13/2018 1:57 PM	03:00	7.00 pH	19.80 °C	3,058.6 µS/cm	0.48 mg/L	1.66 NTU	2.5 mV	11.85 ft	0.15 l/min
9/13/2018 2:00 PM	06:00	7.02 pH	18.78 °C	3,128.5 µS/cm	0.31 mg/L	2.76 NTU	18.4 mV	11.85 ft	0.15 l/min
9/13/2018 2:03 PM	09:00	7.03 pH	18.48 °C	3,146.6 µS/cm	0.26 mg/L	2.00 NTU	26.3 mV	11.85 ft	0.15 l/min
9/13/2018 2:06 PM	12:00	7.03 pH	18.43 °C	3,151.5 µS/cm	0.21 mg/L	1.58 NTU	31.7 mV	11.85 ft	0.00 l/min
9/13/2018 2:09 PM	15:00	7.03 pH	18.71 °C	3,165.0 µS/cm	0.21 mg/L	1.87 NTU	35.7 mV	11.85 ft	0.15 l/min
9/13/2018 2:12 PM	18:00	7.03 pH	19.39 °C	3,224.6 µS/cm	0.23 mg/L	2.51 NTU	37.9 mV	11.85 ft	0.15 l/min
9/13/2018 2:15 PM	21:00	7.02 pH	19.61 °C	3,195.1 µS/cm	0.23 mg/L	3.38 NTU	41.2 mV	11.85 ft	0.15 l/min
9/13/2018 2:18 PM	24:00	7.03 pH	18.92 °C	3,152.0 µS/cm	0.19 mg/L	3.53 NTU	44.9 mV	11.85 ft	0.15 l/min
9/13/2018 2:21 PM	27:00	7.03 pH	18.38 °C	3,143.0 µS/cm	0.17 mg/L	4.60 NTU	48.1 mV	11.85 ft	0.15 l/min
9/13/2018 2:24 PM	30:00	7.03 pH	18.05 °C	3,139.9 µS/cm	0.16 mg/L	6.02 NTU	50.9 mV	11.85 ft	0.15 l/min
9/13/2018 2:27 PM	33:00	7.04 pH	17.79 °C	3,135.5 µS/cm	0.15 mg/L	8.92 NTU	53.5 mV	11.85 ft	0.10 l/min
9/13/2018 2:30 PM	36:00	7.04 pH	17.86 °C	3,150.8 µS/cm	0.15 mg/L	7.29 NTU	55.0 mV	11.85 ft	0.10 l/min

Samples

Sample ID:	Description:
BPGP 93	Collected @ 1435 No odor, no sheen , clear

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/11/2018 8:36:49 AM
Project: BPGP94
Operator Name: JS/JR

Location Name: BPGP94 **Well Diameter: 0.75 in** **Casing Type: PVC** **Total Depth: 21.62 ft** **Initial Depth to Water: 12.7 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 17.2 ft** **Estimated Total Volume Pumped: 2.25 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.25 l/min** **Final Draw Down: -0.25 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Weather Conditions:
Sunny, clear 68° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/11/2018 8:36 AM	00:00	7.21 pH	17.23 °C	3.07 µS/cm	8.52 mg/L	0.00 NTU	223.7 mV	12.70 ft	0.00 l/min
9/11/2018 8:39 AM	03:00	7.01 pH	14.67 °C	3,504.6 µS/cm	1.80 mg/L	10.68 NTU	243.9 mV	12.45 ft	0.25 l/min
9/11/2018 8:42 AM	06:00	7.05 pH	14.16 °C	3,538.3 µS/cm	1.46 mg/L	0.58 NTU	240.9 mV	12.45 ft	0.25 l/min
9/11/2018 8:45 AM	09:00	7.09 pH	14.03 °C	3,543.5 µS/cm	1.40 mg/L	0.12 NTU	238.1 mV	12.45 ft	0.25 l/min
9/11/2018 8:48 AM	12:00	7.12 pH	13.92 °C	3,546.7 µS/cm	1.39 mg/L	0.27 NTU	234.4 mV	12.45 ft	0.25 l/min

Samples

Sample ID:	Description:
BPGP94	VOCs, MNA

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/15/2018 7:47:06 AM
Project: BPGW01
Operator Name: PL/RM

Location Name: BPGW01 **Well Diameter: 2 in** **Casing Type: PVC** **Total Depth: 18.95 ft** **Initial Depth to Water: 13.55 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 17 ft** **Estimated Total Volume Pumped: 5400 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.05 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/15/2018 7:47 AM	00:00	6.34 pH	15.61 °C	4,320.7 µS/cm	0.48 mg/L	159.44 NTU	122.1 mV	13.60 ft	300.00 ml/min
9/15/2018 7:50 AM	03:00	6.29 pH	16.28 °C	4,239.1 µS/cm	0.28 mg/L	53.16 NTU	125.5 mV	13.60 ft	300.00 ml/min
9/15/2018 7:53 AM	06:00	6.21 pH	16.52 °C	4,205.0 µS/cm	0.27 mg/L	26.89 NTU	130.4 mV	13.60 ft	300.00 ml/min
9/15/2018 7:56 AM	09:00	6.24 pH	16.66 °C	4,174.2 µS/cm	0.28 mg/L	14.03 NTU	129.2 mV	13.60 ft	300.00 ml/min
9/15/2018 7:59 AM	12:00	6.28 pH	16.74 °C	4,143.0 µS/cm	0.28 mg/L	6.20 NTU	127.7 mV	13.60 ft	300.00 ml/min
9/15/2018 8:02 AM	15:00	6.29 pH	16.80 °C	4,121.0 µS/cm	0.27 mg/L	4.43 NTU	127.1 mV	13.60 ft	300.00 ml/min
9/15/2018 8:05 AM	18:00	6.30 pH	16.82 °C	4,100.8 µS/cm	0.27 mg/L	3.39 NTU	127.0 mV	13.60 ft	300.00 ml/min

Samples

Sample ID:	Description:
BPGW01	Collected @ 0808 Strong hydrocarbon odor, brown to clear and no sheen

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/11/2018 8:21:57 AM
Project: Billings PCE
Operator Name: PL, RM

Location Name: BPGW04 **Initial Depth to Water: 11.64 m**	**Pump Type: Bladder** **Tubing Type: Poly** **Pump Intake From TOC: 18 ft** **Estimated Total Volume Pumped: 4.5 gal** **Flow Cell Volume: 130 ml** **Final Flow Rate: 250 ml/min** **Final Draw Down: -8.08 m**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:
No odor, clear ,no sheen

Weather Conditions:
57 F Clear Sky

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 5	
9/11/2018 8:21 AM	00:00	10.26 pH	14.40 °C	3,067.8 µS/cm	2.29 mg/L	2.50 NTU	-42.7 mV	38.19 ft	
9/11/2018 8:24 AM	03:00	10.26 pH	14.39 °C	3,066.8 µS/cm	2.28 mg/L	2.41 NTU	-42.7 mV	38.19 ft	
9/11/2018 8:26 AM	04:12	10.26 pH	14.39 °C	3,066.5 µS/cm	2.29 mg/L	3.01 NTU	-42.7 mV	11.64 ft	
9/11/2018 8:29 AM	07:12	8.76 pH	15.03 °C	2,507.2 µS/cm	2.98 mg/L	20.36 NTU	-28.4 mV	11.64 ft	300.00 ml/min
9/11/2018 8:32 AM	10:12	7.51 pH	14.81 °C	2,343.4 µS/cm	1.48 mg/L	43.07 NTU	-4.7 mV	11.69 ft	50.00 ml/min
9/11/2018 8:35 AM	13:12	7.40 pH	15.48 °C	2,337.2 µS/cm	1.51 mg/L	47.91 NTU	9.1 mV	11.65 ft	150.00 ml/min
9/11/2018 8:38 AM	16:12	7.36 pH	15.10 °C	2,329.5 µS/cm	1.24 mg/L	57.09 NTU	17.9 mV	11.70 ft	150.00 ml/min
9/11/2018 8:41 AM	19:12	7.35 pH	15.11 °C	2,326.1 µS/cm	1.19 mg/L	55.42 NTU	23.8 mV	11.70 ft	150.00 ml/min
9/11/2018 8:44 AM	22:12	7.34 pH	15.13 °C	2,316.8 µS/cm	1.18 mg/L	55.61 NTU	28.3 mV	11.68 ft	150.00 ml/min
9/11/2018 8:47 AM	25:12	7.32 pH	15.21 °C	2,310.5 µS/cm	1.19 mg/L	53.92 NTU	32.0 mV	11.68 ft	150.00 ml/min
9/11/2018 8:50 AM	28:12	7.31 pH	15.31 °C	2,291.9 µS/cm	1.24 mg/L	40.89 NTU	35.3 mV	11.68 ft	150.00 ml/min
9/11/2018 8:53 AM	31:12	7.30 pH	15.39 °C	2,279.1 µS/cm	1.33 mg/L	41.77 NTU	38.3 mV	11.68 ft	150.00 ml/min
9/11/2018 8:56 AM	34:12	7.29 pH	15.47 °C	2,293.5 µS/cm	1.46 mg/L	32.57 NTU	41.6 mV	11.68 ft	150.00 ml/min

9/11/2018 8:59 AM	37:12	7.28 pH	15.55 °C	2,332.5 µS/cm	1.57 mg/L	27.09 NTU	44.7 mV	11.68 ft	150.00 ml/min
9/11/2018 9:02 AM	40:12	7.27 pH	15.61 °C	2,379.4 µS/cm	1.69 mg/L	21.24 NTU	47.7 mV	11.68 ft	150.00 ml/min
9/11/2018 9:05 AM	43:12	7.26 pH	15.66 °C	2,439.9 µS/cm	1.84 mg/L	16.52 NTU	50.8 mV	11.68 ft	150.00 ml/min
9/11/2018 9:08 AM	46:12	7.26 pH	15.71 °C	2,483.3 µS/cm	1.99 mg/L	17.66 NTU	53.6 mV	11.68 ft	150.00 ml/min
9/11/2018 9:11 AM	49:12	7.25 pH	15.78 °C	2,516.4 µS/cm	2.11 mg/L	17.55 NTU	56.2 mV	11.68 ft	150.00 ml/min
9/11/2018 9:14 AM	52:12	7.25 pH	15.81 °C	2,506.6 µS/cm	2.15 mg/L	16.50 NTU	58.5 mV	11.68 ft	150.00 ml/min
9/11/2018 9:17 AM	55:12	7.24 pH	15.87 °C	2,528.3 µS/cm	2.24 mg/L	17.54 NTU	60.8 mV	11.68 ft	150.00 ml/min
9/11/2018 9:20 AM	58:12	7.24 pH	15.89 °C	2,536.9 µS/cm	2.30 mg/L	18.58 NTU	62.9 mV	11.68 ft	150.00 ml/min
9/11/2018 9:23 AM	01:01:12	7.24 pH	15.96 °C	2,529.5 µS/cm	2.36 mg/L	20.86 NTU	64.7 mV	11.68 ft	150.00 ml/min
9/11/2018 9:26 AM	01:04:12	7.23 pH	15.99 °C	2,540.4 µS/cm	2.44 mg/L	25.25 NTU	66.6 mV	11.68 ft	150.00 ml/min
9/11/2018 9:29 AM	01:07:12	7.23 pH	16.02 °C	2,559.9 µS/cm	2.52 mg/L	29.99 NTU	68.4 mV	11.68 ft	150.00 ml/min
9/11/2018 9:32 AM	01:10:12	7.23 pH	16.04 °C	2,572.0 µS/cm	2.54 mg/L	34.29 NTU	70.1 mV	11.68 ft	150.00 ml/min
9/11/2018 9:35 AM	01:13:12	7.22 pH	16.07 °C	2,592.8 µS/cm	2.65 mg/L	40.26 NTU	71.9 mV	11.68 ft	150.00 ml/min
9/11/2018 9:38 AM	01:16:12	7.22 pH	16.06 °C	2,593.8 µS/cm	2.68 mg/L	46.55 NTU	73.5 mV	11.68 ft	150.00 ml/min
9/11/2018 9:41 AM	01:19:12	7.22 pH	16.07 °C	2,568.9 µS/cm	2.70 mg/L	52.26 NTU	75.0 mV	11.68 ft	150.00 ml/min
9/11/2018 9:44 AM	01:22:12	7.22 pH	16.10 °C	2,576.1 µS/cm	2.76 mg/L	49.78 NTU	76.4 mV	11.68 ft	150.00 ml/min
9/11/2018 9:47 AM	01:25:12	7.22 pH	16.11 °C	2,562.4 µS/cm	2.74 mg/L	65.26 NTU	77.7 mV	11.68 ft	150.00 ml/min
9/11/2018 9:50 AM	01:28:12	7.21 pH	16.18 °C	2,572.6 µS/cm	2.78 mg/L	79.25 NTU	78.9 mV	11.68 ft	150.00 ml/min
9/11/2018 9:53 AM	01:31:12	7.21 pH	16.16 °C	2,580.7 µS/cm	2.82 mg/L	94.95 NTU	80.2 mV	11.68 ft	150.00 ml/min
9/11/2018 9:56 AM	01:34:12	7.21 pH	16.20 °C	2,586.7 µS/cm	2.85 mg/L	168.15 NTU	81.2 mV	11.68 ft	150.00 ml/min
9/11/2018 9:59 AM	01:37:12	7.21 pH	15.96 °C	2,585.9 µS/cm	2.79 mg/L	140.38 NTU	82.3 mV	11.68 ft	200.00 ml/min
9/11/2018 10:02 AM	01:40:12	7.20 pH	15.87 °C	2,601.8 µS/cm	3.01 mg/L	148.68 NTU	84.0 mV	11.68 ft	250.00 ml/min
9/11/2018 10:05 AM	01:43:12	7.20 pH	15.89 °C	2,607.2 µS/cm	3.04 mg/L	153.77 NTU	85.2 mV	11.68 ft	250.00 ml/min
9/11/2018 10:08 AM	01:46:12	7.20 pH	15.97 °C	2,610.4 µS/cm	3.08 mg/L	161.95 NTU	86.4 mV	11.68 ft	250.00 ml/min
9/11/2018 10:11 AM	01:49:12	7.20 pH	16.03 °C	2,606.0 µS/cm	3.12 mg/L	171.00 NTU	87.7 mV	11.68 ft	250.00 ml/min
9/11/2018 10:14 AM	01:52:12	7.19 pH	16.11 °C	2,602.3 µS/cm	3.16 mg/L	150.67 NTU	88.8 mV	11.68 ft	250.00 ml/min
9/11/2018 10:17 AM	01:55:12	7.19 pH	16.15 °C	2,610.5 µS/cm	3.19 mg/L	181.73 NTU	89.7 mV	11.68 ft	250.00 ml/min

Samples

Sample ID:	Description:
BPGW04	VOC'S

Low-Flow Test Report:

Test Date / Time: 9/14/2018 11:08:16 AM
Project: EMW - 18
Operator Name: PL/RM

Location Name: EMW - 18 **Well Diameter: 2 in** **Casing Type: PVC** **Total Depth: 21.22 ft** **Initial Depth to Water: 10.37 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 17.3 ft** **Estimated Total Volume Pumped: 8100 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.02 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/14/2018 11:08 AM	00:00	6.70 pH	18.54 °C	3,020.5 µS/cm	3.95 mg/L	234.65 NTU	37.8 mV	10.37 ft	300.00 ml/min
9/14/2018 11:11 AM	03:00	6.68 pH	18.38 °C	3,019.9 µS/cm	3.96 mg/L	97.02 NTU	50.5 mV	10.39 ft	300.00 ml/min
9/14/2018 11:14 AM	06:00	6.68 pH	18.51 °C	3,017.9 µS/cm	3.86 mg/L	52.67 NTU	58.4 mV	10.39 ft	300.00 ml/min
9/14/2018 11:17 AM	09:00	6.68 pH	18.54 °C	3,013.5 µS/cm	3.78 mg/L	44.83 NTU	63.2 mV	10.39 ft	300.00 ml/min
9/14/2018 11:20 AM	12:00	6.68 pH	18.53 °C	3,009.6 µS/cm	3.60 mg/L	28.96 NTU	67.0 mV	10.39 ft	300.00 ml/min
9/14/2018 11:23 AM	15:00	6.67 pH	18.55 °C	2,996.2 µS/cm	3.25 mg/L	25.72 NTU	70.6 mV	10.39 ft	300.00 ml/min
9/14/2018 11:26 AM	18:00	6.66 pH	18.56 °C	2,991.4 µS/cm	3.11 mg/L	14.94 NTU	72.5 mV	10.39 ft	300.00 ml/min
9/14/2018 11:29 AM	21:00	6.66 pH	18.58 °C	2,985.9 µS/cm	3.05 mg/L	8.52 NTU	75.0 mV	10.39 ft	300.00 ml/min
9/14/2018 11:32 AM	24:00	6.66 pH	18.70 °C	2,977.3 µS/cm	3.05 mg/L	5.03 NTU	77.0 mV	10.39 ft	300.00 ml/min
9/14/2018 11:35 AM	27:00	6.66 pH	18.69 °C	2,975.8 µS/cm	3.09 mg/L	2.39 NTU	79.0 mV	10.39 ft	300.00 ml/min

Samples

Sample ID:	Description:
EMW - 18	Collected @ 1138 No odor, no sheen, clear VOC's only

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/12/2018 10:58:50 AM
Project: EMW-03
Operator Name: BW/ST

Location Name: EMW-03 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 10 ft** **Total Depth: 20 ft** **Initial Depth to Water: 11.03 ft**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 14.5 ft** **Estimated Total Volume Pumped: 15060 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.01 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:
Clear. No odor.

Weather Conditions:
Sunny 65

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/12/2018 10:58 AM	00:00	6.84 pH	18.04 °C	2,086.2 µS/cm	4.79 mg/L	342.30 NTU	199.1 mV	11.03 ft	170.00 ml/min
9/12/2018 11:01 AM	03:00	6.86 pH	16.84 °C	2,121.4 µS/cm	0.42 mg/L	220.38 NTU	198.1 mV	11.03 ft	350.00 ml/min
9/12/2018 11:04 AM	06:00	6.88 pH	16.19 °C	2,133.5 µS/cm	0.22 mg/L	85.00 NTU	198.4 mV	11.05 ft	300.00 ml/min
9/12/2018 11:07 AM	09:00	6.89 pH	15.97 °C	2,122.0 µS/cm	0.17 mg/L	54.06 NTU	200.1 mV	11.09 ft	300.00 ml/min
9/12/2018 11:10 AM	12:00	6.91 pH	15.83 °C	2,107.3 µS/cm	0.15 mg/L	42.62 NTU	200.6 mV	11.09 ft	300.00 ml/min
9/12/2018 11:13 AM	15:00	6.94 pH	15.75 °C	2,082.6 µS/cm	0.14 mg/L	32.22 NTU	200.9 mV	11.09 ft	300.00 ml/min
9/12/2018 11:16 AM	18:00	6.95 pH	15.72 °C	2,069.8 µS/cm	0.13 mg/L	40.88 NTU	201.7 mV	11.09 ft	300.00 ml/min
9/12/2018 11:19 AM	21:00	6.96 pH	15.76 °C	2,062.6 µS/cm	0.12 mg/L	48.17 NTU	202.4 mV	11.10 ft	300.00 ml/min
9/12/2018 11:22 AM	24:00	6.97 pH	15.73 °C	2,056.4 µS/cm	0.11 mg/L	69.51 NTU	203.0 mV	11.10 ft	300.00 ml/min
9/12/2018 11:25 AM	27:00	6.97 pH	15.81 °C	2,047.0 µS/cm	0.11 mg/L	92.61 NTU	203.4 mV	11.06 ft	300.00 ml/min
9/12/2018 11:28 AM	30:00	6.97 pH	15.80 °C	2,043.3 µS/cm	0.10 mg/L	104.53 NTU	204.2 mV	11.05 ft	300.00 ml/min
9/12/2018 11:31 AM	33:00	6.98 pH	15.83 °C	2,034.1 µS/cm	0.10 mg/L	148.34 NTU	204.8 mV	11.07 ft	300.00 ml/min
9/12/2018 11:34 AM	36:00	6.97 pH	15.84 °C	2,032.9 µS/cm	0.10 mg/L	176.00 NTU	205.8 mV	11.09 ft	300.00 ml/min

9/12/2018 11:37 AM	39:00	6.95 pH	15.80 °C	2,022.7 µS/cm	0.09 mg/L	246.70 NTU	207.7 mV	11.07 ft	300.00 ml/min
9/12/2018 11:40 AM	42:00	6.95 pH	15.74 °C	2,041.1 µS/cm	0.18 mg/L	414.67 NTU	208.1 mV	11.03 ft	300.00 ml/min
9/12/2018 11:43 AM	45:00	6.97 pH	15.73 °C	2,031.6 µS/cm	0.14 mg/L	468.70 NTU	208.2 mV	11.02 ft	300.00 ml/min
9/12/2018 11:46 AM	48:00	6.97 pH	15.68 °C	2,024.6 µS/cm	0.09 mg/L	483.92 NTU	208.9 mV	11.05 ft	300.00 ml/min
9/12/2018 11:49 AM	51:00	6.97 pH	15.68 °C	2,025.0 µS/cm	0.08 mg/L	513.28 NTU	209.8 mV	11.04 ft	300.00 ml/min

Samples

Sample ID:	Description:
EMW-03	VOCs METALS

Low-Flow Test Report:

Test Date / Time: 9/11/2018 10:50:44 AM
Project: EMW-09
Operator Name: PL, RM

Location Name: BPGW04 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 12.83 ft** **Total Depth: 22.83 ft** **Initial Depth to Water: 11.46 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 17 ft** **Estimated Total Volume Pumped: 9300 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.03 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:
Clear string odor no sheen

Weather Conditions:
Sunny 70 F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/11/2018 10:50 AM	00:00	7.28 pH	18.55 °C	2,560.1 µS/cm	1.27 mg/L	690.02 NTU	-220.1 mV	11.46 ft	400.00 ml/min
9/11/2018 10:53 AM	03:00	7.28 pH	16.73 °C	2,648.5 µS/cm	0.16 mg/L	815.85 NTU	-236.6 mV	11.49 ft	300.00 ml/min
9/11/2018 10:56 AM	06:00	7.28 pH	16.39 °C	2,648.2 µS/cm	0.12 mg/L	664.38 NTU	-243.0 mV	11.49 ft	300.00 ml/min
9/11/2018 10:59 AM	09:00	7.27 pH	16.44 °C	2,621.4 µS/cm	0.12 mg/L	330.92 NTU	-246.1 mV	11.49 ft	300.00 ml/min
9/11/2018 11:02 AM	12:00	7.27 pH	16.53 °C	2,621.5 µS/cm	0.11 mg/L	240.89 NTU	-249.7 mV	11.49 ft	300.00 ml/min
9/11/2018 11:05 AM	15:00	7.27 pH	16.59 °C	2,625.3 µS/cm	0.08 mg/L	198.77 NTU	-252.7 mV	11.49 ft	300.00 ml/min
9/11/2018 11:08 AM	18:00	7.27 pH	16.56 °C	2,618.9 µS/cm	0.07 mg/L	163.96 NTU	-254.6 mV	11.49 ft	300.00 ml/min
9/11/2018 11:11 AM	21:00	7.27 pH	16.55 °C	2,616.2 µS/cm	0.06 mg/L	74.57 NTU	-256.3 mV	11.49 ft	300.00 ml/min
9/11/2018 11:14 AM	24:00	7.27 pH	16.49 °C	2,617.8 µS/cm	0.05 mg/L	87.63 NTU	-257.6 mV	11.49 ft	300.00 ml/min
9/11/2018 11:17 AM	27:00	7.28 pH	16.50 °C	2,619.9 µS/cm	0.04 mg/L	90.84 NTU	-259.0 mV	11.49 ft	300.00 ml/min
9/11/2018 11:20 AM	30:00	7.27 pH	16.62 °C	2,626.2 µS/cm	0.04 mg/L	88.93 NTU	-260.1 mV	11.49 ft	300.00 ml/min

Samples

Sample ID:	Description:
EMW-09	VOCs vph eph @1122

Low-Flow Test Report:

Test Date / Time: 9/13/2018 3:39:20 PM
Project: EMW-28
Operator Name: BW/ST

Location Name: EMW-28 **Well Diameter: 4 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 6.4 ft** **Total Depth: 16.4 ft** **Initial Depth to Water: 15.01 ft**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 15.7 ft** **Estimated Total Volume Pumped: 12660 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 280 ml/min** **Final Draw Down: 0.01 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:

Weather Conditions:
70 F. Sunny

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/13/2018 3:39 PM	00:00	7.41 pH	22.82 °C	690.13 µS/cm	5.75 mg/L	34.22 NTU	132.1 mV	15.01 ft	300.00 ml/min
9/13/2018 3:42 PM	03:00	7.30 pH	18.64 °C	645.78 µS/cm	0.49 mg/L	15.29 NTU	19.2 mV	15.01 ft	280.00 ml/min
9/13/2018 3:45 PM	06:00	7.30 pH	18.03 °C	638.32 µS/cm	0.42 mg/L	9.63 NTU	-30.7 mV	15.02 ft	280.00 ml/min
9/13/2018 3:48 PM	09:00	7.31 pH	17.80 °C	629.81 µS/cm	0.58 mg/L	6.51 NTU	-76.8 mV	15.02 ft	280.00 ml/min
9/13/2018 3:51 PM	12:00	7.32 pH	17.54 °C	626.40 µS/cm	0.66 mg/L	3.87 NTU	-92.7 mV	15.02 ft	280.00 ml/min
9/13/2018 3:54 PM	15:00	7.35 pH	17.31 °C	619.78 µS/cm	0.76 mg/L	2.85 NTU	-98.8 mV	15.02 ft	280.00 ml/min
9/13/2018 3:57 PM	18:00	7.34 pH	17.27 °C	611.52 µS/cm	0.90 mg/L	2.40 NTU	-97.2 mV	15.02 ft	280.00 ml/min
9/13/2018 4:00 PM	21:00	7.35 pH	17.23 °C	603.08 µS/cm	1.05 mg/L	2.10 NTU	-94.5 mV	15.02 ft	280.00 ml/min
9/13/2018 4:03 PM	24:00	7.36 pH	17.05 °C	595.01 µS/cm	1.18 mg/L	1.49 NTU	-93.4 mV	15.03 ft	280.00 ml/min
9/13/2018 4:06 PM	27:00	7.35 pH	17.04 °C	592.36 µS/cm	1.25 mg/L	1.40 NTU	-88.3 mV	15.02 ft	280.00 ml/min
9/13/2018 4:09 PM	30:00	7.37 pH	16.90 °C	585.31 µS/cm	1.40 mg/L	1.35 NTU	-82.7 mV	15.02 ft	280.00 ml/min
9/13/2018 4:12 PM	33:00	7.37 pH	17.07 °C	585.46 µS/cm	1.48 mg/L	1.26 NTU	-76.0 mV	15.02 ft	280.00 ml/min
9/13/2018 4:15 PM	36:00	7.37 pH	17.12 °C	582.58 µS/cm	1.56 mg/L	1.21 NTU	-71.6 mV	15.02 ft	280.00 ml/min

9/13/2018 4:18 PM	39:00	7.37 pH	17.11 °C	580.79 µS/cm	1.63 mg/L	1.14 NTU	-67.1 mV	15.02 ft	280.00 ml/min
9/13/2018 4:21 PM	42:00	7.37 pH	17.11 °C	578.90 µS/cm	1.70 mg/L	1.09 NTU	-62.1 mV	15.02 ft	280.00 ml/min
9/13/2018 4:24 PM	45:00	7.32 pH	17.19 °C	577.40 µS/cm	1.77 mg/L	1.06 NTU	-55.4 mV	15.02 ft	280.00 ml/min

Samples

Sample ID:	Description:
EMW-28	Clear. No odor. VOC only. Blind duplicate 20180913-01. Sample time 1630

Low-Flow Test Report:

Test Date / Time: 9/13/2018 2:46:24 PM
Project: EMW-32
Operator Name: BW/ST

Location Name: EMW-32 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 10.02 ft** **Total Depth: 20.02 ft** **Initial Depth to Water: 15.62 ft**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 17.8 ft** **Estimated Total Volume Pumped: 8100 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.08 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:
Clear. No odor.

Weather Conditions:
Sunny 75,

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/13/2018 2:46 PM	00:00	6.92 pH	21.06 °C	1,679.8 µS/cm	5.45 mg/L	92.38 NTU	160.5 mV	15.62 ft	300.00 ml/min
9/13/2018 2:49 PM	03:00	6.63 pH	17.03 °C	1,729.6 µS/cm	5.24 mg/L	115.22 NTU	191.7 mV	15.69 ft	300.00 ml/min
9/13/2018 2:52 PM	06:00	6.65 pH	15.93 °C	1,738.1 µS/cm	5.32 mg/L	69.64 NTU	197.8 mV	15.69 ft	300.00 ml/min
9/13/2018 2:55 PM	09:00	6.66 pH	15.34 °C	1,746.2 µS/cm	5.42 mg/L	28.08 NTU	200.0 mV	15.69 ft	300.00 ml/min
9/13/2018 2:58 PM	12:00	6.68 pH	15.07 °C	1,752.5 µS/cm	5.44 mg/L	17.32 NTU	201.4 mV	15.70 ft	300.00 ml/min
9/13/2018 3:01 PM	15:00	6.69 pH	14.91 °C	1,756.7 µS/cm	5.47 mg/L	16.31 NTU	202.2 mV	15.70 ft	300.00 ml/min
9/13/2018 3:04 PM	18:00	6.70 pH	14.80 °C	1,761.6 µS/cm	5.47 mg/L	11.51 NTU	202.8 mV	15.70 ft	300.00 ml/min
9/13/2018 3:07 PM	21:00	6.71 pH	14.76 °C	1,770.4 µS/cm	5.50 mg/L	8.27 NTU	203.3 mV	15.70 ft	300.00 ml/min
9/13/2018 3:10 PM	24:00	6.73 pH	14.69 °C	1,770.8 µS/cm	5.51 mg/L	7.81 NTU	203.2 mV	15.70 ft	300.00 ml/min
9/13/2018 3:13 PM	27:00	6.73 pH	14.62 °C	1,775.2 µS/cm	5.49 mg/L	5.80 NTU	203.8 mV	15.70 ft	300.00 ml/min

Samples

Sample ID:	Description:

EMW-32	VOCs + MS/MSD

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/14/2018 3:29:31 PM
Project: MW 109
Operator Name: PL/RM

Location Name: MW 109 **Well Diameter: 2 in** **Casing Type: PVC** **Total Depth: 28.7 ft** **Initial Depth to Water: 17.09 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 25.5 ft** **Estimated Total Volume Pumped: 4500 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.26 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:
VOCs, EPH/VPH, Metals

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/14/2018 3:29 PM	00:00	6.74 pH	15.64 °C	3,237.4 µS/cm	0.50 mg/L	88.28 NTU	85.7 mV	17.09 ft	300.00 ml/min
9/14/2018 3:32 PM	03:00	6.73 pH	14.64 °C	3,235.6 µS/cm	0.18 mg/L	57.74 NTU	88.4 mV	17.00 ft	300.00 ml/min
9/14/2018 3:35 PM	06:00	6.73 pH	14.44 °C	3,259.7 µS/cm	0.12 mg/L	51.76 NTU	89.7 mV	17.23 ft	300.00 ml/min
9/14/2018 3:38 PM	09:00	6.74 pH	14.31 °C	3,266.1 µS/cm	0.12 mg/L	37.61 NTU	90.2 mV	17.30 ft	300.00 ml/min
9/14/2018 3:41 PM	12:00	6.74 pH	14.30 °C	3,260.8 µS/cm	0.12 mg/L	40.26 NTU	90.1 mV	17.35 ft	300.00 ml/min
9/14/2018 3:44 PM	15:00	6.74 pH	14.31 °C	3,260.2 µS/cm	0.16 mg/L	38.75 NTU	89.5 mV	17.35 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW 109	Collected @ 1545 No odor, no sheen , clear

Low-Flow Test Report:

Test Date / Time: 9/12/2018 2:13:52 PM
Project: MW 111
Operator Name: PL

Location Name: MW 111 **Well Diameter: 2 in** **Casing Type: PVC** **Total Depth: 23.7 m** **Initial Depth to Water: 14.11 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 19.7 ft** **Estimated Total Volume Pumped: 14118 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.27 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/12/2018 2:13 PM	00:00	7.28 pH	18.15 °C	1,511.7 µS/cm	0.42 mg/L	144.58 NTU	76.7 mV	14.27 ft	250.00 ml/min
9/12/2018 2:16 PM	03:00	7.29 pH	16.86 °C	1,530.5 µS/cm	0.23 mg/L	113.00 NTU	75.9 mV	14.30 ft	250.00 ml/min
9/12/2018 2:19 PM	06:00	7.29 pH	16.33 °C	1,537.2 µS/cm	0.20 mg/L	120.58 NTU	75.6 mV	14.30 ft	250.00 ml/min
9/12/2018 2:22 PM	09:00	7.26 pH	16.21 °C	1,536.8 µS/cm	0.33 mg/L	143.40 NTU	75.8 mV	14.30 ft	250.00 ml/min
9/12/2018 2:25 PM	12:00	7.26 pH	16.17 °C	1,540.0 µS/cm	0.42 mg/L	183.83 NTU	76.2 mV	14.30 ft	250.00 ml/min
9/12/2018 2:28 PM	15:00	7.26 pH	16.05 °C	1,537.0 µS/cm	0.48 mg/L	187.17 NTU	76.3 mV	14.30 ft	250.00 ml/min
9/12/2018 2:31 PM	18:00	7.26 pH	16.02 °C	1,539.9 µS/cm	0.50 mg/L	141.81 NTU	76.4 mV	14.30 ft	250.00 ml/min
9/12/2018 2:34 PM	21:00	7.26 pH	16.01 °C	1,538.9 µS/cm	0.54 mg/L	124.17 NTU	76.4 mV	14.30 ft	250.00 ml/min
9/12/2018 2:37 PM	24:00	7.26 pH	15.93 °C	1,539.0 µS/cm	0.53 mg/L	95.11 NTU	76.3 mV	14.30 ft	300.00 ml/min
9/12/2018 2:40 PM	27:00	7.27 pH	15.77 °C	1,538.7 µS/cm	0.56 mg/L	92.56 NTU	76.3 mV	14.35 ft	300.00 ml/min
9/12/2018 2:43 PM	30:00	7.26 pH	15.65 °C	1,539.5 µS/cm	0.62 mg/L	66.47 NTU	76.6 mV	14.35 ft	300.00 ml/min
9/12/2018 2:46 PM	33:00	7.26 pH	15.84 °C	1,542.6 µS/cm	0.63 mg/L	83.21 NTU	76.6 mV	14.35 ft	300.00 ml/min
9/12/2018 2:49 PM	36:00	7.26 pH	15.68 °C	1,542.8 µS/cm	0.67 mg/L	47.29 NTU	76.9 mV	14.38 ft	300.00 ml/min
9/12/2018 2:52 PM	39:00	7.26 pH	15.66 °C	1,540.6 µS/cm	0.69 mg/L	35.95 NTU	77.0 mV	14.38 ft	300.00 ml/min
9/12/2018 2:55 PM	42:00	7.25 pH	15.62 °C	1,550.9 µS/cm	0.69 mg/L	33.41 NTU	77.1 mV	14.38 ft	300.00 ml/min

9/12/2018 2:58 PM	45:00	7.24 pH	15.56 °C	1,546.5 µS/cm	0.87 mg/L	30.93 NTU	77.6 mV	14.38 ft	300.00 ml/min
9/12/2018 3:01 PM	48:00	7.23 pH	15.57 °C	1,548.6 µS/cm	1.02 mg/L	28.27 NTU	78.0 mV	14.38 ft	300.00 ml/min
9/12/2018 3:04 PM	51:00	7.23 pH	15.49 °C	1,556.2 µS/cm	1.03 mg/L	23.95 NTU	78.6 mV	14.38 ft	300.00 ml/min
9/12/2018 3:07 PM	54:00	7.22 pH	15.56 °C	1,560.9 µS/cm	1.07 mg/L	22.17 NTU	79.3 mV	14.38 ft	300.00 ml/min
9/12/2018 3:10 PM	57:00	7.23 pH	15.71 °C	1,560.9 µS/cm	1.11 mg/L	35.07 NTU	79.7 mV	14.38 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW 111	Collected @ 1512 No odor, murky to clear , no sheen

Low-Flow Test Report:

Test Date / Time: 9/12/2018 4:54:13 PM
Project: MW 112
Operator Name: PL

Location Name: MW 112 **Well Diameter: 2 in** **Casing Type: PVC** **Total Depth: 18.15 ft** **Initial Depth to Water: 6.9 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 14.45 ft** **Estimated Total Volume Pumped: 18000 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.05 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/12/2018 4:54 PM	00:00	6.85 pH	20.34 °C	2,906.8 µS/cm	1.33 mg/L	192.60 NTU	80.8 mV	6.95 ft	300.00 ml/min
9/12/2018 4:57 PM	03:00	6.81 pH	18.67 °C	3,003.5 µS/cm	0.12 mg/L	163.78 NTU	78.4 mV	6.95 ft	300.00 ml/min
9/12/2018 5:00 PM	06:00	6.82 pH	18.33 °C	2,987.2 µS/cm	0.07 mg/L	109.19 NTU	76.5 mV	6.95 ft	300.00 ml/min
9/12/2018 5:03 PM	09:00	6.83 pH	18.18 °C	2,966.7 µS/cm	0.06 mg/L	117.71 NTU	71.7 mV	6.95 ft	300.00 ml/min
9/12/2018 5:06 PM	12:00	6.84 pH	18.12 °C	2,948.0 µS/cm	0.05 mg/L	62.23 NTU	65.0 mV	6.95 ft	300.00 ml/min
9/12/2018 5:09 PM	15:00	6.85 pH	18.08 °C	2,942.2 µS/cm	0.04 mg/L	62.90 NTU	58.3 mV	6.95 ft	300.00 ml/min
9/12/2018 5:12 PM	18:00	6.85 pH	18.05 °C	2,941.4 µS/cm	0.03 mg/L	44.79 NTU	52.3 mV	6.95 ft	300.00 ml/min
9/12/2018 5:15 PM	21:00	6.85 pH	18.02 °C	2,925.4 µS/cm	0.03 mg/L	41.81 NTU	46.9 mV	6.95 ft	300.00 ml/min
9/12/2018 5:18 PM	24:00	6.86 pH	17.98 °C	2,917.3 µS/cm	0.02 mg/L	27.51 NTU	42.5 mV	6.95 ft	300.00 ml/min
9/12/2018 5:21 PM	27:00	6.86 pH	17.91 °C	2,918.5 µS/cm	0.02 mg/L	40.87 NTU	38.6 mV	6.95 ft	300.00 ml/min
9/12/2018 5:24 PM	30:00	6.86 pH	17.89 °C	2,919.5 µS/cm	0.02 mg/L	36.42 NTU	35.0 mV	6.95 ft	300.00 ml/min
9/12/2018 5:27 PM	33:00	6.86 pH	17.87 °C	2,917.3 µS/cm	0.02 mg/L	32.49 NTU	32.0 mV	6.95 ft	300.00 ml/min
9/12/2018 5:30 PM	36:00	6.86 pH	17.87 °C	2,914.4 µS/cm	0.02 mg/L	24.70 NTU	29.5 mV	6.95 ft	300.00 ml/min
9/12/2018 5:33 PM	39:00	6.86 pH	17.86 °C	2,914.6 µS/cm	0.02 mg/L	35.47 NTU	27.2 mV	6.95 ft	300.00 ml/min
9/12/2018 5:36 PM	42:00	6.87 pH	17.84 °C	2,913.1 µS/cm	0.02 mg/L	30.02 NTU	25.0 mV	6.95 ft	300.00 ml/min

9/12/2018 5:39 PM	45:00	6.87 pH	17.86 °C	2,915.4 µS/cm	0.03 mg/L	40.41 NTU	23.4 mV	6.95 ft	300.00 ml/min
9/12/2018 5:42 PM	48:00	6.87 pH	17.82 °C	2,913.3 µS/cm	0.03 mg/L	34.77 NTU	21.4 mV	6.95 ft	300.00 ml/min
9/12/2018 5:45 PM	51:00	6.87 pH	17.83 °C	2,916.3 µS/cm	0.03 mg/L	22.35 NTU	20.0 mV	6.95 ft	300.00 ml/min
9/12/2018 5:48 PM	54:00	6.86 pH	17.81 °C	2,920.0 µS/cm	0.03 mg/L	18.89 NTU	18.7 mV	6.95 ft	300.00 ml/min
9/12/2018 5:51 PM	57:00	6.86 pH	17.84 °C	2,915.8 µS/cm	0.03 mg/L	42.33 NTU	17.6 mV	6.95 ft	300.00 ml/min
9/12/2018 5:54 PM	01:00:00	6.86 pH	17.78 °C	2,911.0 µS/cm	0.03 mg/L	39.69 NTU	16.5 mV	6.95 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW 112	Collected @ 1756 No odor, no sheen, milky to clear

Low-Flow Test Report:

Test Date / Time: 9/12/2018 10:38:02 AM
Project: MW 114
Operator Name: PL

Location Name: MW 114 **Well Diameter: 2 in** **Casing Type: PVC** **Total Depth: 24.15 ft** **Initial Depth to Water: 14.61 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 17 ft** **Estimated Total Volume Pumped: 12600 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.02 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/12/2018 10:38 AM	00:00	7.12 pH	17.10 °C	2,714.9 µS/cm	0.50 mg/L	307.38 NTU	81.8 mV	14.61 ft	300.00 ml/min
9/12/2018 10:41 AM	03:00	7.15 pH	16.88 °C	2,791.5 µS/cm	0.14 mg/L	249.79 NTU	75.0 mV	14.67 ft	300.00 ml/min
9/12/2018 10:44 AM	06:00	7.15 pH	16.70 °C	2,797.8 µS/cm	0.10 mg/L	152.47 NTU	72.1 mV	14.67 ft	300.00 ml/min
9/12/2018 10:47 AM	09:00	7.15 pH	16.63 °C	2,792.8 µS/cm	0.06 mg/L	91.13 NTU	71.9 mV	14.62 ft	300.00 ml/min
9/12/2018 10:50 AM	12:00	7.15 pH	16.51 °C	2,763.2 µS/cm	0.04 mg/L	66.21 NTU	71.8 mV	14.63 ft	300.00 ml/min
9/12/2018 10:53 AM	15:00	7.15 pH	16.49 °C	2,723.0 µS/cm	0.03 mg/L	72.06 NTU	71.5 mV	14.63 ft	300.00 ml/min
9/12/2018 10:56 AM	18:00	7.15 pH	16.57 °C	2,668.8 µS/cm	0.03 mg/L	55.94 NTU	71.0 mV	14.63 ft	300.00 ml/min
9/12/2018 10:59 AM	21:00	7.15 pH	16.42 °C	2,598.6 µS/cm	0.03 mg/L	67.91 NTU	69.8 mV	14.63 ft	300.00 ml/min
9/12/2018 11:02 AM	24:00	7.15 pH	16.44 °C	2,536.7 µS/cm	0.02 mg/L	54.15 NTU	69.4 mV	14.63 ft	300.00 ml/min
9/12/2018 11:05 AM	27:00	7.14 pH	16.47 °C	2,470.0 µS/cm	0.02 mg/L	56.43 NTU	69.1 mV	14.63 ft	300.00 ml/min
9/12/2018 11:08 AM	30:00	7.14 pH	16.49 °C	2,424.9 µS/cm	0.02 mg/L	41.28 NTU	68.6 mV	14.63 ft	300.00 ml/min
9/12/2018 11:11 AM	33:00	7.14 pH	16.52 °C	2,383.7 µS/cm	0.02 mg/L	50.50 NTU	68.3 mV	14.63 ft	300.00 ml/min
9/12/2018 11:14 AM	36:00	7.13 pH	16.54 °C	2,342.5 µS/cm	0.01 mg/L	32.39 NTU	68.1 mV	14.63 ft	300.00 ml/min
9/12/2018 11:17 AM	39:00	7.13 pH	16.54 °C	2,301.3 µS/cm	0.01 mg/L	30.35 NTU	67.6 mV	14.63 ft	300.00 ml/min
9/12/2018 11:20 AM	42:00	7.12 pH	16.51 °C	2,276.8 µS/cm	0.01 mg/L	38.15 NTU	67.4 mV	14.63 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW 114	Collected @ 1120 No odor, milky , no sheen Turbidity was reflecting the natural flow of formation water coming into the casing. So we sampled it.

Low-Flow Test Report:

Test Date / Time: 9/12/2018 3:46:12 PM
Project: MW 116
Operator Name: PL

Location Name: MW 116 **Well Diameter: 2 in** **Casing Type: PVC** **Total Depth: 23.1 ft** **Initial Depth to Water: 12.65 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 20 ft** **Estimated Total Volume Pumped: 9900 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/12/2018 3:46 PM	00:00	7.11 pH	21.45 °C	1,952.3 µS/cm	1.70 mg/L	205.26 NTU	85.7 mV	12.65 ft	300.00 ml/min
9/12/2018 3:49 PM	03:00	7.09 pH	17.27 °C	2,273.8 µS/cm	0.25 mg/L	276.92 NTU	83.7 mV	12.68 ft	300.00 ml/min
9/12/2018 3:52 PM	06:00	7.08 pH	16.62 °C	2,258.9 µS/cm	0.15 mg/L	538.89 NTU	82.6 mV	12.68 ft	300.00 ml/min
9/12/2018 3:55 PM	09:00	7.07 pH	16.39 °C	2,257.8 µS/cm	0.14 mg/L	585.75 NTU	81.8 mV	12.65 ft	300.00 ml/min
9/12/2018 3:58 PM	12:00	7.08 pH	16.29 °C	2,226.2 µS/cm	0.19 mg/L	465.50 NTU	80.5 mV	12.65 ft	300.00 ml/min
9/12/2018 4:01 PM	15:00	7.07 pH	16.24 °C	2,161.8 µS/cm	0.29 mg/L	344.47 NTU	79.9 mV	12.65 ft	300.00 ml/min
9/12/2018 4:04 PM	18:00	7.07 pH	16.22 °C	2,135.4 µS/cm	0.42 mg/L	225.02 NTU	79.5 mV	12.65 ft	300.00 ml/min
9/12/2018 4:07 PM	21:00	7.08 pH	16.29 °C	2,125.4 µS/cm	0.51 mg/L	192.41 NTU	79.0 mV	12.65 ft	300.00 ml/min
9/12/2018 4:10 PM	24:00	7.07 pH	16.19 °C	2,102.6 µS/cm	0.51 mg/L	136.04 NTU	78.3 mV	12.65 ft	300.00 ml/min
9/12/2018 4:13 PM	27:00	7.07 pH	16.17 °C	2,096.2 µS/cm	0.55 mg/L	100.88 NTU	77.9 mV	12.65 ft	300.00 ml/min
9/12/2018 4:16 PM	30:00	7.07 pH	16.27 °C	2,089.0 µS/cm	0.55 mg/L	103.59 NTU	77.2 mV	12.65 ft	300.00 ml/min
9/12/2018 4:19 PM	33:00	7.07 pH	16.23 °C	2,079.1 µS/cm	0.56 mg/L	110.87 NTU	76.7 mV	12.65 ft	300.00 ml/min

Samples

Sample ID:	Description:

MW 116	Collected @ 1620 No odor, no sheen, murky

Low-Flow Test Report:

Test Date / Time: 9/14/2018 8:07:27 AM
Project: MW 117
Operator Name: PL/RM

Location Name: MW 117 **Well Diameter: 2 in** **Casing Type: PVC** **Total Depth: 22.34 ft** **Initial Depth to Water: 11.87 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 17.63 ft** **Estimated Total Volume Pumped: 14400 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.22 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/14/2018 8:07 AM	00:00	6.86 pH	14.29 °C	3,082.4 µS/cm	3.04 mg/L	277.08 NTU	33.9 mV	11.87 ft	300.00 ml/min
9/14/2018 8:10 AM	03:00	6.96 pH	14.94 °C	3,667.8 µS/cm	0.43 mg/L	369.16 NTU	-137.3 mV	12.12 ft	300.00 ml/min
9/14/2018 8:13 AM	06:00	6.97 pH	14.86 °C	3,692.6 µS/cm	0.14 mg/L	381.87 NTU	-152.2 mV	12.12 ft	300.00 ml/min
9/14/2018 8:16 AM	09:00	6.97 pH	14.85 °C	3,715.1 µS/cm	0.11 mg/L	404.44 NTU	-159.9 mV	12.09 ft	300.00 ml/min
9/14/2018 8:19 AM	12:00	6.96 pH	14.86 °C	3,722.5 µS/cm	0.09 mg/L	316.70 NTU	-164.5 mV	12.09 ft	300.00 ml/min
9/14/2018 8:22 AM	15:00	6.96 pH	14.85 °C	3,745.7 µS/cm	0.08 mg/L	257.65 NTU	-168.3 mV	12.09 ft	300.00 ml/min
9/14/2018 8:25 AM	18:00	6.95 pH	14.81 °C	3,774.5 µS/cm	0.08 mg/L	273.07 NTU	-171.3 mV	12.09 ft	300.00 ml/min
9/14/2018 8:28 AM	21:00	6.95 pH	14.83 °C	3,793.7 µS/cm	0.06 mg/L	189.78 NTU	-174.0 mV	12.09 ft	300.00 ml/min
9/14/2018 8:31 AM	24:00	6.94 pH	14.83 °C	3,816.4 µS/cm	0.05 mg/L	190.84 NTU	-176.8 mV	12.09 ft	300.00 ml/min
9/14/2018 8:34 AM	27:00	6.94 pH	14.82 °C	3,827.0 µS/cm	0.04 mg/L	166.65 NTU	-179.1 mV	12.09 ft	300.00 ml/min
9/14/2018 8:37 AM	30:00	6.94 pH	14.82 °C	3,839.7 µS/cm	0.04 mg/L	124.64 NTU	-181.3 mV	12.09 ft	300.00 ml/min
9/14/2018 8:40 AM	33:00	6.94 pH	14.83 °C	3,826.3 µS/cm	0.04 mg/L	149.51 NTU	-183.3 mV	12.09 ft	300.00 ml/min
9/14/2018 8:43 AM	36:00	6.94 pH	14.83 °C	3,838.0 µS/cm	0.03 mg/L	121.87 NTU	-185.1 mV	12.09 ft	300.00 ml/min
9/14/2018 8:46 AM	39:00	6.93 pH	14.82 °C	3,877.8 µS/cm	0.02 mg/L	89.26 NTU	-186.9 mV	12.09 ft	300.00 ml/min
9/14/2018 8:49 AM	42:00	6.93 pH	14.82 °C	3,876.9 µS/cm	0.02 mg/L	80.50 NTU	-188.6 mV	12.09 ft	300.00 ml/min

9/14/2018 8:52 AM	45:00	6.93 pH	14.83 °C	3,874.4 µS/cm	0.02 mg/L	78.24 NTU	-190.3 mV	12.09 ft	300.00 ml/min
9/14/2018 8:55 AM	48:00	6.93 pH	14.84 °C	3,932.2 µS/cm	0.02 mg/L	85.01 NTU	-191.8 mV	12.09 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW 117	Collected @ 858 Strong hydrocarbon odor, no sheen Milky and turbid

Low-Flow Test Report:

Test Date / Time: 9/14/2018 9:31:19 AM
Project: MW 118
Operator Name: PL/RM

Location Name: MW 118 **Well Diameter: 2 in** **Casing Type: PVC** **Total Depth: 23.77 ft** **Initial Depth to Water: 15.63 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 20 ft** **Estimated Total Volume Pumped: 16200 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.15 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/14/2018 9:31 AM	00:00	6.74 pH	16.08 °C	4,169.2 µS/cm	2.12 mg/L	1,881.8 NTU	-29.4 mV	15.63 ft	300.00 ml/min
9/14/2018 9:34 AM	03:00	6.72 pH	15.88 °C	4,167.4 µS/cm	1.08 mg/L	1,378.2 NTU	-26.1 mV	15.78 ft	300.00 ml/min
9/14/2018 9:37 AM	06:00	6.72 pH	15.81 °C	4,168.2 µS/cm	0.96 mg/L	471.58 NTU	-23.9 mV	15.78 ft	300.00 ml/min
9/14/2018 9:40 AM	09:00	6.72 pH	15.79 °C	4,159.9 µS/cm	0.86 mg/L	197.18 NTU	-22.3 mV	15.78 ft	300.00 ml/min
9/14/2018 9:43 AM	12:00	6.72 pH	15.77 °C	4,149.8 µS/cm	0.79 mg/L	182.29 NTU	-21.1 mV	15.78 ft	300.00 ml/min
9/14/2018 9:46 AM	15:00	6.72 pH	15.78 °C	4,139.5 µS/cm	0.74 mg/L	145.94 NTU	-20.0 mV	15.78 ft	300.00 ml/min
9/14/2018 9:49 AM	18:00	6.72 pH	15.78 °C	4,129.3 µS/cm	0.74 mg/L	107.62 NTU	-18.6 mV	15.78 ft	300.00 ml/min
9/14/2018 9:52 AM	21:00	6.72 pH	15.79 °C	4,122.7 µS/cm	0.74 mg/L	200.15 NTU	-17.1 mV	15.78 ft	300.00 ml/min
9/14/2018 9:55 AM	24:00	6.72 pH	15.78 °C	4,115.5 µS/cm	0.76 mg/L	66.25 NTU	-15.6 mV	15.78 ft	300.00 ml/min
9/14/2018 9:58 AM	27:00	6.67 pH	16.15 °C	4,127.3 µS/cm	3.56 mg/L	47.16 NTU	17.1 mV	15.78 ft	300.00 ml/min
9/14/2018 10:01 AM	30:00	6.72 pH	15.84 °C	4,112.6 µS/cm	0.88 mg/L	33.94 NTU	4.2 mV	15.78 ft	300.00 ml/min
9/14/2018 10:04 AM	33:00	6.72 pH	15.83 °C	4,107.3 µS/cm	0.92 mg/L	32.50 NTU	2.8 mV	15.78 ft	300.00 ml/min
9/14/2018 10:07 AM	36:00	6.72 pH	15.82 °C	4,102.3 µS/cm	0.95 mg/L	33.63 NTU	2.9 mV	15.78 ft	300.00 ml/min
9/14/2018 10:10 AM	39:00	6.72 pH	15.81 °C	4,096.3 µS/cm	0.97 mg/L	24.49 NTU	3.8 mV	15.78 ft	300.00 ml/min
9/14/2018 10:13 AM	42:00	6.72 pH	15.82 °C	4,085.9 µS/cm	0.99 mg/L	17.79 NTU	4.6 mV	15.78 ft	300.00 ml/min

9/14/2018 10:16 AM	45:00	6.72 pH	15.80 °C	4,085.8 µS/cm	1.00 mg/L	16.66 NTU	5.8 mV	15.78 ft	300.00 ml/min
9/14/2018 10:19 AM	48:00	6.72 pH	15.82 °C	4,084.5 µS/cm	1.06 mg/L	29.01 NTU	7.5 mV	15.78 ft	300.00 ml/min
9/14/2018 10:22 AM	51:00	6.72 pH	15.83 °C	4,079.3 µS/cm	1.03 mg/L	37.67 NTU	9.1 mV	15.78 ft	300.00 ml/min
9/14/2018 10:25 AM	54:00	6.72 pH	15.84 °C	4,074.1 µS/cm	1.06 mg/L	19.17 NTU	10.1 mV	15.78 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW 118	Collected @ 1026 Hydrocarbon odor, no sheen , went from very turbid orange to more clear. Sampled based on 3 casing volumes being purged.

Low-Flow Test Report:

Test Date / Time: 9/14/2018 4:47:51 PM
Project: MW-100
Operator Name: BW/ST

Location Name: MW-100 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 12.73 ft** **Total Depth: 22.73 ft** **Initial Depth to Water: 9.24 ft**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 16 ft** **Estimated Total Volume Pumped: 9000 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.06 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:
Clear no odor

Weather Conditions:
75F. Sunny,

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/14/2018 4:47 PM	00:00	7.02 pH	19.11 °C	2,724.6 µS/cm	3.07 mg/L	159.86 NTU	189.7 mV	9.24 ft	300.00 ml/min
9/14/2018 4:50 PM	03:00	7.02 pH	16.63 °C	2,751.8 µS/cm	0.28 mg/L	166.77 NTU	181.1 mV	9.24 ft	300.00 ml/min
9/14/2018 4:53 PM	06:00	6.97 pH	15.77 °C	2,745.1 µS/cm	0.17 mg/L	128.90 NTU	182.7 mV	9.30 ft	300.00 ml/min
9/14/2018 4:56 PM	09:00	6.93 pH	15.41 °C	2,712.6 µS/cm	0.14 mg/L	143.25 NTU	184.3 mV	9.30 ft	300.00 ml/min
9/14/2018 4:59 PM	12:00	6.90 pH	15.13 °C	2,696.4 µS/cm	0.13 mg/L	145.90 NTU	184.9 mV	9.31 ft	300.00 ml/min
9/14/2018 5:02 PM	15:00	6.90 pH	14.98 °C	2,686.5 µS/cm	0.11 mg/L	110.77 NTU	184.7 mV	9.28 ft	300.00 ml/min
9/14/2018 5:05 PM	18:00	6.90 pH	14.86 °C	2,666.1 µS/cm	0.10 mg/L	82.11 NTU	183.9 mV	9.30 ft	300.00 ml/min
9/14/2018 5:08 PM	21:00	6.91 pH	14.76 °C	2,661.6 µS/cm	0.10 mg/L	72.49 NTU	183.0 mV	9.31 ft	300.00 ml/min
9/14/2018 5:11 PM	24:00	6.91 pH	14.72 °C	2,662.9 µS/cm	0.10 mg/L	65.75 NTU	182.0 mV	9.25 ft	300.00 ml/min
9/14/2018 5:14 PM	27:00	6.92 pH	14.70 °C	2,660.9 µS/cm	0.09 mg/L	58.55 NTU	181.0 mV	9.27 ft	300.00 ml/min
9/14/2018 5:17 PM	30:00	6.93 pH	14.64 °C	2,662.4 µS/cm	0.09 mg/L	66.59 NTU	180.1 mV	9.30 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW-100	VOCs

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/12/2018 8:47:08 AM
Project: MW-101
Operator Name: BW

Location Name: MW-101 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 13.75 ft** **Total Depth: 23.75 ft** **Initial Depth to Water: 9.92 ft**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 16.8 ft** **Estimated Total Volume Pumped: 24930 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: -0.01 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:
Well did not stabilize. 6.75 gallons purge.

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/12/2018 8:47 AM	00:00	7.21 pH	12.62 °C	2,081.6 µS/cm	5.73 mg/L	198.35 NTU	256.0 mV	9.92 ft	210.00 ml/min
9/12/2018 8:50 AM	03:00	6.99 pH	14.36 °C	2,241.5 µS/cm	0.78 mg/L	511.31 NTU	251.0 mV	9.99 ft	210.00 ml/min
9/12/2018 8:53 AM	06:00	7.02 pH	14.63 °C	2,156.0 µS/cm	0.48 mg/L	283.39 NTU	247.5 mV	9.99 ft	210.00 ml/min
9/12/2018 8:56 AM	09:00	7.06 pH	14.79 °C	1,996.1 µS/cm	0.46 mg/L	222.58 NTU	244.5 mV	9.99 ft	210.00 ml/min
9/12/2018 8:59 AM	12:00	7.10 pH	14.94 °C	1,849.0 µS/cm	0.52 mg/L	187.28 NTU	241.2 mV	9.99 ft	210.00 ml/min
9/12/2018 9:02 AM	15:00	7.12 pH	14.99 °C	1,774.3 µS/cm	0.46 mg/L	154.48 NTU	239.5 mV	9.99 ft	210.00 ml/min
9/12/2018 9:05 AM	18:00	7.12 pH	15.05 °C	1,787.0 µS/cm	0.46 mg/L	205.67 NTU	238.7 mV	9.99 ft	210.00 ml/min
9/12/2018 9:08 AM	21:00	7.14 pH	15.09 °C	1,746.8 µS/cm	0.37 mg/L	120.00 NTU	237.3 mV	9.99 ft	210.00 ml/min
9/12/2018 9:11 AM	24:00	7.14 pH	15.08 °C	1,742.0 µS/cm	0.31 mg/L	106.84 NTU	236.4 mV	9.99 ft	210.00 ml/min
9/12/2018 9:14 AM	27:00	7.14 pH	15.13 °C	1,733.4 µS/cm	0.28 mg/L	77.55 NTU	235.9 mV	9.99 ft	210.00 ml/min
9/12/2018 9:17 AM	30:00	7.15 pH	15.15 °C	1,729.5 µS/cm	0.27 mg/L	96.43 NTU	234.6 mV	9.99 ft	210.00 ml/min
9/12/2018 9:20 AM	33:00	7.15 pH	15.15 °C	1,722.8 µS/cm	0.25 mg/L	82.86 NTU	234.2 mV	9.99 ft	210.00 ml/min
9/12/2018 9:23 AM	36:00	7.15 pH	15.15 °C	1,710.9 µS/cm	0.23 mg/L	64.36 NTU	233.8 mV	9.99 ft	210.00 ml/min
9/12/2018 9:26 AM	39:00	7.15 pH	15.18 °C	1,711.3 µS/cm	0.23 mg/L	71.81 NTU	232.8 mV	9.99 ft	210.00 ml/min
9/12/2018 9:29 AM	42:00	7.16 pH	15.21 °C	1,700.4 µS/cm	0.22 mg/L	66.77 NTU	232.3 mV	9.99 ft	210.00 ml/min

9/12/2018 9:32 AM	45:00	7.15 pH	15.21 °C	1,694.4 µS/cm	0.19 mg/L	52.60 NTU	232.2 mV	9.99 ft	210.00 ml/min
9/12/2018 9:35 AM	48:00	7.16 pH	15.24 °C	1,688.9 µS/cm	0.19 mg/L	61.47 NTU	231.6 mV	9.99 ft	210.00 ml/min
9/12/2018 9:38 AM	51:00	7.16 pH	15.23 °C	1,680.0 µS/cm	0.18 mg/L	65.30 NTU	231.0 mV	9.99 ft	210.00 ml/min
9/12/2018 9:41 AM	54:00	7.16 pH	15.24 °C	1,674.3 µS/cm	0.17 mg/L	45.37 NTU	230.5 mV	9.99 ft	210.00 ml/min
9/12/2018 9:44 AM	57:00	7.16 pH	15.25 °C	1,666.7 µS/cm	0.16 mg/L	48.82 NTU	230.0 mV	9.99 ft	210.00 ml/min
9/12/2018 9:47 AM	01:00:00	7.17 pH	15.27 °C	1,655.3 µS/cm	0.16 mg/L	111.05 NTU	224.1 mV	9.91 ft	210.00 ml/min
9/12/2018 9:50 AM	01:03:00	7.15 pH	15.21 °C	1,659.3 µS/cm	0.19 mg/L	80.20 NTU	227.0 mV	9.91 ft	300.00 ml/min
9/12/2018 9:53 AM	01:06:00	7.16 pH	15.18 °C	1,643.2 µS/cm	0.17 mg/L	71.82 NTU	227.3 mV	9.92 ft	300.00 ml/min
9/12/2018 9:56 AM	01:09:00	7.16 pH	15.21 °C	1,643.6 µS/cm	0.25 mg/L	71.28 NTU	227.1 mV	9.92 ft	300.00 ml/min
9/12/2018 9:59 AM	01:12:00	7.16 pH	15.24 °C	1,641.5 µS/cm	0.61 mg/L	78.69 NTU	227.0 mV	9.92 ft	300.00 ml/min
9/12/2018 10:02 AM	01:15:00	7.16 pH	15.23 °C	1,631.7 µS/cm	0.16 mg/L	58.13 NTU	226.6 mV	9.92 ft	300.00 ml/min
9/12/2018 10:05 AM	01:18:00	7.16 pH	15.22 °C	1,630.3 µS/cm	0.15 mg/L	50.02 NTU	225.5 mV	9.92 ft	300.00 ml/min
9/12/2018 10:08 AM	01:21:00	7.16 pH	15.24 °C	1,624.7 µS/cm	0.15 mg/L	45.08 NTU	224.5 mV	9.92 ft	300.00 ml/min
9/12/2018 10:11 AM	01:24:00	7.17 pH	15.23 °C	1,621.4 µS/cm	0.15 mg/L	55.14 NTU	223.4 mV	9.93 ft	300.00 ml/min
9/12/2018 10:14 AM	01:27:00	7.17 pH	15.25 °C	1,617.5 µS/cm	0.15 mg/L	60.96 NTU	222.9 mV	9.93 ft	300.00 ml/min
9/12/2018 10:17 AM	01:30:00	7.17 pH	15.26 °C	1,613.7 µS/cm	0.14 mg/L	52.00 NTU	221.9 mV	9.89 ft	300.00 ml/min
9/12/2018 10:20 AM	01:33:00	7.17 pH	15.26 °C	1,610.6 µS/cm	0.14 mg/L	37.13 NTU	220.8 mV	9.89 ft	300.00 ml/min
9/12/2018 10:23 AM	01:36:00	7.17 pH	15.27 °C	1,608.4 µS/cm	0.13 mg/L	35.99 NTU	220.3 mV	9.90 ft	300.00 ml/min
9/12/2018 10:26 AM	01:39:00	7.17 pH	15.30 °C	1,605.4 µS/cm	0.52 mg/L	40.16 NTU	219.5 mV	9.91 ft	300.00 ml/min
9/12/2018 10:29 AM	01:42:00	7.17 pH	15.27 °C	1,597.0 µS/cm	0.14 mg/L	28.31 NTU	218.7 mV	9.91 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW-101	No odor. Cloudy. VOCs MNA, Metals

Low-Flow Test Report:

Test Date / Time: 9/11/2018 5:19:08 PM
Project: MW-102
Operator Name: ST

Location Name: MW-102 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 10.8 ft** **Total Depth: 20.8 ft** **Initial Depth to Water: 9.21 m**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 15 ft** **Estimated Total Volume Pumped: 6750 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 250 ml/min** **Final Draw Down: 0.01 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:

Weather Conditions:
Sunny 79 F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/11/2018 5:19 PM	00:00	7.08 pH	19.07 °C	2,437.9 µS/cm	0.85 mg/L	498.93 NTU	227.2 mV	9.21 ft	250.00 ml/min
9/11/2018 5:22 PM	03:00	7.11 pH	17.73 °C	2,458.1 µS/cm	0.70 mg/L	312.32 NTU	227.8 mV	9.21 ft	250.00 ml/min
9/11/2018 5:25 PM	06:00	7.10 pH	17.16 °C	2,481.3 µS/cm	0.92 mg/L	233.90 NTU	229.6 mV	9.21 ft	250.00 ml/min
9/11/2018 5:28 PM	09:00	7.06 pH	16.93 °C	2,503.1 µS/cm	1.07 mg/L	189.49 NTU	232.1 mV	9.21 ft	250.00 ml/min
9/11/2018 5:31 PM	12:00	7.04 pH	16.77 °C	2,520.6 µS/cm	1.20 mg/L	141.18 NTU	233.3 mV	9.21 ft	250.00 ml/min
9/11/2018 5:34 PM	15:00	7.03 pH	16.62 °C	2,532.1 µS/cm	1.30 mg/L	97.54 NTU	233.5 mV	9.21 ft	250.00 ml/min
9/11/2018 5:37 PM	18:00	7.03 pH	16.49 °C	2,545.8 µS/cm	1.38 mg/L	108.71 NTU	232.9 mV	9.21 ft	250.00 ml/min
9/11/2018 5:40 PM	21:00	7.03 pH	16.35 °C	2,554.0 µS/cm	1.40 mg/L	90.06 NTU	232.1 mV	9.21 ft	250.00 ml/min
9/11/2018 5:43 PM	24:00	7.04 pH	16.21 °C	2,557.2 µS/cm	1.46 mg/L	86.92 NTU	230.9 mV	9.21 ft	250.00 ml/min
9/11/2018 5:46 PM	27:00	7.05 pH	16.21 °C	2,563.8 µS/cm	1.52 mg/L	83.40 NTU	229.8 mV	9.21 ft	250.00 ml/min

Samples

Sample ID:	Description:

MW-102	Clear. No odor. Well vault was buried in hydrated bentonite and had to be cleared. VOCs

Low-Flow Test Report:

Test Date / Time: 9/11/2018 11:33:15 AM
Project: MW-103
Operator Name: ST

Location Name: MW-103 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 14 ft** **Total Depth: 24 ft** **Initial Depth to Water: 11.13 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 17.5 ft** **Estimated Total Volume Pumped: 648 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 27 ml/min** **Final Draw Down: 0.02 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:
Turbid no odor

Weather Conditions:
Sunny 70 F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/11/2018 11:33 AM	00:00	7.08 pH	19.58 °C	2,571.9 µS/cm	4.22 mg/L	342.40 NTU	-108.8 mV	11.13 ft	27.00 ml/min
9/11/2018 11:36 AM	03:00	7.01 pH	15.72 °C	2,785.0 µS/cm	0.33 mg/L	219.21 NTU	-117.6 mV	11.15 ft	27.00 ml/min
9/11/2018 11:39 AM	06:00	7.01 pH	15.40 °C	2,788.7 µS/cm	0.20 mg/L	91.82 NTU	-121.2 mV	11.15 ft	27.00 ml/min
9/11/2018 11:42 AM	09:00	7.00 pH	15.27 °C	2,798.3 µS/cm	0.14 mg/L	70.94 NTU	-122.5 mV	11.15 ft	27.00 ml/min
9/11/2018 11:45 AM	12:00	7.00 pH	15.32 °C	2,805.2 µS/cm	0.12 mg/L	59.65 NTU	-123.0 mV	11.15 ft	27.00 ml/min
9/11/2018 11:48 AM	15:00	7.01 pH	15.20 °C	2,809.7 µS/cm	0.10 mg/L	48.05 NTU	-123.0 mV	11.15 ft	27.00 ml/min
9/11/2018 11:51 AM	18:00	7.01 pH	15.10 °C	2,814.5 µS/cm	0.09 mg/L	37.65 NTU	-122.6 mV	11.15 ft	27.00 ml/min
9/11/2018 11:54 AM	21:00	7.01 pH	15.21 °C	2,821.8 µS/cm	0.08 mg/L	37.62 NTU	-121.6 mV	11.15 ft	27.00 ml/min
9/11/2018 11:57 AM	24:00	7.00 pH	15.22 °C	2,825.1 µS/cm	0.08 mg/L	36.48 NTU	-120.5 mV	11.15 ft	27.00 ml/min

Samples

Sample ID:	Description:
MW-103	VIOCS + METALS

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/11/2018 2:23:41 PM
Project: MW-104
Operator Name: PL

Location Name: MW-104 **Well Diameter: 2 in** **Casing Type: PVC** **Total Depth: 23.64 ft** **Initial Depth to Water: 12.83 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 17 ft** **Estimated Total Volume Pumped: 11799 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 325 ml/min** **Final Draw Down: 0.02 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/11/2018 2:23 PM	00:00	7.04 pH	16.12 °C	2,533.7 µS/cm	0.45 mg/L	372.12 NTU	-15.2 mV	12.85 ft	3.00 ml/min
9/11/2018 2:26 PM	03:00	7.04 pH	15.98 °C	2,541.2 µS/cm	0.39 mg/L	323.04 NTU	-14.5 mV	12.85 ft	325.00 ml/min
9/11/2018 2:29 PM	06:00	7.04 pH	16.10 °C	2,525.5 µS/cm	0.50 mg/L	290.37 NTU	-13.0 mV	12.85 ft	30.00 ml/min
9/11/2018 2:32 PM	09:00	7.03 pH	16.08 °C	2,504.4 µS/cm	0.38 mg/L	211.35 NTU	-12.3 mV	12.85 ft	325.00 ml/min
9/11/2018 2:35 PM	12:00	7.04 pH	16.07 °C	2,479.6 µS/cm	0.64 mg/L	113.56 NTU	-10.9 mV	12.85 ft	325.00 ml/min
9/11/2018 2:38 PM	15:00	7.03 pH	16.06 °C	2,428.7 µS/cm	0.54 mg/L	77.91 NTU	-9.4 mV	12.85 ft	325.00 ml/min
9/11/2018 2:41 PM	18:00	7.02 pH	16.09 °C	2,384.6 µS/cm	0.37 mg/L	52.59 NTU	-9.2 mV	12.85 ft	325.00 ml/min
9/11/2018 2:44 PM	21:00	7.02 pH	16.05 °C	2,336.9 µS/cm	0.27 mg/L	44.30 NTU	-9.7 mV	12.85 ft	325.00 ml/min
9/11/2018 2:47 PM	24:00	7.02 pH	16.05 °C	2,287.5 µS/cm	0.20 mg/L	37.20 NTU	-10.4 mV	12.85 ft	325.00 ml/min
9/11/2018 2:50 PM	27:00	7.02 pH	16.09 °C	2,247.6 µS/cm	0.17 mg/L	38.11 NTU	-11.0 mV	12.85 ft	325.00 ml/min
9/11/2018 2:53 PM	30:00	7.01 pH	16.07 °C	2,214.2 µS/cm	0.15 mg/L	51.14 NTU	-11.3 mV	12.85 ft	325.00 ml/min
9/11/2018 2:56 PM	33:00	7.01 pH	16.05 °C	2,174.0 µS/cm	0.13 mg/L	78.99 NTU	-11.9 mV	12.85 ft	325.00 ml/min
9/11/2018 2:59 PM	36:00	7.01 pH	16.03 °C	2,125.1 µS/cm	0.12 mg/L	46.77 NTU	-12.2 mV	12.85 ft	325.00 ml/min
9/11/2018 3:02 PM	39:00	7.01 pH	16.03 °C	2,102.9 µS/cm	0.11 mg/L	49.45 NTU	-12.5 mV	12.85 ft	325.00 ml/min
9/11/2018 3:05 PM	42:00	7.01 pH	15.97 °C	2,069.8 µS/cm	0.11 mg/L	48.13 NTU	-12.6 mV	12.85 ft	325.00 ml/min

Samples

Sample ID:	Description:
MW104	No odor, no sheen and clear Collected @ 1510

Low-Flow Test Report:

Test Date / Time: 9/13/2018 12:14:02 PM
Project: MW-105
Operator Name: BW/ST

Location Name: MW-105 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 13.7 ft** **Total Depth: 23.7 ft** **Initial Depth to Water: 11.99 ft**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 17.7 ft** **Estimated Total Volume Pumped: 19059 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.05 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:
Slight dark color, slight HC odor. Well did not stabilize but was close. Purged 3 well volumes and then collected the sample.

Weather Conditions:
65 F. Cloudy

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/13/2018 12:14 PM	00:00	7.20 pH	17.67 °C	3,728.1 µS/cm	3.15 mg/L	433.57 NTU	9.0 mV	11.99 ft	300.00 ml/min
9/13/2018 12:17 PM	03:00	7.19 pH	15.58 °C	3,947.2 µS/cm	0.33 mg/L	372.96 NTU	-24.5 mV	12.01 ft	300.00 ml/min
9/13/2018 12:20 PM	06:00	7.19 pH	15.13 °C	3,952.9 µS/cm	0.23 mg/L	323.15 NTU	-32.6 mV	12.01 ft	300.00 ml/min
9/13/2018 12:23 PM	09:00	7.18 pH	14.91 °C	3,935.7 µS/cm	0.23 mg/L	301.62 NTU	-36.3 mV	12.03 ft	300.00 ml/min
9/13/2018 12:26 PM	12:00	7.18 pH	14.70 °C	3,940.2 µS/cm	0.21 mg/L	233.97 NTU	-38.9 mV	12.03 ft	300.00 ml/min
9/13/2018 12:29 PM	15:00	7.18 pH	14.66 °C	3,941.9 µS/cm	0.21 mg/L	191.21 NTU	-40.2 mV	12.02 ft	30.00 ml/min
9/13/2018 12:34 PM	20:18	7.19 pH	14.63 °C	3,933.5 µS/cm	0.25 mg/L	145.89 NTU	-39.8 mV	12.02 ft	300.00 ml/min
9/13/2018 12:37 PM	23:18	7.19 pH	14.62 °C	3,915.9 µS/cm	0.21 mg/L	121.26 NTU	-41.7 mV	12.02 ft	300.00 ml/min
9/13/2018 12:40 PM	26:18	7.19 pH	14.63 °C	3,904.6 µS/cm	0.16 mg/L	104.26 NTU	-43.3 mV	12.05 ft	300.00 ml/min
9/13/2018 12:43 PM	29:18	7.20 pH	14.66 °C	3,893.4 µS/cm	0.12 mg/L	89.08 NTU	-43.8 mV	12.05 ft	300.00 ml/min
9/13/2018 12:46 PM	32:18	7.20 pH	14.70 °C	3,883.7 µS/cm	0.11 mg/L	76.87 NTU	-43.5 mV	12.04 ft	300.00 ml/min
9/13/2018 12:49 PM	35:18	7.20 pH	14.71 °C	3,894.3 µS/cm	0.13 mg/L	74.26 NTU	-43.7 mV	12.05 ft	300.00 ml/min
9/13/2018 12:52 PM	38:18	7.20 pH	14.62 °C	3,862.5 µS/cm	0.11 mg/L	57.94 NTU	-44.7 mV	12.05 ft	300.00 ml/min

9/13/2018 12:55 PM	41:18	7.20 pH	14.59 °C	3,857.5 µS/cm	0.11 mg/L	56.74 NTU	-45.4 mV	12.06 ft	300.00 ml/min
9/13/2018 12:58 PM	44:18	7.20 pH	14.59 °C	3,852.1 µS/cm	0.14 mg/L	44.13 NTU	-44.8 mV	12.03 ft	300.00 ml/min
9/13/2018 1:01 PM	47:18	7.20 pH	14.55 °C	3,844.5 µS/cm	0.12 mg/L	44.12 NTU	-44.5 mV	12.03 ft	300.00 ml/min
9/13/2018 1:04 PM	50:18	7.20 pH	14.56 °C	3,842.2 µS/cm	0.11 mg/L	39.20 NTU	-44.3 mV	12.05 ft	300.00 ml/min
9/13/2018 1:07 PM	53:18	7.20 pH	14.60 °C	3,833.5 µS/cm	0.10 mg/L	39.63 NTU	-44.2 mV	12.04 ft	300.00 ml/min
9/13/2018 1:10 PM	56:18	7.21 pH	14.61 °C	3,824.1 µS/cm	0.10 mg/L	33.18 NTU	-43.7 mV	12.03 ft	300.00 ml/min
9/13/2018 1:13 PM	59:18	7.20 pH	14.65 °C	3,816.9 µS/cm	0.13 mg/L	33.42 NTU	-41.9 mV	12.05 ft	300.00 ml/min
9/13/2018 1:16 PM	01:02:18	7.20 pH	14.62 °C	3,824.7 µS/cm	0.12 mg/L	37.76 NTU	-41.6 mV	12.04 ft	300.00 ml/min
9/13/2018 1:19 PM	01:05:18	7.19 pH	14.63 °C	3,806.8 µS/cm	0.09 mg/L	35.90 NTU	-40.6 mV	12.04 ft	300.00 ml/min
9/13/2018 1:22 PM	01:08:18	7.20 pH	14.66 °C	3,786.5 µS/cm	0.09 mg/L	31.83 NTU	-39.7 mV	12.04 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW-105	VOCs, EPH/VPH, metals

Low-Flow Test Report:

Test Date / Time: 9/13/2018 11:07:29 AM
Project: MW106
Operator Name: JS/RM

Location Name: MW106 **Well Diameter: 2 in** **Casing Type: PVC** **Total Depth: 27.35 ft** **Initial Depth to Water: 14.74 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 21 ft** **Estimated Total Volume Pumped: 7.95 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.25 ml/min** **Final Draw Down: 14.8 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:

Weather Conditions:
Overcast, slight breeze SE, 61° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/13/2018 11:07 AM	00:00	7.05 pH	16.40 °C	2,965.2 µS/cm	1.02 mg/L	144.39 NTU	2.2 mV	14.74 ft	0.20 ml/min
9/13/2018 11:10 AM	03:00	7.03 pH	14.66 °C	2,998.5 µS/cm	0.22 mg/L	166.32 NTU	5.9 mV	14.80 ft	0.25 ml/min
9/13/2018 11:13 AM	06:00	7.03 pH	14.32 °C	3,021.5 µS/cm	0.10 mg/L	122.15 NTU	7.8 mV	14.80 ft	0.25 ml/min
9/13/2018 11:16 AM	09:00	7.03 pH	14.12 °C	3,020.1 µS/cm	0.07 mg/L	117.39 NTU	9.0 mV	14.80 ft	0.25 ml/min
9/13/2018 11:19 AM	12:00	7.03 pH	14.04 °C	3,006.9 µS/cm	0.05 mg/L	107.82 NTU	10.1 mV	14.80 ft	0.25 ml/min
9/13/2018 11:22 AM	15:00	7.04 pH	13.99 °C	3,002.3 µS/cm	0.04 mg/L	81.14 NTU	11.1 mV	14.80 ft	0.25 ml/min
9/13/2018 11:25 AM	18:00	7.04 pH	14.20 °C	3,003.9 µS/cm	0.08 mg/L	71.76 NTU	12.2 mV	14.80 ft	0.00 ml/min
9/13/2018 11:28 AM	21:00	7.04 pH	14.06 °C	2,999.2 µS/cm	0.08 mg/L	129.67 NTU	13.3 mV	14.80 ft	0.25 ml/min
9/13/2018 11:31 AM	24:00	7.04 pH	13.99 °C	2,998.6 µS/cm	0.03 mg/L	105.02 NTU	14.2 mV	14.80 ft	0.25 ml/min
9/13/2018 11:34 AM	27:00	7.04 pH	13.99 °C	2,998.9 µS/cm	0.02 mg/L	80.63 NTU	15.2 mV	14.80 ft	0.25 ml/min
9/13/2018 11:37 AM	30:00	7.05 pH	14.07 °C	2,992.1 µS/cm	0.01 mg/L	75.56 NTU	16.0 mV	14.80 ft	0.25 ml/min
9/13/2018 11:40 AM	33:00	7.05 pH	14.01 °C	2,998.2 µS/cm	0.01 mg/L	66.68 NTU	16.7 mV	14.80 ft	0.25 ml/min
9/13/2018 11:43 AM	36:00	7.05 pH	13.99 °C	2,996.2 µS/cm	0.01 mg/L	56.70 NTU	17.2 mV	14.80 ft	0.25 ml/min

Samples

Sample ID:	Description:
MW-106	VOCs

Low-Flow Test Report:

Test Date / Time: 9/12/2018 3:58:07 PM
Project: MW-107
Operator Name: BW/ST

Location Name: MW-107 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 18.2 ft** **Total Depth: 28.2 ft** **Initial Depth to Water: 15.49 ft**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 22 ft** **Estimated Total Volume Pumped: 19800 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.02 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:

Weather Conditions:
Cloudy 65 F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/12/2018 3:58 PM	00:00	6.99 pH	21.53 °C	2,625.4 µS/cm	4.89 mg/L	180.07 NTU	218.7 mV	15.49 ft	300.00 ml/min
9/12/2018 4:01 PM	03:00	6.93 pH	17.31 °C	2,625.4 µS/cm	2.64 mg/L	724.90 NTU	220.7 mV	15.53 ft	300.00 ml/min
9/12/2018 4:04 PM	06:00	6.88 pH	16.39 °C	2,649.3 µS/cm	2.36 mg/L	834.63 NTU	225.0 mV	15.51 ft	300.00 ml/min
9/12/2018 4:07 PM	09:00	6.82 pH	16.12 °C	2,661.5 µS/cm	2.26 mg/L	555.69 NTU	224.4 mV	15.52 ft	300.00 ml/min
9/12/2018 4:10 PM	12:00	6.81 pH	15.98 °C	2,653.4 µS/cm	2.26 mg/L	429.72 NTU	224.7 mV	15.53 ft	300.00 ml/min
9/12/2018 4:13 PM	15:00	6.81 pH	15.82 °C	2,640.8 µS/cm	2.27 mg/L	409.72 NTU	223.9 mV	15.51 ft	300.00 ml/min
9/12/2018 4:16 PM	18:00	6.82 pH	15.75 °C	2,636.6 µS/cm	2.30 mg/L	295.53 NTU	222.8 mV	15.52 ft	300.00 ml/min
9/12/2018 4:19 PM	21:00	6.82 pH	15.66 °C	2,621.6 µS/cm	2.33 mg/L	240.50 NTU	221.6 mV	15.51 ft	300.00 ml/min
9/12/2018 4:22 PM	24:00	6.84 pH	15.56 °C	2,613.9 µS/cm	2.34 mg/L	213.09 NTU	220.1 mV	15.52 ft	300.00 ml/min
9/12/2018 4:25 PM	27:00	6.85 pH	15.52 °C	2,612.6 µS/cm	2.36 mg/L	171.42 NTU	218.6 mV	15.51 ft	300.00 ml/min
9/12/2018 4:28 PM	30:00	6.86 pH	15.56 °C	2,608.6 µS/cm	2.38 mg/L	129.27 NTU	217.2 mV	15.51 ft	300.00 ml/min
9/12/2018 4:31 PM	33:00	6.87 pH	15.53 °C	2,605.7 µS/cm	2.38 mg/L	112.84 NTU	215.5 mV	15.52 ft	300.00 ml/min
9/12/2018 4:34 PM	36:00	6.88 pH	15.55 °C	2,607.5 µS/cm	2.38 mg/L	92.69 NTU	214.4 mV	15.50 ft	300.00 ml/min

9/12/2018 4:37 PM	39:00	6.90 pH	15.55 °C	2,598.8 µS/cm	2.38 mg/L	138.07 NTU	212.8 mV	15.51 ft	300.00 ml/min
9/12/2018 4:40 PM	42:00	6.91 pH	15.44 °C	2,577.3 µS/cm	2.35 mg/L	93.32 NTU	211.1 mV	15.51 ft	300.00 ml/min
9/12/2018 4:43 PM	45:00	6.92 pH	16.02 °C	2,603.2 µS/cm	2.47 mg/L	79.33 NTU	210.3 mV	15.51 ft	300.00 ml/min
9/12/2018 4:46 PM	48:00	6.91 pH	15.69 °C	2,610.3 µS/cm	2.38 mg/L	198.83 NTU	210.4 mV	15.51 ft	300.00 ml/min
9/12/2018 4:49 PM	51:00	6.92 pH	15.48 °C	2,593.5 µS/cm	2.39 mg/L	128.65 NTU	209.7 mV	15.50 ft	300.00 ml/min
9/12/2018 4:52 PM	54:00	6.92 pH	15.46 °C	2,594.6 µS/cm	2.40 mg/L	108.82 NTU	209.6 mV	15.50 ft	300.00 ml/min
9/12/2018 4:55 PM	57:00	6.92 pH	15.45 °C	2,590.0 µS/cm	2.40 mg/L	85.14 NTU	209.2 mV	15.51 ft	300.00 ml/min
9/12/2018 4:58 PM	01:00:00	6.92 pH	15.44 °C	2,591.9 µS/cm	2.43 mg/L	68.52 NTU	208.8 mV	15.50 ft	300.00 ml/min
9/12/2018 5:01 PM	01:03:00	6.92 pH	15.43 °C	2,590.5 µS/cm	2.43 mg/L	64.83 NTU	208.5 mV	15.51 ft	300.00 ml/min
9/12/2018 5:04 PM	01:06:00	6.93 pH	15.42 °C	2,588.8 µS/cm	2.43 mg/L	67.07 NTU	207.8 mV	15.51 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW-107	Slightly cloudy. No odor. VOCs only. Sample time 1705

Low-Flow Test Report:

Test Date / Time: 9/12/2018 5:26:00 PM
Project: MW-108
Operator Name: BW/ST

Location Name: MW-108 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 18.05 ft** **Total Depth: 28.05 ft** **Initial Depth to Water: 14.13 ft**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 21 ft** **Estimated Total Volume Pumped: 11700 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.03 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:
String odor. Clear

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/12/2018 5:26 PM	00:00	7.12 pH	20.61 °C	3,392.4 µS/cm	4.91 mg/L	90.01 NTU	-74.0 mV	14.13 ft	300.00 ml/min
9/12/2018 5:29 PM	03:00	7.06 pH	17.30 °C	3,621.7 µS/cm	0.43 mg/L	53.46 NTU	-171.8 mV	14.13 ft	300.00 ml/min
9/12/2018 5:32 PM	06:00	7.03 pH	16.55 °C	3,631.7 µS/cm	0.24 mg/L	43.19 NTU	-179.6 mV	14.14 ft	300.00 ml/min
9/12/2018 5:35 PM	09:00	7.00 pH	16.19 °C	3,656.2 µS/cm	0.20 mg/L	37.78 NTU	-179.5 mV	14.14 ft	300.00 ml/min
9/12/2018 5:38 PM	12:00	6.99 pH	16.03 °C	3,666.6 µS/cm	0.18 mg/L	42.60 NTU	-177.6 mV	14.14 ft	300.00 ml/min
9/12/2018 5:41 PM	15:00	6.98 pH	15.86 °C	3,675.6 µS/cm	0.17 mg/L	31.16 NTU	-176.9 mV	14.16 ft	300.00 ml/min
9/12/2018 5:44 PM	18:00	6.98 pH	15.78 °C	3,682.2 µS/cm	0.15 mg/L	23.38 NTU	-176.9 mV	14.13 ft	300.00 ml/min
9/12/2018 5:47 PM	21:00	6.97 pH	15.83 °C	3,688.6 µS/cm	0.14 mg/L	24.40 NTU	-175.6 mV	14.14 ft	300.00 ml/min
9/12/2018 5:50 PM	24:00	6.97 pH	15.75 °C	3,696.6 µS/cm	0.13 mg/L	20.09 NTU	-175.8 mV	14.14 ft	300.00 ml/min
9/12/2018 5:53 PM	27:00	6.97 pH	15.61 °C	3,693.1 µS/cm	0.13 mg/L	19.73 NTU	-176.8 mV	14.15 ft	300.00 ml/min
9/12/2018 5:56 PM	30:00	6.97 pH	15.58 °C	3,698.2 µS/cm	0.13 mg/L	18.19 NTU	-176.8 mV	14.20 ft	300.00 ml/min
9/12/2018 5:59 PM	33:00	6.98 pH	15.54 °C	3,699.3 µS/cm	0.12 mg/L	15.05 NTU	-177.1 mV	14.20 ft	300.00 ml/min
9/12/2018 6:02 PM	36:00	6.98 pH	15.53 °C	3,705.3 µS/cm	0.11 mg/L	14.35 NTU	-178.4 mV	14.16 ft	300.00 ml/min
9/12/2018 6:05 PM	39:00	6.98 pH	15.51 °C	3,706.7 µS/cm	0.10 mg/L	13.21 NTU	-179.0 mV	14.16 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW-108	VOC, SVOC, EPH, VPH

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/13/2018 4:46:23 PM
Project: MW-110
Operator Name: BW/ST

Location Name: MW-110 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 18.03 ft** **Total Depth: 28.03 ft** **Initial Depth to Water: 16.63 ft**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 22.3 ft** **Estimated Total Volume Pumped: 20040 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 290 ml/min** **Final Draw Down: 0.1 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:
Clear no odor

Weather Conditions:
70 F. Cloudy

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/13/2018 4:46 PM	00:00	7.00 pH	19.55 °C	3,371.6 µS/cm	3.90 mg/L	180.74 NTU	104.3 mV	16.63 ft	300.00 ml/min
9/13/2018 4:49 PM	03:00	7.00 pH	16.50 °C	3,443.4 µS/cm	1.73 mg/L	176.77 NTU	109.6 mV	16.63 ft	290.00 ml/min
9/13/2018 4:52 PM	06:00	6.91 pH	15.65 °C	3,474.7 µS/cm	1.53 mg/L	170.34 NTU	117.8 mV	16.73 ft	290.00 ml/min
9/13/2018 4:55 PM	09:00	6.86 pH	15.15 °C	3,485.0 µS/cm	1.49 mg/L	185.01 NTU	122.4 mV	16.74 ft	290.00 ml/min
9/13/2018 4:58 PM	12:00	6.85 pH	14.92 °C	3,500.1 µS/cm	1.44 mg/L	153.14 NTU	124.5 mV	16.74 ft	290.00 ml/min
9/13/2018 5:01 PM	15:00	6.85 pH	14.74 °C	3,504.8 µS/cm	1.43 mg/L	156.17 NTU	126.3 mV	16.72 ft	290.00 ml/min
9/13/2018 5:04 PM	18:00	6.85 pH	14.57 °C	3,498.3 µS/cm	1.43 mg/L	137.77 NTU	127.7 mV	16.73 ft	290.00 ml/min
9/13/2018 5:07 PM	21:00	6.85 pH	14.48 °C	3,509.8 µS/cm	1.42 mg/L	125.95 NTU	129.1 mV	16.72 ft	290.00 ml/min
9/13/2018 5:10 PM	24:00	6.85 pH	14.45 °C	3,513.9 µS/cm	1.41 mg/L	107.79 NTU	130.4 mV	16.71 ft	290.00 ml/min
9/13/2018 5:13 PM	27:00	6.85 pH	14.36 °C	3,514.8 µS/cm	1.40 mg/L	88.49 NTU	131.5 mV	16.73 ft	290.00 ml/min
9/13/2018 5:16 PM	30:00	6.86 pH	14.40 °C	3,520.4 µS/cm	1.41 mg/L	98.44 NTU	132.6 mV	16.74 ft	290.00 ml/min
9/13/2018 5:19 PM	33:00	6.86 pH	14.37 °C	3,521.7 µS/cm	1.41 mg/L	92.45 NTU	133.6 mV	16.72 ft	290.00 ml/min
9/13/2018 5:22 PM	36:00	6.87 pH	14.32 °C	3,518.6 µS/cm	1.40 mg/L	56.07 NTU	134.5 mV	16.71 ft	290.00 ml/min

9/13/2018 5:25 PM	39:00	6.87 pH	14.34 °C	3,534.0 µS/cm	1.43 mg/L	55.65 NTU	135.6 mV	16.73 ft	290.00 ml/min
9/13/2018 5:28 PM	42:00	6.87 pH	14.30 °C	3,544.8 µS/cm	1.50 mg/L	100.09 NTU	136.8 mV	16.75 ft	290.00 ml/min
9/13/2018 5:31 PM	45:00	6.87 pH	14.23 °C	3,524.3 µS/cm	1.47 mg/L	88.07 NTU	138.0 mV	16.74 ft	290.00 ml/min
9/13/2018 5:34 PM	48:00	6.87 pH	14.30 °C	3,524.8 µS/cm	1.49 mg/L	88.27 NTU	138.9 mV	16.72 ft	290.00 ml/min
9/13/2018 5:37 PM	51:00	6.87 pH	14.19 °C	3,529.3 µS/cm	1.47 mg/L	58.50 NTU	139.9 mV	16.73 ft	290.00 ml/min
9/13/2018 5:40 PM	54:00	6.88 pH	14.19 °C	3,528.5 µS/cm	1.47 mg/L	38.61 NTU	140.8 mV	16.73 ft	290.00 ml/min
9/13/2018 5:43 PM	57:00	6.88 pH	14.18 °C	3,532.1 µS/cm	1.46 mg/L	27.98 NTU	141.6 mV	16.73 ft	290.00 ml/min
9/13/2018 5:46 PM	01:00:00	6.89 pH	14.10 °C	3,531.0 µS/cm	1.48 mg/L	40.27 NTU	136.5 mV	16.72 ft	290.00 ml/min
9/13/2018 5:49 PM	01:03:00	6.89 pH	14.03 °C	3,536.5 µS/cm	1.48 mg/L	22.59 NTU	143.2 mV	16.72 ft	290.00 ml/min
9/13/2018 5:52 PM	01:06:00	6.89 pH	14.02 °C	3,535.5 µS/cm	1.47 mg/L	22.88 NTU	144.9 mV	16.73 ft	290.00 ml/min
9/13/2018 5:55 PM	01:09:00	6.89 pH	14.02 °C	3,549.7 µS/cm	1.47 mg/L	22.95 NTU	146.1 mV	16.73 ft	290.00 ml/min

Samples

Sample ID:	Description:
MW-110	VOCs

Low-Flow Test Report:

Test Date / Time: 9/13/2018 4:08:34 PM
Project: MW113
Operator Name: JS/RM

Location Name: MW113 **Well Diameter: 2 in** **Casing Type: PVC** **Total Depth: 13.85 m** **Initial Depth to Water: 3.55 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 8.7 ft** **Estimated Total Volume Pumped: 6300 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.13 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:

Weather Conditions:
Partly cloudy, 68° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/13/2018 4:08 PM	00:00	6.76 pH	22.37 °C	3,821.6 µS/cm	0.72 mg/L	126.51 NTU	61.5 mV	3.55 ft	300.00 ml/min
9/13/2018 4:11 PM	03:00	6.75 pH	20.64 °C	3,832.4 µS/cm	0.14 mg/L	58.93 NTU	67.2 mV	3.62 ft	300.00 ml/min
9/13/2018 4:14 PM	06:00	6.75 pH	20.29 °C	3,830.8 µS/cm	0.08 mg/L	29.38 NTU	69.9 mV	3.68 ft	300.00 ml/min
9/13/2018 4:17 PM	09:00	6.75 pH	20.05 °C	3,816.1 µS/cm	0.06 mg/L	23.97 NTU	72.0 mV	3.68 ft	300.00 ml/min
9/13/2018 4:20 PM	12:00	6.76 pH	19.96 °C	3,823.8 µS/cm	0.05 mg/L	17.60 NTU	74.0 mV	3.68 ft	300.00 ml/min
9/13/2018 4:23 PM	15:00	6.76 pH	19.86 °C	3,815.6 µS/cm	0.04 mg/L	15.54 NTU	75.6 mV	3.68 ft	300.00 ml/min
9/13/2018 4:26 PM	18:00	6.76 pH	19.85 °C	3,818.4 µS/cm	0.04 mg/L	9.28 NTU	76.6 mV	3.68 ft	300.00 ml/min
9/13/2018 4:29 PM	21:00	6.76 pH	19.77 °C	3,808.2 µS/cm	0.03 mg/L	8.16 NTU	77.4 mV	3.68 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW-113	VOCs, Blind DUP 20180913-03

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/13/2018 4:56:15 PM
Project: MW115
Operator Name: JS/RM

Location Name: MW115 **Well Diameter: 2 in** **Casing Type: PVC** **Total Depth: 23.6 ft** **Initial Depth to Water: 9.62 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 16.6 ft** **Estimated Total Volume Pumped: 7200 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 9.7 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:

Weather Conditions:
Mostly cloudy, NW wind, 65° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/13/2018 4:56 PM	00:00	6.83 pH	21.93 °C	2,653.3 µS/cm	1.46 mg/L	134.51 NTU	78.2 mV	9.62 ft	300.00 ml/min
9/13/2018 4:59 PM	03:00	6.80 pH	19.09 °C	2,715.8 µS/cm	0.35 mg/L	277.78 NTU	81.8 mV	9.68 ft	300.00 ml/min
9/13/2018 5:02 PM	06:00	6.80 pH	18.37 °C	2,758.7 µS/cm	0.25 mg/L	279.66 NTU	84.0 mV	9.70 ft	300.00 ml/min
9/13/2018 5:05 PM	09:00	6.79 pH	18.06 °C	2,772.0 µS/cm	0.20 mg/L	239.57 NTU	85.9 mV	9.70 ft	300.00 ml/min
9/13/2018 5:08 PM	12:00	6.79 pH	17.90 °C	2,786.2 µS/cm	0.17 mg/L	219.82 NTU	87.4 mV	9.70 ft	300.00 ml/min
9/13/2018 5:11 PM	15:00	6.79 pH	17.80 °C	2,792.0 µS/cm	0.16 mg/L	273.44 NTU	88.1 mV	9.70 ft	300.00 ml/min
9/13/2018 5:14 PM	18:00	6.79 pH	17.57 °C	2,792.5 µS/cm	0.12 mg/L	184.27 NTU	88.9 mV	9.70 ft	300.00 ml/min
9/13/2018 5:17 PM	21:00	6.79 pH	17.59 °C	2,798.7 µS/cm	0.12 mg/L	193.42 NTU	89.4 mV	9.70 ft	300.00 ml/min
9/13/2018 5:20 PM	24:00	6.79 pH	17.55 °C	2,805.9 µS/cm	0.10 mg/L	174.98 NTU	89.7 mV	9.70 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW115	VOCs, SVOCs

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/14/2018 9:26:29 AM
Project: MW-119
Operator Name: BW/ST

Location Name: MW-119 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 13.67 ft** **Total Depth: 23.67 ft** **Initial Depth to Water: 14.49 ft**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 19 ft** **Estimated Total Volume Pumped: 15360 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 320 ml/min** **Final Draw Down: 0.16 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:
Parameters did not stabilize. Sampled after purging 3 well volumes. Clear no odor.

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/14/2018 9:26 AM	00:00	7.00 pH	15.50 °C	4,401.5 µS/cm	2.05 mg/L	145.31 NTU	228.1 mV	14.49 ft	320.00 ml/min
9/14/2018 9:29 AM	03:00	7.00 pH	15.28 °C	4,396.0 µS/cm	0.58 mg/L	84.81 NTU	234.9 mV	14.69 ft	320.00 ml/min
9/14/2018 9:32 AM	06:00	7.00 pH	15.25 °C	4,394.4 µS/cm	0.58 mg/L	95.38 NTU	235.2 mV	14.66 ft	320.00 ml/min
9/14/2018 9:35 AM	09:00	6.99 pH	15.25 °C	4,392.9 µS/cm	0.59 mg/L	67.02 NTU	234.4 mV	14.64 ft	320.00 ml/min
9/14/2018 9:38 AM	12:00	7.00 pH	15.24 °C	4,386.4 µS/cm	0.51 mg/L	71.44 NTU	233.9 mV	14.65 ft	320.00 ml/min
9/14/2018 9:41 AM	15:00	7.00 pH	15.25 °C	4,387.8 µS/cm	0.51 mg/L	69.67 NTU	233.4 mV	14.63 ft	320.00 ml/min
9/14/2018 9:44 AM	18:00	7.00 pH	15.24 °C	4,385.5 µS/cm	0.46 mg/L	48.50 NTU	233.3 mV	14.66 ft	320.00 ml/min
9/14/2018 9:47 AM	21:00	7.00 pH	15.25 °C	4,384.8 µS/cm	0.42 mg/L	41.74 NTU	233.1 mV	14.66 ft	320.00 ml/min
9/14/2018 9:50 AM	24:00	7.01 pH	15.26 °C	4,383.5 µS/cm	0.42 mg/L	38.04 NTU	232.6 mV	14.65 ft	320.00 ml/min
9/14/2018 9:53 AM	27:00	7.01 pH	15.24 °C	4,381.5 µS/cm	0.41 mg/L	27.21 NTU	231.8 mV	14.64 ft	320.00 ml/min
9/14/2018 9:56 AM	30:00	7.01 pH	15.26 °C	4,381.7 µS/cm	0.40 mg/L	24.57 NTU	231.9 mV	14.69 ft	320.00 ml/min
9/14/2018 9:59 AM	33:00	7.01 pH	15.26 °C	4,379.0 µS/cm	0.34 mg/L	25.77 NTU	231.5 mV	14.70 ft	320.00 ml/min
9/14/2018 10:02 AM	36:00	7.01 pH	15.27 °C	4,379.7 µS/cm	0.37 mg/L	21.57 NTU	231.3 mV	14.71 ft	320.00 ml/min
9/14/2018 10:05 AM	39:00	7.01 pH	15.28 °C	4,373.6 µS/cm	0.32 mg/L	15.26 NTU	230.6 mV	14.62 ft	320.00 ml/min
9/14/2018 10:08 AM	42:00	7.01 pH	15.28 °C	4,378.7 µS/cm	0.32 mg/L	13.69 NTU	230.3 mV	14.70 ft	320.00 ml/min

9/14/2018 10:11 AM	45:00	7.01 pH	15.26 °C	4,375.8 µS/cm	0.29 mg/L	12.62 NTU	229.5 mV	14.65 ft	320.00 ml/min
9/14/2018 10:14 AM	48:00	7.01 pH	15.28 °C	4,374.9 µS/cm	0.28 mg/L	12.72 NTU	229.1 mV	14.65 ft	320.00 ml/min

Samples

Sample ID:	Description:
MW-119	VOC, EPH/VPH, metals. Sample time 1015.

Low-Flow Test Report:

Test Date / Time: 9/14/2018 11:03:28 AM
Project: MW-120
Operator Name: BW/ST

Location Name: MW-120 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 11.67 ft** **Total Depth: 21.67 ft** **Initial Depth to Water: 10.24 ft**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 16.1 ft** **Estimated Total Volume Pumped: 9000 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.02 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:

Weather Conditions:
65 F. Cloudy

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/14/2018 11:03 AM	00:00	7.06 pH	14.77 °C	3,185.1 µS/cm	1.71 mg/L	215.89 NTU	246.9 mV	10.27 ft	300.00 ml/min
9/14/2018 11:06 AM	03:00	7.06 pH	14.75 °C	3,172.4 µS/cm	1.69 mg/L	163.39 NTU	240.4 mV	10.27 ft	300.00 ml/min
9/14/2018 11:09 AM	06:00	7.07 pH	14.72 °C	3,164.1 µS/cm	1.67 mg/L	131.37 NTU	237.2 mV	10.26 ft	300.00 ml/min
9/14/2018 11:12 AM	09:00	7.07 pH	14.71 °C	3,160.9 µS/cm	1.67 mg/L	126.22 NTU	235.4 mV	10.26 ft	300.00 ml/min
9/14/2018 11:15 AM	12:00	7.07 pH	14.70 °C	3,160.3 µS/cm	1.66 mg/L	86.58 NTU	234.2 mV	10.25 ft	300.00 ml/min
9/14/2018 11:18 AM	15:00	7.07 pH	14.70 °C	3,160.8 µS/cm	1.64 mg/L	72.34 NTU	233.4 mV	10.27 ft	300.00 ml/min
9/14/2018 11:21 AM	18:00	7.07 pH	14.71 °C	3,161.7 µS/cm	1.65 mg/L	62.79 NTU	232.8 mV	10.25 ft	300.00 ml/min
9/14/2018 11:24 AM	21:00	7.07 pH	14.71 °C	3,156.5 µS/cm	1.61 mg/L	44.80 NTU	232.4 mV	10.26 ft	300.00 ml/min
9/14/2018 11:27 AM	24:00	7.08 pH	14.70 °C	3,154.3 µS/cm	1.62 mg/L	36.62 NTU	232.1 mV	10.26 ft	300.00 ml/min
9/14/2018 11:30 AM	27:00	7.07 pH	14.71 °C	3,151.7 µS/cm	1.60 mg/L	34.55 NTU	231.9 mV	10.26 ft	300.00 ml/min
9/14/2018 11:33 AM	30:00	7.07 pH	14.71 °C	3,152.8 µS/cm	1.59 mg/L	37.13 NTU	231.6 mV	10.26 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW-120	Clear no odor.

Low-Flow Test Report:

Test Date / Time: 9/14/2018 1:13:42 PM
Project: MW-121
Operator Name: BW/ST

Location Name: MW-121 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 11.38 ft** **Total Depth: 21.38 ft** **Initial Depth to Water: 11.29 ft**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 16.3 ft** **Estimated Total Volume Pumped: 13344 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 290 ml/min** **Final Draw Down: 0.16 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:
Clear no odor.

Weather Conditions:
Cloudy 65F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/14/2018 1:13 PM	00:00	6.76 pH	18.37 °C	5,120.9 µS/cm	3.72 mg/L	266.54 NTU	168.5 mV	11.29 ft	300.00 ml/min
9/14/2018 1:16 PM	03:00	6.74 pH	15.94 °C	5,292.6 µS/cm	0.46 mg/L	348.91 NTU	155.8 mV	11.29 ft	29.00 ml/min
9/14/2018 1:19 PM	06:00	6.72 pH	15.68 °C	5,280.9 µS/cm	0.58 mg/L	279.97 NTU	151.1 mV	11.43 ft	290.00 ml/min
9/14/2018 1:22 PM	09:00	6.72 pH	15.61 °C	5,276.0 µS/cm	0.61 mg/L	262.83 NTU	146.5 mV	11.46 ft	290.00 ml/min
9/14/2018 1:25 PM	12:00	6.72 pH	15.58 °C	5,300.0 µS/cm	0.59 mg/L	220.58 NTU	142.1 mV	11.43 ft	290.00 ml/min
9/14/2018 1:28 PM	15:00	6.73 pH	15.47 °C	5,305.3 µS/cm	0.57 mg/L	175.34 NTU	138.4 mV	11.45 ft	290.00 ml/min
9/14/2018 1:31 PM	18:00	6.74 pH	15.39 °C	5,311.3 µS/cm	0.55 mg/L	161.08 NTU	135.3 mV	11.45 ft	290.00 ml/min
9/14/2018 1:34 PM	21:00	6.74 pH	15.35 °C	5,536.4 µS/cm	0.52 mg/L	112.95 NTU	131.1 mV	11.41 ft	29.00 ml/min
9/14/2018 1:37 PM	24:00	6.75 pH	15.32 °C	5,537.2 µS/cm	0.47 mg/L	75.91 NTU	128.5 mV	11.42 ft	290.00 ml/min
9/14/2018 1:40 PM	27:00	6.76 pH	15.28 °C	5,534.6 µS/cm	0.47 mg/L	59.31 NTU	126.0 mV	11.43 ft	290.00 ml/min
9/14/2018 1:43 PM	30:00	6.76 pH	15.31 °C	5,535.5 µS/cm	0.46 mg/L	41.85 NTU	123.1 mV	11.47 ft	290.00 ml/min
9/14/2018 1:46 PM	33:00	6.77 pH	15.31 °C	5,540.9 µS/cm	0.46 mg/L	26.63 NTU	120.0 mV	11.45 ft	290.00 ml/min
9/14/2018 1:49 PM	36:00	6.77 pH	15.32 °C	5,536.7 µS/cm	0.46 mg/L	20.95 NTU	116.7 mV	11.45 ft	290.00 ml/min

9/14/2018 1:52 PM	39:00	6.78 pH	15.32 °C	5,536.6 µS/cm	0.47 mg/L	16.53 NTU	113.8 mV	11.45 ft	290.00 ml/min
9/14/2018 1:55 PM	42:00	6.78 pH	15.26 °C	5,540.4 µS/cm	0.46 mg/L	12.76 NTU	111.2 mV	11.49 ft	290.00 ml/min
9/14/2018 1:58 PM	45:00	6.78 pH	15.26 °C	5,533.2 µS/cm	0.44 mg/L	10.66 NTU	108.9 mV	11.46 ft	29.00 ml/min
9/14/2018 2:01 PM	48:00	6.78 pH	15.23 °C	5,526.9 µS/cm	0.43 mg/L	9.97 NTU	106.9 mV	11.47 ft	290.00 ml/min
9/14/2018 2:04 PM	51:00	6.78 pH	15.23 °C	5,531.2 µS/cm	0.42 mg/L	7.25 NTU	105.2 mV	11.47 ft	290.00 ml/min
9/14/2018 2:07 PM	54:00	6.78 pH	15.23 °C	5,541.5 µS/cm	0.42 mg/L	6.26 NTU	103.8 mV	11.45 ft	290.00 ml/min

Samples

Sample ID:	Description:
MW-121	VOCs

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/14/2018 2:26:51 PM
Project: MW-122
Operator Name: BW/ST

Location Name: MW-122 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 12.97 ft** **Total Depth: 22.97 ft** **Initial Depth to Water: 11.56 ft**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 17.3 ft** **Estimated Total Volume Pumped: 11700 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.09 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:
Turbid slight odor

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/14/2018 2:26 PM	00:00	6.94 pH	15.83 °C	5,579.9 µS/cm	1.66 mg/L	262.22 NTU	144.7 mV	11.56 ft	300.00 ml/min
9/14/2018 2:29 PM	03:00	6.93 pH	14.57 °C	5,689.7 µS/cm	0.30 mg/L	253.47 NTU	145.4 mV	11.56 ft	300.00 ml/min
9/14/2018 2:32 PM	06:00	6.92 pH	14.21 °C	5,666.2 µS/cm	0.24 mg/L	287.74 NTU	146.8 mV	11.56 ft	300.00 ml/min
9/14/2018 2:35 PM	09:00	6.91 pH	14.05 °C	5,628.9 µS/cm	0.20 mg/L	259.49 NTU	148.0 mV	11.59 ft	300.00 ml/min
9/14/2018 2:38 PM	12:00	6.91 pH	13.96 °C	5,417.7 µS/cm	0.19 mg/L	317.62 NTU	148.9 mV	11.60 ft	300.00 ml/min
9/14/2018 2:41 PM	15:00	6.92 pH	13.94 °C	5,399.0 µS/cm	0.19 mg/L	141.11 NTU	149.5 mV	11.60 ft	300.00 ml/min
9/14/2018 2:44 PM	18:00	6.92 pH	13.94 °C	5,422.1 µS/cm	0.21 mg/L	97.60 NTU	150.3 mV	11.65 ft	300.00 ml/min
9/14/2018 2:47 PM	21:00	6.92 pH	13.91 °C	5,412.3 µS/cm	0.15 mg/L	104.73 NTU	150.7 mV	11.62 ft	300.00 ml/min
9/14/2018 2:50 PM	24:00	6.92 pH	13.91 °C	5,425.9 µS/cm	0.15 mg/L	82.51 NTU	151.2 mV	11.62 ft	300.00 ml/min
9/14/2018 2:53 PM	27:00	6.92 pH	13.94 °C	5,404.5 µS/cm	0.15 mg/L	107.35 NTU	151.8 mV	11.65 ft	300.00 ml/min
9/14/2018 2:56 PM	30:00	6.92 pH	13.90 °C	5,403.2 µS/cm	0.53 mg/L	81.71 NTU	152.4 mV	11.61 ft	300.00 ml/min
9/14/2018 2:59 PM	33:00	6.92 pH	13.78 °C	5,385.6 µS/cm	0.13 mg/L	60.03 NTU	153.0 mV	11.65 ft	300.00 ml/min
9/14/2018 3:02 PM	36:00	6.93 pH	13.85 °C	5,381.7 µS/cm	0.12 mg/L	58.92 NTU	153.3 mV	11.65 ft	300.00 ml/min
9/14/2018 3:05 PM	39:00	6.93 pH	13.85 °C	5,370.1 µS/cm	0.47 mg/L	62.77 NTU	153.8 mV	11.65 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW-122	VOCS, VPH/EPH, METALS

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/11/2018 3:36:19 PM
Project: MW-123
Operator Name: ST

Location Name: MW-123 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 15.3 ft** **Total Depth: 25.3 ft** **Initial Depth to Water: 12.41 m**	**Pump Type: QED Samole Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 19 ft** **Estimated Total Volume Pumped: 12150 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 225 ml/min** **Final Draw Down: 0.04 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:
Clear, no odor. Turbidity sensor appears to be drifting. All other parameters stable.

Weather Conditions:
Sunny 75

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/11/2018 3:36 PM	00:00	7.05 pH	19.90 °C	3,122.9 µS/cm	1.82 mg/L	64.02 NTU	233.7 mV	12.41 ft	225.00 ml/min
9/11/2018 3:39 PM	03:00	7.09 pH	17.99 °C	3,157.8 µS/cm	0.65 mg/L	66.73 NTU	235.3 mV	12.47 ft	225.00 ml/min
9/11/2018 3:42 PM	06:00	7.04 pH	17.50 °C	3,177.3 µS/cm	0.47 mg/L	69.97 NTU	238.6 mV	12.40 ft	225.00 ml/min
9/11/2018 3:45 PM	09:00	6.99 pH	17.10 °C	3,165.3 µS/cm	0.45 mg/L	59.90 NTU	242.9 mV	12.47 ft	225.00 ml/min
9/11/2018 3:48 PM	12:00	6.97 pH	17.00 °C	3,150.7 µS/cm	0.41 mg/L	57.52 NTU	244.6 mV	12.47 ft	225.00 ml/min
9/11/2018 3:51 PM	15:00	6.96 pH	16.97 °C	3,136.1 µS/cm	0.40 mg/L	78.40 NTU	244.9 mV	12.47 ft	225.00 ml/min
9/11/2018 3:54 PM	18:00	6.96 pH	16.64 °C	3,133.7 µS/cm	0.39 mg/L	86.79 NTU	245.0 mV	12.47 ft	225.00 ml/min
9/11/2018 3:57 PM	21:00	6.97 pH	16.67 °C	3,121.5 µS/cm	0.34 mg/L	115.07 NTU	244.1 mV	12.47 ft	225.00 ml/min
9/11/2018 4:00 PM	24:00	6.99 pH	16.58 °C	3,094.7 µS/cm	0.32 mg/L	132.62 NTU	243.2 mV	12.47 ft	225.00 ml/min
9/11/2018 4:03 PM	27:00	7.01 pH	16.59 °C	3,078.5 µS/cm	0.39 mg/L	157.56 NTU	240.8 mV	12.47 ft	225.00 ml/min
9/11/2018 4:06 PM	30:00	7.02 pH	16.46 °C	3,065.6 µS/cm	0.40 mg/L	158.85 NTU	238.6 mV	12.47 ft	225.00 ml/min
9/11/2018 4:09 PM	33:00	7.04 pH	16.47 °C	3,072.0 µS/cm	0.40 mg/L	228.71 NTU	238.5 mV	12.47 ft	225.00 ml/min
9/11/2018 4:12 PM	36:00	7.05 pH	16.39 °C	3,058.2 µS/cm	0.32 mg/L	246.89 NTU	237.8 mV	12.47 ft	225.00 ml/min

9/11/2018 4:15 PM	39:00	7.06 pH	16.50 °C	3,057.1 µS/cm	0.32 mg/L	253.26 NTU	235.8 mV	12.47 ft	225.00 ml/min
9/11/2018 4:18 PM	42:00	7.08 pH	16.43 °C	3,088.4 µS/cm	0.37 mg/L	292.90 NTU	234.0 mV	12.47 ft	225.00 ml/min
9/11/2018 4:21 PM	45:00	7.08 pH	16.32 °C	3,082.2 µS/cm	0.32 mg/L	383.04 NTU	231.2 mV	12.47 ft	225.00 ml/min
9/11/2018 4:24 PM	48:00	7.08 pH	16.28 °C	3,083.5 µS/cm	0.29 mg/L	439.12 NTU	229.9 mV	12.47 ft	225.00 ml/min
9/11/2018 4:27 PM	51:00	7.09 pH	16.32 °C	3,058.1 µS/cm	0.28 mg/L	450.54 NTU	229.0 mV	12.47 ft	225.00 ml/min
9/11/2018 4:30 PM	54:00	7.10 pH	16.19 °C	3,043.3 µS/cm	0.27 mg/L	635.58 NTU	228.4 mV	12.47 ft	225.00 ml/min

Samples

Sample ID:	Description:
MW-123	VOCs

Low-Flow Test Report:

Test Date / Time: 9/12/2018 12:14:41 PM
Project: MW-124
Operator Name: BW/ST

Location Name: MW-124 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 13.64 ft** **Total Depth: 23.64 ft** **Initial Depth to Water: 9.73 ft**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 15.5 ft** **Estimated Total Volume Pumped: 8105 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.08 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/12/2018 12:14 PM	00:00	7.04 pH	22.61 °C	2,609.5 µS/cm	5.08 mg/L	312.70 NTU	220.6 mV	9.79 ft	280.00 ml/min
9/12/2018 12:17 PM	03:00	7.02 pH	17.86 °C	2,989.3 µS/cm	0.28 mg/L	1,148.9 NTU	214.7 mV	9.79 ft	300.00 ml/min
9/12/2018 12:20 PM	06:00	6.97 pH	16.91 °C	3,020.0 µS/cm	0.25 mg/L	517.70 NTU	216.2 mV	9.80 ft	300.00 ml/min
9/12/2018 12:23 PM	09:00	6.91 pH	16.42 °C	3,036.7 µS/cm	0.28 mg/L	395.11 NTU	218.2 mV	9.81 ft	300.00 ml/min
9/12/2018 12:26 PM	12:00	6.88 pH	16.20 °C	3,028.2 µS/cm	0.26 mg/L	353.42 NTU	218.0 mV	9.82 ft	300.00 ml/min
9/12/2018 12:29 PM	15:00	6.89 pH	16.02 °C	3,013.2 µS/cm	0.22 mg/L	306.83 NTU	217.1 mV	9.82 ft	300.00 ml/min
9/12/2018 12:32 PM	18:00	6.89 pH	15.92 °C	3,002.1 µS/cm	0.22 mg/L	261.17 NTU	215.9 mV	9.81 ft	300.00 ml/min
9/12/2018 12:35 PM	21:00	6.90 pH	15.78 °C	2,984.3 µS/cm	0.18 mg/L	249.70 NTU	215.2 mV	9.82 ft	300.00 ml/min
9/12/2018 12:38 PM	24:00	6.91 pH	15.65 °C	2,960.6 µS/cm	0.18 mg/L	257.57 NTU	214.4 mV	9.80 ft	300.00 ml/min
9/12/2018 12:41 PM	27:13	6.91 pH	15.52 °C	2,958.5 µS/cm	0.15 mg/L	422.87 NTU	206.6 mV	9.81 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW-124	No order. Slightly turbid. VOCs with a matrix spike matrix spike duplicate.

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/11/2018 1:32:30 PM
Project: MW-125
Operator Name: ST

Location Name: MW-125 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 13.81 ft** **Total Depth: 23.81 ft** **Initial Depth to Water: 11.9 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 18 ft** **Estimated Total Volume Pumped: 10500 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 250 ml/min** **Final Draw Down: 0.05 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:
Clear no odor, sample time 1400

Weather Conditions:
Sunny 75

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/11/2018 1:32 PM	00:00	7.04 pH	16.55 °C	2,458.8 µS/cm	2.19 mg/L	456.68 NTU	31.6 mV	11.90 ft	250.00 ml/min
9/11/2018 1:35 PM	03:00	7.04 pH	15.26 °C	2,538.7 µS/cm	0.55 mg/L	203.30 NTU	22.9 mV	11.95 ft	250.00 ml/min
9/11/2018 1:38 PM	06:00	7.03 pH	15.05 °C	2,545.5 µS/cm	0.26 mg/L	163.31 NTU	16.6 mV	11.95 ft	250.00 ml/min
9/11/2018 1:41 PM	09:00	7.03 pH	15.03 °C	2,542.4 µS/cm	0.14 mg/L	126.44 NTU	11.2 mV	11.95 ft	250.00 ml/min
9/11/2018 1:44 PM	12:00	7.03 pH	14.96 °C	2,548.8 µS/cm	0.10 mg/L	92.15 NTU	6.7 mV	11.95 ft	250.00 ml/min
9/11/2018 1:47 PM	15:00	7.03 pH	14.98 °C	2,526.9 µS/cm	0.09 mg/L	100.53 NTU	3.2 mV	11.95 ft	250.00 ml/min
9/11/2018 1:50 PM	18:00	7.03 pH	14.89 °C	2,538.7 µS/cm	0.08 mg/L	79.13 NTU	0.0 mV	11.95 ft	250.00 ml/min
9/11/2018 1:53 PM	21:00	7.04 pH	14.90 °C	2,546.0 µS/cm	0.06 mg/L	65.27 NTU	-3.3 mV	11.95 ft	250.00 ml/min
9/11/2018 1:56 PM	24:00	7.04 pH	14.90 °C	2,548.4 µS/cm	0.06 mg/L	99.41 NTU	-5.7 mV	11.95 ft	250.00 ml/min
9/11/2018 1:59 PM	27:00	7.03 pH	14.86 °C	2,541.3 µS/cm	0.05 mg/L	53.38 NTU	-7.3 mV	11.95 ft	250.00 ml/min
9/11/2018 2:02 PM	30:00	7.03 pH	14.83 °C	2,539.6 µS/cm	0.04 mg/L	57.10 NTU	-9.2 mV	11.95 ft	250.00 ml/min
9/11/2018 2:05 PM	33:00	7.04 pH	14.79 °C	2,539.2 µS/cm	0.03 mg/L	42.86 NTU	-10.7 mV	11.95 ft	250.00 ml/min
9/11/2018 2:08 PM	36:00	7.04 pH	14.91 °C	2,543.6 µS/cm	0.03 mg/L	42.77 NTU	-12.2 mV	11.95 ft	250.00 ml/min

9/11/2018 2:11 PM	39:00	7.03 pH	14.96 °C	2,548.9 µS/cm	0.02 mg/L	62.27 NTU	-13.4 mV	11.95 ft	250.00 ml/min
9/11/2018 2:14 PM	42:00	7.03 pH	15.00 °C	2,546.7 µS/cm	0.02 mg/L	44.74 NTU	-14.3 mV	11.95 ft	250.00 ml/min

Samples

Sample ID:	Description:
MW-125	VOCs

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/10/2018 4:34:16 PM
Project: Mw126
Operator Name: Rm

Location Name: Mw126 **Well Diameter: 2 in** **Casing Type: Stainless** **Screen Length: 5 ft** **Top of Screen: 31.05 ft** **Total Depth: 36.05 ft** **Initial Depth to Water: 13.14 m**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 34 ft** **Estimated Total Volume Pumped: 22434.334 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 250 ml/min** **Final Draw Down: -3.133 m**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:

Weather Conditions:
Hot
80

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/10/2018 4:34 PM	00:00	11.49 pH	31.56 °C	4,418.4 µS/cm	6.63 mg/L	8.67 NTU	55.8 mV	43.11 ft	7.00 ml/min
9/10/2018 4:37 PM	03:00	10.77 pH	27.34 °C	3,452.3 µS/cm	3.23 mg/L	11.17 NTU	-29.4 mV	43.11 ft	0.70 ml/min
9/10/2018 4:38 PM	04:23	10.43 pH	26.70 °C	3,305.6 µS/cm	2.11 mg/L	24.54 NTU	-70.3 mV	43.11 ft	75.00 ml/min
9/10/2018 4:41 PM	07:23	10.04 pH	25.48 °C	3,161.0 µS/cm	1.25 mg/L	25.41 NTU	-142.0 mV	13.09 ft	75.00 ml/min
9/10/2018 4:44 PM	10:23	9.94 pH	24.79 °C	3,157.5 µS/cm	0.94 mg/L	41.48 NTU	-166.6 mV	13.30 ft	75.00 ml/min
9/10/2018 4:47 PM	13:23	9.91 pH	24.32 °C	3,105.5 µS/cm	0.80 mg/L	66.69 NTU	-179.7 mV	13.50 ft	75.00 ml/min
9/10/2018 4:50 PM	16:23	9.89 pH	24.11 °C	3,088.4 µS/cm	0.69 mg/L	78.40 NTU	-189.6 mV	13.69 ft	75.00 ml/min
9/10/2018 4:53 PM	19:23	9.88 pH	23.88 °C	3,033.7 µS/cm	0.62 mg/L	105.15 NTU	-199.9 mV	13.90 ft	150.00 ml/min
9/10/2018 4:56 PM	22:23	9.96 pH	20.41 °C	2,925.0 µS/cm	0.37 mg/L	165.90 NTU	-211.2 mV	14.53 ft	150.00 ml/min
9/10/2018 4:59 PM	25:23	9.94 pH	19.70 °C	2,929.8 µS/cm	0.23 mg/L	270.63 NTU	-220.8 mV	15.09 ft	150.00 ml/min
9/10/2018 5:02 PM	28:23	9.91 pH	19.28 °C	2,952.3 µS/cm	0.17 mg/L	355.56 NTU	-228.0 mV	15.69 ft	150.00 ml/min
9/10/2018 5:05 PM	31:23	9.93 pH	18.42 °C	2,907.5 µS/cm	0.13 mg/L	766.99 NTU	-234.6 mV	15.69 ft	250.00 ml/min

9/10/2018 5:08 PM	34:23	9.93 pH	17.94 °C	2,890.8 µS/cm	0.10 mg/L	701.60 NTU	-241.4 mV	17.90 ft	250.00 ml/min
9/10/2018 5:11 PM	37:23	9.93 pH	17.89 °C	2,896.9 µS/cm	0.09 mg/L	421.95 NTU	-244.4 mV	18.20 ft	250.00 ml/min
9/10/2018 5:14 PM	40:23	9.94 pH	17.76 °C	2,881.3 µS/cm	0.09 mg/L	490.60 NTU	-249.3 mV	18.95 ft	250.00 ml/min
9/10/2018 5:17 PM	43:23	9.95 pH	17.77 °C	2,895.3 µS/cm	0.09 mg/L	1,168.0 NTU	-252.0 mV	19.84 ft	250.00 ml/min
9/10/2018 5:20 PM	46:23	9.97 pH	17.63 °C	2,951.1 µS/cm	0.09 mg/L	167.62 NTU	-256.7 mV	20.67 ft	250.00 ml/min
9/10/2018 5:23 PM	49:23	9.98 pH	17.63 °C	2,965.0 µS/cm	0.10 mg/L	464.83 NTU	-260.5 mV	21.55 ft	250.00 ml/min
9/10/2018 5:26 PM	52:23	9.99 pH	17.44 °C	2,968.9 µS/cm	0.10 mg/L	574.94 NTU	-263.4 mV	22.41 ft	250.00 ml/min
9/10/2018 5:29 PM	55:23	10.00 pH	17.33 °C	2,948.6 µS/cm	0.10 mg/L	602.63 NTU	-265.9 mV	23.20 ft	250.00 ml/min
9/10/2018 5:32 PM	58:23	10.01 pH	17.39 °C	2,997.6 µS/cm	0.10 mg/L	501.29 NTU	-267.9 mV	24.09 ft	250.00 ml/min
9/10/2018 5:35 PM	01:01:23	10.01 pH	17.41 °C	3,006.2 µS/cm	0.11 mg/L	166.18 NTU	-269.5 mV	24.86 ft	250.00 ml/min
9/10/2018 5:38 PM	01:04:23	10.02 pH	17.20 °C	2,995.7 µS/cm	0.12 mg/L	243.07 NTU	-269.9 mV	25.65 ft	250.00 ml/min
9/10/2018 5:41 PM	01:07:23	10.04 pH	17.17 °C	2,989.2 µS/cm	0.14 mg/L	430.66 NTU	-270.1 mV	26.51 ft	250.00 ml/min
9/10/2018 5:44 PM	01:10:23	10.04 pH	17.01 °C	2,995.2 µS/cm	0.16 mg/L	260.90 NTU	-269.8 mV	27.30 ft	250.00 ml/min
9/10/2018 5:47 PM	01:13:23	10.05 pH	16.91 °C	2,979.4 µS/cm	0.20 mg/L	239.37 NTU	-268.6 mV	28.00 ft	250.00 ml/min
9/10/2018 5:50 PM	01:16:23	10.05 pH	16.83 °C	2,984.3 µS/cm	0.24 mg/L	320.61 NTU	-267.4 mV	28.94 ft	250.00 ml/min
9/10/2018 5:53 PM	01:19:23	10.04 pH	16.88 °C	2,969.6 µS/cm	0.25 mg/L	375.73 NTU	-265.4 mV	29.77 ft	250.00 ml/min
9/10/2018 5:56 PM	01:22:23	10.05 pH	16.83 °C	2,982.9 µS/cm	0.32 mg/L	411.66 NTU	-262.5 mV	30.46 ft	250.00 ml/min
9/10/2018 5:59 PM	01:25:23	10.05 pH	16.83 °C	2,967.3 µS/cm	0.39 mg/L	476.87 NTU	-259.4 mV	30.58 ft	250.00 ml/min
9/10/2018 6:02 PM	01:28:23	10.04 pH	16.88 °C	2,978.2 µS/cm	0.47 mg/L	513.95 NTU	-255.1 mV	30.92 ft	250.00 ml/min
9/10/2018 6:05 PM	01:31:23	9.99 pH	16.90 °C	2,950.9 µS/cm	0.34 mg/L	590.09 NTU	-251.1 mV	31.21 ft	250.00 ml/min
9/10/2018 6:08 PM	01:34:23	10.12 pH	16.85 °C	2,989.5 µS/cm	0.22 mg/L	641.28 NTU	-251.9 mV	31.70 ft	250.00 ml/min
9/10/2018 6:11 PM	01:37:23	10.16 pH	16.85 °C	3,017.0 µS/cm	0.20 mg/L	588.50 NTU	-252.9 mV	31.83 ft	250.00 ml/min
9/10/2018 6:14 PM	01:40:23	10.15 pH	16.77 °C	3,022.7 µS/cm	0.20 mg/L	698.28 NTU	-251.7 mV	32.19 ft	250.00 ml/min
9/10/2018 6:17 PM	01:43:23	10.23 pH	16.70 °C	3,024.9 µS/cm	0.20 mg/L	747.12 NTU	-253.7 mV	32.47 ft	250.00 ml/min
9/10/2018 6:20 PM	01:46:23	10.35 pH	16.61 °C	3,044.3 µS/cm	0.18 mg/L	816.98 NTU	-259.6 mV	32.80 ft	250.00 ml/min
9/10/2018 6:23 PM	01:49:23	10.42 pH	16.77 °C	3,061.8 µS/cm	0.46 mg/L	855.97 NTU	-260.7 mV	32.83 ft	250.00 ml/min

Samples

Sample ID:	Description:

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/10/2018 6:26:33 PM
Project: MW-127
Operator Name: ST/BW

Location Name: MW-127 **Well Diameter: 2 in** **Casing Type: SS316** **Screen Length: 5 ft** **Top of Screen: 39.2 ft** **Total Depth: 44.2 ft** **Initial Depth to Water: 13.03 ft**	**Pump Type: Bladder Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 42 ft** **Estimated Total Volume Pumped: 25.175 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.25 l/min** **Final Draw Down: 28.21 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:
Well purged dry

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/10/2018 6:26 PM	00:00	8.02 pH	17.99 °C	25.64 µS/cm	6.65 mg/L	908.87 NTU	-4.8 mV	13.03 ft	0.20 l/min
9/10/2018 6:29 PM	03:00	8.14 pH	17.66 °C	23.88 µS/cm	5.59 mg/L	3,597.4 NTU	-68.1 mV	15.07 ft	0.00 l/min
9/10/2018 6:32 PM	06:00	8.26 pH	17.54 °C	22.59 µS/cm	5.12 mg/L	564.16 NTU	-82.1 mV	15.86 ft	0.25 l/min
9/10/2018 6:35 PM	09:00	8.26 pH	17.49 °C	205.15 µS/cm	4.74 mg/L	0.44 NTU	-85.0 mV	16.79 ft	0.25 l/min
9/10/2018 6:42 PM	15:47	8.14 pH	17.37 °C	6,146.1 µS/cm	2.18 mg/L	0.14 NTU	-88.0 mV	18.01 ft	0.25 l/min
9/10/2018 6:45 PM	18:47	8.13 pH	17.49 °C	6,072.1 µS/cm	0.68 mg/L	0.20 NTU	-96.3 mV	19.96 ft	0.25 l/min
9/10/2018 6:48 PM	21:47	8.13 pH	17.43 °C	5,986.1 µS/cm	0.57 mg/L	0.27 NTU	-97.5 mV	20.79 ft	0.25 l/min
9/10/2018 6:50 PM	23:49	8.13 pH	17.41 °C	5,931.3 µS/cm	0.55 mg/L	14.71 NTU	-96.2 mV	21.47 ft	0.25 l/min
9/10/2018 6:53 PM	26:49	8.13 pH	17.48 °C	6,310.5 µS/cm	0.38 mg/L	6.24 NTU	-99.5 mV	22.24 ft	0.25 l/min
9/10/2018 6:56 PM	29:49	8.12 pH	17.31 °C	6,307.3 µS/cm	0.23 mg/L	5.90 NTU	-103.3 mV	23.46 ft	0.25 l/min
9/10/2018 6:59 PM	32:49	8.12 pH	17.28 °C	6,252.0 µS/cm	0.22 mg/L	6.39 NTU	-103.5 mV	24.20 ft	0.25 l/min
9/10/2018 7:02 PM	35:49	8.12 pH	17.22 °C	6,268.1 µS/cm	0.22 mg/L	14.25 NTU	-102.9 mV	25.12 ft	0.25 l/min
9/10/2018 7:05 PM	38:49	8.12 pH	17.27 °C	6,304.1 µS/cm	0.22 mg/L	11.07 NTU	-102.2 mV	25.94 ft	0.25 l/min
9/10/2018 7:08 PM	41:49	8.13 pH	17.20 °C	6,310.6 µS/cm	0.22 mg/L	9.47 NTU	-101.5 mV	26.91 ft	0.25 l/min
9/10/2018 7:11 PM	44:49	8.13 pH	17.17 °C	6,324.1 µS/cm	0.21 mg/L	3.17 NTU	-100.1 mV	27.80 ft	0.25 l/min

9/10/2018 7:14 PM	47:49	8.12 pH	17.14 °C	6,327.8 µS/cm	0.21 mg/L	4.35 NTU	-99.0 mV	28.69 ft	0.25 l/min
9/10/2018 7:17 PM	50:49	8.13 pH	17.19 °C	6,314.4 µS/cm	0.20 mg/L	8.18 NTU	-98.2 mV	29.67 ft	0.25 l/min
9/10/2018 7:20 PM	53:49	8.12 pH	17.18 °C	6,340.3 µS/cm	0.20 mg/L	6.44 NTU	-97.1 mV	30.52 ft	0.25 l/min
9/10/2018 7:23 PM	56:49	8.11 pH	17.12 °C	6,331.1 µS/cm	0.20 mg/L	11.91 NTU	-95.0 mV	31.42 ft	0.25 l/min
9/10/2018 7:26 PM	59:49	8.11 pH	17.03 °C	6,349.7 µS/cm	0.20 mg/L	6.58 NTU	-93.2 mV	32.21 ft	0.25 l/min
9/10/2018 7:29 PM	01:02:49	8.11 pH	16.99 °C	6,340.0 µS/cm	0.19 mg/L	6.93 NTU	-90.6 mV	33.08 ft	0.25 l/min
9/10/2018 7:32 PM	01:05:49	8.12 pH	16.94 °C	6,316.7 µS/cm	0.20 mg/L	5.62 NTU	-87.8 mV	33.93 ft	0.25 l/min
9/10/2018 7:34 PM	01:07:42	8.12 pH	16.94 °C	6,313.2 µS/cm	0.21 mg/L	6.42 NTU	-85.2 mV	34.42 ft	0.25 l/min
9/10/2018 7:37 PM	01:10:42	8.12 pH	17.02 °C	6,292.5 µS/cm	0.22 mg/L	5.32 NTU	-81.2 mV	35.25 ft	0.25 l/min
9/10/2018 7:40 PM	01:13:42	8.12 pH	17.00 °C	6,264.1 µS/cm	0.25 mg/L	3.17 NTU	-76.2 mV	36.14 ft	0.25 l/min
9/10/2018 7:43 PM	01:16:42	8.14 pH	16.92 °C	6,208.3 µS/cm	0.28 mg/L	2.45 NTU	-72.4 mV	37.05 ft	0.25 l/min
9/10/2018 7:46 PM	01:19:42	8.17 pH	16.96 °C	6,112.3 µS/cm	0.38 mg/L	2.07 NTU	-68.2 mV	37.87 ft	0.25 l/min
9/10/2018 7:49 PM	01:22:42	8.21 pH	16.90 °C	5,998.5 µS/cm	0.55 mg/L	2.22 NTU	-62.9 mV	38.53 ft	0.25 l/min
9/10/2018 7:52 PM	01:25:42	8.24 pH	16.89 °C	5,937.9 µS/cm	0.77 mg/L	2.23 NTU	-56.5 mV	39.44 ft	0.25 l/min
9/10/2018 7:55 PM	01:28:42	8.25 pH	16.86 °C	5,913.8 µS/cm	0.88 mg/L	8.49 NTU	-50.6 mV	39.81 ft	0.25 l/min
9/10/2018 7:58 PM	01:31:42	8.18 pH	16.85 °C	6,081.2 µS/cm	0.78 mg/L	99.15 NTU	-47.7 mV	40.20 ft	0.25 l/min
9/10/2018 8:01 PM	01:34:42	8.14 pH	16.86 °C	6,270.2 µS/cm	0.48 mg/L	133.96 NTU	-59.3 mV	40.56 ft	0.25 l/min
9/10/2018 8:04 PM	01:37:42	8.14 pH	16.80 °C	6,326.2 µS/cm	0.37 mg/L	117.28 NTU	-71.9 mV	40.89 ft	0.25 l/min
9/10/2018 8:07 PM	01:40:42	8.14 pH	16.75 °C	6,397.4 µS/cm	0.28 mg/L	89.51 NTU	-79.1 mV	41.24 ft	0.25 l/min
9/10/2018 8:10 PM	01:43:42	8.15 pH	16.73 °C	6,492.8 µS/cm	0.23 mg/L	48.61 NTU	-84.4 mV	41.24 ft	0.25 l/min

Samples

Sample ID:	Description:

Low-Flow Test Report:

Test Date / Time: 9/11/2018 3:58:22 PM
Project: MW-104 (2)
Operator Name: PL

Location Name: MW128 **Well Diameter: 2 in** **Casing Type: PVC** **Total Depth: 23.42 ft** **Initial Depth to Water: 8.89 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 20 ft** **Estimated Total Volume Pumped: 4050 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.07 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:

Weather Conditions:
73 F Clear Slight Breeze

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/11/2018 3:58 PM	00:00	7.03 pH	18.47 °C	2,774.5 µS/cm	0.26 mg/L	115.88 NTU	-3.6 mV	8.89 ft	300.00 ml/min
9/11/2018 4:01 PM	03:00	7.03 pH	16.89 °C	2,748.4 µS/cm	0.18 mg/L	129.46 NTU	-2.2 mV	8.80 ft	225.00 ml/min
9/11/2018 4:04 PM	06:00	7.03 pH	16.04 °C	2,696.9 µS/cm	0.11 mg/L	130.48 NTU	-1.3 mV	8.00 ft	225.00 ml/min
9/11/2018 4:07 PM	09:00	7.04 pH	15.58 °C	2,687.8 µS/cm	0.08 mg/L	114.80 NTU	-0.6 mV	8.95 ft	300.00 ml/min
9/11/2018 4:10 PM	12:00	7.03 pH	15.37 °C	2,676.9 µS/cm	0.07 mg/L	111.74 NTU	0.1 mV	8.96 ft	300.00 ml/min
9/11/2018 4:13 PM	15:00	7.03 pH	15.31 °C	2,671.0 µS/cm	0.06 mg/L	108.68 NTU	0.7 mV	8.96 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW108	Collected @ 1615 No sheen , clear , no odor Upon opening the well there was a strong gasoline smell that faded .

Low-Flow Test Report:

Test Date / Time: 9/14/2018 3:37:17 PM
Project: MW-128
Operator Name: BW/ST

Location Name: MW-128 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 13.42 ft** **Total Depth: 23.42 ft** **Initial Depth to Water: 8.98 ft**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 16.2 ft** **Estimated Total Volume Pumped: 14400 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 320 ml/min** **Final Draw Down: 0.12 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:
Clear no odor

Weather Conditions:
75F. Sunny

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/14/2018 3:37 PM	00:00	7.03 pH	18.26 °C	3,248.3 µS/cm	2.83 mg/L	198.79 NTU	177.1 mV	8.98 ft	320.00 ml/min
9/14/2018 3:40 PM	03:00	7.05 pH	16.01 °C	3,289.1 µS/cm	0.22 mg/L	59.32 NTU	169.9 mV	9.02 ft	320.00 ml/min
9/14/2018 3:43 PM	06:00	7.04 pH	15.44 °C	3,293.9 µS/cm	0.16 mg/L	34.70 NTU	168.4 mV	9.02 ft	320.00 ml/min
9/14/2018 3:46 PM	09:00	7.03 pH	15.01 °C	3,246.6 µS/cm	0.13 mg/L	70.66 NTU	167.5 mV	9.02 ft	320.00 ml/min
9/14/2018 3:49 PM	12:00	7.02 pH	14.83 °C	3,216.6 µS/cm	0.11 mg/L	54.18 NTU	167.2 mV	9.02 ft	320.00 ml/min
9/14/2018 3:52 PM	15:00	7.03 pH	14.78 °C	3,198.5 µS/cm	0.10 mg/L	65.57 NTU	166.9 mV	9.01 ft	320.00 ml/min
9/14/2018 3:55 PM	18:00	7.03 pH	14.70 °C	3,191.7 µS/cm	0.09 mg/L	55.45 NTU	166.6 mV	9.04 ft	320.00 ml/min
9/14/2018 3:58 PM	21:00	7.04 pH	14.68 °C	3,186.8 µS/cm	0.09 mg/L	42.52 NTU	166.3 mV	9.05 ft	320.00 ml/min
9/14/2018 4:01 PM	24:00	7.04 pH	14.72 °C	3,176.2 µS/cm	0.08 mg/L	37.07 NTU	166.2 mV	9.01 ft	320.00 ml/min
9/14/2018 4:04 PM	27:00	7.04 pH	14.79 °C	3,175.8 µS/cm	0.08 mg/L	30.35 NTU	166.1 mV	9.04 ft	320.00 ml/min
9/14/2018 4:07 PM	30:00	7.05 pH	14.70 °C	3,160.1 µS/cm	0.07 mg/L	38.72 NTU	166.2 mV	9.08 ft	320.00 ml/min
9/14/2018 4:10 PM	33:00	7.04 pH	14.74 °C	3,160.3 µS/cm	0.07 mg/L	29.52 NTU	166.4 mV	9.04 ft	320.00 ml/min
9/14/2018 4:13 PM	36:00	7.04 pH	14.61 °C	3,158.7 µS/cm	0.07 mg/L	40.29 NTU	166.5 mV	9.04 ft	320.00 ml/min

9/14/2018 4:16 PM	39:00	7.03 pH	14.57 °C	3,152.1 µS/cm	0.06 mg/L	26.76 NTU	166.7 mV	9.06 ft	320.00 ml/min
9/14/2018 4:19 PM	42:00	7.04 pH	14.59 °C	3,146.7 µS/cm	0.06 mg/L	24.75 NTU	166.8 mV	9.10 ft	320.00 ml/min
9/14/2018 4:22 PM	45:00	7.05 pH	14.56 °C	3,145.6 µS/cm	0.06 mg/L	20.82 NTU	166.6 mV	9.10 ft	320.00 ml/min

Samples

Sample ID:	Description:
MW-128	MNA parameters

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/14/2018 12:01:01 PM
Project: MW-129
Operator Name: BW/ST

Location Name: MW-129 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 16 ft** **Total Depth: 26.01 ft** **Initial Depth to Water: 13.56 ft**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 19.7 ft** **Estimated Total Volume Pumped: 103666.5 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 310 ml/min** **Final Draw Down: 0.12 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:

Weather Conditions:
65 F. Cloudy

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/14/2018 12:01 PM	00:00	7.07 pH	17.64 °C	2,553.6 µS/cm	4.95 mg/L	157.97 NTU	65.9 mV	13.56 ft	300.00 ml/min
9/14/2018 12:04 PM	03:00	7.07 pH	14.79 °C	2,685.5 µS/cm	0.42 mg/L	70.72 NTU	17.9 mV	13.56 ft	310.00 ml/min
9/14/2018 12:07 PM	06:00	7.05 pH	14.18 °C	2,703.5 µS/cm	0.24 mg/L	63.32 NTU	10.7 mV	13.56 ft	310.00 ml/min
9/14/2018 12:10 PM	09:00	7.03 pH	13.83 °C	2,704.9 µS/cm	0.19 mg/L	65.17 NTU	7.1 mV	13.62 ft	310.00 ml/min
9/14/2018 12:13 PM	12:00	7.03 pH	13.71 °C	2,705.7 µS/cm	0.16 mg/L	73.06 NTU	4.0 mV	13.63 ft	31,078 ml/min
9/14/2018 12:16 PM	15:00	7.03 pH	13.59 °C	2,711.5 µS/cm	0.16 mg/L	76.65 NTU	1.3 mV	13.66 ft	310.00 ml/min
9/14/2018 12:19 PM	18:00	7.03 pH	13.70 °C	2,714.3 µS/cm	0.15 mg/L	67.69 NTU	1.0 mV	13.67 ft	310.00 ml/min
9/14/2018 12:22 PM	21:00	7.05 pH	13.59 °C	2,698.7 µS/cm	0.13 mg/L	74.99 NTU	0.1 mV	13.67 ft	310.00 ml/min
9/14/2018 12:31 PM	30:45	7.06 pH	13.49 °C	2,710.5 µS/cm	0.18 mg/L	63.39 NTU	1.6 mV	13.67 ft	310.00 ml/min
9/14/2018 12:34 PM	33:45	7.07 pH	13.49 °C	2,696.7 µS/cm	0.09 mg/L	56.50 NTU	2.4 mV	13.68 ft	310.00 ml/min
9/14/2018 12:37 PM	36:45	7.07 pH	13.47 °C	2,693.8 µS/cm	0.08 mg/L	59.76 NTU	3.3 mV	13.68 ft	310.00 ml/min

Samples

Sample ID:	Description:
MW-129	Clear no odor VOCs

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/12/2018 1:40:20 PM
Project: MW-130
Operator Name: BW/ST

Location Name: MW-130 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 13.63 ft** **Total Depth: 23.63 ft** **Initial Depth to Water: 11.15 ft**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 17.5 ft** **Estimated Total Volume Pumped: 16740 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 310 ml/min** **Final Draw Down: 0.14 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:
Clear. No odor.

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/12/2018 1:40 PM	00:00	7.31 pH	21.16 °C	804.64 µS/cm	5.72 mg/L	481.66 NTU	206.7 mV	11.25 ft	310.00 ml/min
9/12/2018 1:43 PM	03:00	7.30 pH	17.34 °C	921.98 µS/cm	4.51 mg/L	433.15 NTU	211.9 mV	11.25 ft	310.00 ml/min
9/12/2018 1:46 PM	06:00	7.24 pH	16.63 °C	984.35 µS/cm	4.64 mg/L	290.10 NTU	215.6 mV	11.26 ft	310.00 ml/min
9/12/2018 1:49 PM	09:00	7.13 pH	16.42 °C	1,017.2 µS/cm	4.78 mg/L	239.28 NTU	221.3 mV	11.29 ft	310.00 ml/min
9/12/2018 1:52 PM	12:00	7.11 pH	16.15 °C	1,051.1 µS/cm	4.89 mg/L	193.42 NTU	222.4 mV	11.26 ft	310.00 ml/min
9/12/2018 1:55 PM	15:00	7.12 pH	16.00 °C	1,058.5 µS/cm	4.97 mg/L	142.09 NTU	221.5 mV	11.26 ft	310.00 ml/min
9/12/2018 1:58 PM	18:00	7.13 pH	15.98 °C	1,061.7 µS/cm	4.98 mg/L	126.93 NTU	220.0 mV	11.29 ft	310.00 ml/min
9/12/2018 2:01 PM	21:00	7.15 pH	15.91 °C	1,077.2 µS/cm	4.98 mg/L	105.36 NTU	217.8 mV	11.26 ft	310.00 ml/min
9/12/2018 2:04 PM	24:00	7.18 pH	15.80 °C	1,068.8 µS/cm	4.98 mg/L	107.50 NTU	215.3 mV	11.29 ft	310.00 ml/min
9/12/2018 2:07 PM	27:00	7.20 pH	15.82 °C	1,062.8 µS/cm	5.15 mg/L	80.39 NTU	213.4 mV	11.28 ft	310.00 ml/min
9/12/2018 2:10 PM	30:00	7.24 pH	15.75 °C	1,068.3 µS/cm	5.01 mg/L	46.56 NTU	210.4 mV	11.26 ft	310.00 ml/min
9/12/2018 2:13 PM	33:00	7.26 pH	15.73 °C	1,071.2 µS/cm	5.02 mg/L	43.47 NTU	208.3 mV	11.30 ft	310.00 ml/min
9/12/2018 2:16 PM	36:00	7.28 pH	15.70 °C	1,075.2 µS/cm	4.99 mg/L	37.81 NTU	206.7 mV	11.29 ft	310.00 ml/min
9/12/2018 2:19 PM	39:00	7.30 pH	15.64 °C	1,063.9 µS/cm	4.98 mg/L	42.52 NTU	205.4 mV	11.26 ft	310.00 ml/min
9/12/2018 2:22 PM	42:00	7.31 pH	15.68 °C	1,067.3 µS/cm	4.97 mg/L	41.76 NTU	204.0 mV	11.29 ft	310.00 ml/min

9/12/2018 2:25 PM	45:00	7.32 pH	15.69 °C	1,070.7 µS/cm	4.93 mg/L	32.54 NTU	203.0 mV	11.29 ft	310.00 ml/min
9/12/2018 2:28 PM	48:00	7.32 pH	15.63 °C	1,074.5 µS/cm	4.88 mg/L	28.72 NTU	202.5 mV	11.29 ft	310.00 ml/min
9/12/2018 2:31 PM	51:00	7.33 pH	15.62 °C	1,076.1 µS/cm	4.89 mg/L	32.18 NTU	201.6 mV	11.29 ft	310.00 ml/min
9/12/2018 2:34 PM	54:00	7.33 pH	15.65 °C	1,068.0 µS/cm	4.87 mg/L	32.87 NTU	200.7 mV	11.29 ft	310.00 ml/min

Samples

Sample ID:	Description:
MW-130	VOCs
20180912-03	VOCs

Low-Flow Test Report:

Test Date / Time: 9/13/2018 1:47:18 PM
Project: MW132
Operator Name: JS/RM

Location Name: MW132 **Well Diameter: 2 in** **Casing Type: PVC** **Total Depth: 22.11 m** **Initial Depth to Water: 11.31 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 16.7 ft** **Estimated Total Volume Pumped: 5647.667 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 250 ml/min** **Final Draw Down: 11.52 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:

Weather Conditions:
Partly cloudy, 68° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/13/2018 1:47 PM	00:00	6.92 pH	22.22 °C	2,858.7 µS/cm	1.69 mg/L	81.55 NTU	53.5 mV	11.31 ft	250.00 ml/min
9/13/2018 1:50 PM	03:00	6.92 pH	17.59 °C	2,462.8 µS/cm	0.37 mg/L	132.66 NTU	59.8 mV	11.48 ft	250.00 ml/min
9/13/2018 1:53 PM	06:00	6.91 pH	17.20 °C	2,621.6 µS/cm	0.38 mg/L	130.94 NTU	63.5 mV	11.52 ft	250.00 ml/min
9/13/2018 1:56 PM	09:00	6.91 pH	16.56 °C	2,725.2 µS/cm	0.46 mg/L	123.52 NTU	65.5 mV	11.52 ft	250.00 ml/min
9/13/2018 1:59 PM	12:00	6.91 pH	16.69 °C	2,737.3 µS/cm	0.49 mg/L	229.15 NTU	66.9 mV	11.52 ft	250.00 ml/min
9/13/2018 2:00 PM	13:34	6.90 pH	16.54 °C	2,797.1 µS/cm	0.52 mg/L	147.59 NTU	68.3 mV	11.52 ft	250.00 ml/min
9/13/2018 2:03 PM	16:34	6.90 pH	16.36 °C	2,821.1 µS/cm	0.56 mg/L	122.17 NTU	69.6 mV	11.52 ft	250.00 ml/min
9/13/2018 2:06 PM	19:34	6.90 pH	16.53 °C	2,854.4 µS/cm	0.64 mg/L	117.67 NTU	70.7 mV	11.52 ft	250.00 ml/min
9/13/2018 2:09 PM	22:34	6.91 pH	16.37 °C	2,881.8 µS/cm	0.66 mg/L	107.73 NTU	71.8 mV	11.52 ft	250.00 ml/min
9/13/2018 2:12 PM	25:34	6.91 pH	16.48 °C	2,889.2 µS/cm	0.69 mg/L	125.02 NTU	72.4 mV	11.52 ft	250.00 ml/min

Samples

Sample ID:	Description:

MW132	VOCs

Low-Flow Test Report:

Test Date / Time: 9/13/2018 12:39:18 PM
Project: MW133
Operator Name: JS/RM

Location Name: MW133 **Well Diameter: 2 ft** **Casing Type: PVC** **Initial Depth to Water: 10.71 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 20.5 ft** **Estimated Total Volume Pumped: 14400 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 14.8 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:

Weather Conditions:
Overcast, 66° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/13/2018 12:39 PM	00:00	6.99 pH	22.35 °C	3,066.5 µS/cm	1.19 mg/L	21.31 NTU	29.5 mV	10.71 ft	300.00 ml/min
9/13/2018 12:42 PM	03:00	6.88 pH	17.60 °C	3,186.5 µS/cm	0.45 mg/L	136.18 NTU	40.0 mV	10.84 ft	300.00 ml/min
9/13/2018 12:45 PM	06:00	6.88 pH	16.81 °C	3,222.6 µS/cm	0.22 mg/L	187.86 NTU	44.7 mV	10.84 ft	300.00 ml/min
9/13/2018 12:48 PM	09:00	6.88 pH	16.70 °C	3,233.0 µS/cm	0.22 mg/L	247.59 NTU	47.6 mV	10.84 ft	300.00 ml/min
9/13/2018 12:51 PM	12:00	6.88 pH	16.58 °C	3,235.9 µS/cm	0.22 mg/L	297.88 NTU	49.0 mV	10.84 ft	300.00 ml/min
9/13/2018 12:54 PM	15:00	6.88 pH	16.59 °C	3,242.8 µS/cm	0.24 mg/L	302.43 NTU	50.4 mV	10.84 ft	300.00 ml/min
9/13/2018 12:57 PM	18:00	6.88 pH	16.49 °C	3,251.0 µS/cm	0.28 mg/L	249.65 NTU	51.6 mV	10.84 ft	300.00 ml/min
9/13/2018 1:00 PM	21:00	6.88 pH	16.52 °C	3,278.4 µS/cm	0.33 mg/L	249.09 NTU	53.1 mV	10.84 ft	300.00 ml/min
9/13/2018 1:03 PM	24:00	6.88 pH	16.48 °C	3,278.8 µS/cm	0.35 mg/L	166.54 NTU	54.3 mV	10.84 ft	300.00 ml/min
9/13/2018 1:06 PM	27:00	6.89 pH	16.43 °C	3,300.4 µS/cm	0.37 mg/L	161.33 NTU	55.4 mV	10.84 ft	300.00 ml/min
9/13/2018 1:09 PM	30:00	6.88 pH	16.46 °C	3,293.5 µS/cm	0.38 mg/L	106.45 NTU	56.7 mV	10.84 ft	300.00 ml/min
9/13/2018 1:12 PM	33:00	6.89 pH	16.49 °C	3,307.4 µS/cm	0.41 mg/L	88.76 NTU	57.8 mV	10.84 ft	300.00 ml/min
9/13/2018 1:15 PM	36:00	6.89 pH	16.50 °C	3,313.1 µS/cm	0.44 mg/L	83.90 NTU	59.1 mV	10.84 ft	300.00 ml/min

9/13/2018 1:18 PM	39:00	6.88 pH	16.51 °C	3,317.7 µS/cm	0.46 mg/L	68.18 NTU	60.3 mV	10.84 ft	300.00 ml/min
9/13/2018 1:21 PM	42:00	6.88 pH	16.73 °C	3,322.0 µS/cm	0.49 mg/L	46.65 NTU	62.1 mV	10.84 ft	300.00 ml/min
9/13/2018 1:24 PM	45:00	6.88 pH	16.64 °C	3,316.7 µS/cm	0.49 mg/L	50.30 NTU	62.7 mV	10.84 ft	300.00 ml/min
9/13/2018 1:27 PM	48:00	6.88 pH	16.66 °C	3,324.5 µS/cm	0.53 mg/L	46.23 NTU	63.7 mV	10.84 ft	300.00 ml/min

Samples

Sample ID:	Description:
MW133	VOCs

Low-Flow Test Report:

Test Date / Time: 9/13/2018 3:24:55 PM
Project: MW134
Operator Name: JS/RM

Location Name: MW134 **Well Diameter: 2 in** **Casing Type: PVC** **Total Depth: 18.82 ft** **Initial Depth to Water: 7.58 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 13.2 ft** **Estimated Total Volume Pumped: 1884 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 200 ml/min** **Final Draw Down: 8.94 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:

Weather Conditions:
Partly cloudy, 76° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/13/2018 3:24 PM	00:00	6.93 pH	24.39 °C	2,686.3 µS/cm	2.04 mg/L	182.10 NTU	67.9 mV	7.58 ft	200.00 ml/min
9/13/2018 3:27 PM	03:00	6.99 pH	19.48 °C	2,497.4 µS/cm	0.19 mg/L	121.40 NTU	68.7 mV	8.90 ft	200.00 ml/min
9/13/2018 3:30 PM	06:00	7.00 pH	19.01 °C	2,471.0 µS/cm	0.14 mg/L	101.92 NTU	68.0 mV	8.92 ft	200.00 ml/min
9/13/2018 3:33 PM	09:00	7.00 pH	18.84 °C	2,445.2 µS/cm	0.12 mg/L	84.64 NTU	67.3 mV	8.94 ft	200.00 ml/min
9/13/2018 3:36 PM	12:00	7.00 pH	18.65 °C	2,436.8 µS/cm	0.10 mg/L	86.24 NTU	65.5 mV	8.94 ft	
9/13/2018 3:39 PM	15:00	7.00 pH	18.66 °C	2,415.9 µS/cm	0.09 mg/L	72.56 NTU	63.8 mV	8.94 ft	
9/13/2018 3:42 PM	18:00	7.01 pH	18.57 °C	2,411.8 µS/cm	0.08 mg/L	60.81 NTU	61.7 mV	8.94 ft	2.00 ml/min
9/13/2018 3:45 PM	21:00	7.01 pH	18.65 °C	2,411.7 µS/cm	0.08 mg/L	63.43 NTU	59.7 mV	8.94 ft	20.00 ml/min
9/13/2018 3:48 PM	24:00	7.02 pH	18.46 °C	2,418.4 µS/cm	0.08 mg/L	58.11 NTU	57.4 mV	8.94 ft	200.00 ml/min

Samples

Sample ID:	Description:
MW134	VOCs

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/14/2018 8:20:00 AM
Project: MW-135
Operator Name: BW/ST

Location Name: MW-135 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 16.23 ft** **Total Depth: 26.23 ft** **Initial Depth to Water: 13.14 ft**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 19.7 ft** **Estimated Total Volume Pumped: 6612 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 310 ml/min** **Final Draw Down: 0.05 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:
Clear. No odor.

Weather Conditions:
60 F. Cloudy

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/14/2018 8:20 AM	00:00	7.02 pH	14.07 °C	2,469.3 µS/cm	5.70 mg/L	297.06 NTU	242.3 mV	13.14 ft	3.00 ml/min
9/14/2018 8:23 AM	03:00	6.98 pH	12.98 °C	2,578.7 µS/cm	0.40 mg/L	421.05 NTU	246.2 mV	13.18 ft	31.00 ml/min
9/14/2018 8:26 AM	06:00	6.96 pH	12.68 °C	2,601.4 µS/cm	0.21 mg/L	378.50 NTU	246.7 mV	13.18 ft	310.00 ml/min
9/14/2018 8:29 AM	09:00	6.97 pH	12.53 °C	2,676.6 µS/cm	0.18 mg/L	269.23 NTU	244.0 mV	13.17 ft	310.00 ml/min
9/14/2018 8:32 AM	12:00	6.98 pH	12.50 °C	2,691.0 µS/cm	2.60 mg/L	210.43 NTU	243.2 mV	13.20 ft	310.00 ml/min
9/14/2018 8:35 AM	15:00	6.96 pH	12.41 °C	2,676.3 µS/cm	0.22 mg/L	136.54 NTU	244.1 mV	13.22 ft	310.00 ml/min
9/14/2018 8:38 AM	18:00	6.96 pH	12.38 °C	2,666.7 µS/cm	0.13 mg/L	115.92 NTU	243.8 mV	13.20 ft	310.00 ml/min
9/14/2018 8:41 AM	21:00	6.96 pH	12.36 °C	2,651.9 µS/cm	0.11 mg/L	70.50 NTU	243.9 mV	13.19 ft	310.00 ml/min
9/14/2018 8:44 AM	24:00	6.96 pH	12.35 °C	2,645.2 µS/cm	0.10 mg/L	69.25 NTU	243.8 mV	13.19 ft	310.00 ml/min
9/14/2018 8:47 AM	27:00	6.97 pH	12.34 °C	2,639.7 µS/cm	0.10 mg/L	72.09 NTU	243.7 mV	13.19 ft	310.00 ml/min

Samples

Sample ID:	Description:

MW-135	VOCs
20180914-01	VOCs blind duplicate

Low-Flow Test Report:

Test Date / Time: 9/15/2018 10:10:10 AM
Project: PAI-WEST
Operator Name: JR

Location Name: PAI-WEST **Well Diameter: 4 in** **Casing Type: Steel** **Initial Depth to Water: 10.01 ft**	**Pump Type: Peristaltic** **Tubing Type: Teflon** **Pump Intake From TOC: 17.6 ft** **Estimated Total Volume Pumped: 2.7 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.15 ml/min** **Final Draw Down: 0.38 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/15/2018 10:10 AM	00:00	7.84 pH	16.18 °C	2,252.2 µS/cm	0.92 mg/L	11.26 NTU	-185.2 mV	10.01 ft	0.15 ml/min
9/15/2018 10:13 AM	03:00	7.84 pH	16.13 °C	2,256.8 µS/cm	0.52 mg/L	11.50 NTU	-201.2 mV	10.11 ft	0.15 ml/min
9/15/2018 10:16 AM	06:00	7.85 pH	16.20 °C	2,257.6 µS/cm	0.40 mg/L	3.60 NTU	-205.6 mV	10.21 ft	0.15 ml/min
9/15/2018 10:19 AM	09:00	7.85 pH	16.17 °C	2,252.9 µS/cm	0.34 mg/L	5.00 NTU	-214.1 mV	10.31 ft	0.15 ml/min
9/15/2018 10:22 AM	12:00	7.85 pH	16.25 °C	2,249.1 µS/cm	0.29 mg/L	1.80 NTU	-214.9 mV	10.36 ft	0.15 ml/min
9/15/2018 10:25 AM	15:00	7.85 pH	16.31 °C	2,251.1 µS/cm	0.26 mg/L	4.70 NTU	-216.0 mV	10.37 ft	0.15 ml/min
9/15/2018 10:28 AM	18:00	7.86 pH	16.40 °C	2,240.5 µS/cm	0.22 mg/L	4.58 NTU	-219.8 mV	10.39 ft	0.15 ml/min

Samples

Sample ID:	Description:
PAI-WEST	

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/14/2018 4:58:54 PM
Project: PEP07
Operator Name: PL/RM

Location Name: PEP07 **Well Diameter: 2 in** **Casing Type: PVC** **Total Depth: 23.25 ft** **Initial Depth to Water: 11.54 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 20.5 ft** **Estimated Total Volume Pumped: 9000 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.47 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/14/2018 4:58 PM	00:00	6.66 pH	17.58 °C	2,897.5 µS/cm	0.29 mg/L	75.58 NTU	78.0 mV	11.74 ft	300.00 ml/min
9/14/2018 5:01 PM	03:00	6.65 pH	16.27 °C	2,950.4 µS/cm	0.16 mg/L	68.33 NTU	-19.3 mV	11.83 ft	300.00 ml/min
9/14/2018 5:04 PM	06:00	6.64 pH	15.84 °C	2,967.8 µS/cm	0.13 mg/L	44.95 NTU	-87.0 mV	11.92 ft	300.00 ml/min
9/14/2018 5:07 PM	09:00	6.62 pH	15.68 °C	2,980.9 µS/cm	0.10 mg/L	44.01 NTU	-90.5 mV	11.96 ft	300.00 ml/min
9/14/2018 5:10 PM	12:00	6.60 pH	15.55 °C	2,986.0 µS/cm	0.10 mg/L	46.07 NTU	-86.0 mV	12.00 ft	300.00 ml/min
9/14/2018 5:13 PM	15:00	6.59 pH	15.49 °C	2,990.3 µS/cm	0.08 mg/L	26.43 NTU	-79.5 mV	12.01 ft	300.00 ml/min
9/14/2018 5:16 PM	18:00	6.60 pH	15.59 °C	2,994.3 µS/cm	0.12 mg/L	50.73 NTU	-72.9 mV	12.01 ft	300.00 ml/min
9/14/2018 5:19 PM	21:00	6.61 pH	15.42 °C	2,991.5 µS/cm	0.11 mg/L	18.81 NTU	-66.5 mV	12.01 ft	300.00 ml/min
9/14/2018 5:22 PM	24:00	6.61 pH	15.41 °C	2,998.8 µS/cm	0.14 mg/L	14.07 NTU	-60.6 mV	12.01 ft	300.00 ml/min
9/14/2018 5:25 PM	27:00	6.61 pH	15.41 °C	3,009.0 µS/cm	0.17 mg/L	11.20 NTU	-55.0 mV	12.01 ft	300.00 ml/min
9/14/2018 5:28 PM	30:00	6.61 pH	15.37 °C	3,004.6 µS/cm	0.20 mg/L	13.05 NTU	-50.3 mV	12.01 ft	300.00 ml/min

Samples

Sample ID:	Description:

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/13/2018 10:27:52 AM
Project: REGAL-I-01
Operator Name: PL/JR

Location Name: REGAL-I-01 **Well Diameter: 6 in** **Casing Type: Steel** **Total Depth: 39.3 ft** **Initial Depth to Water: 13.38 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 26.3 ft** **Estimated Total Volume Pumped: 2.25 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0 l/min** **Final Draw Down: 0.02 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Weather Conditions:
Cloudy; 65 F, 5 mph winds

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/13/2018 10:27 AM	00:00	7.00 pH	20.31 °C	2,456.7 µS/cm	0.83 mg/L	21.67 NTU	-106.2 mV	13.38 ft	0.15 l/min
9/13/2018 10:30 AM	03:00	6.97 pH	17.24 °C	2,205.0 µS/cm	0.62 mg/L	65.32 NTU	-96.5 mV	13.39 ft	0.15 l/min
9/13/2018 10:33 AM	06:00	6.98 pH	16.41 °C	2,215.0 µS/cm	0.40 mg/L	63.12 NTU	-91.2 mV	13.39 ft	0.15 l/min
9/13/2018 10:36 AM	09:00	6.98 pH	16.23 °C	2,226.3 µS/cm	0.32 mg/L	58.52 NTU	-88.3 mV	13.39 ft	0.15 l/min
9/13/2018 10:39 AM	12:00	6.98 pH	16.09 °C	2,230.8 µS/cm	0.28 mg/L	59.91 NTU	-84.5 mV	13.40 ft	0.15 l/min
9/13/2018 10:42 AM	15:00	6.98 pH	16.09 °C	2,235.0 µS/cm	0.25 mg/L	56.47 NTU	-81.9 mV	13.40 ft	0.00 l/min
9/13/2018 10:45 AM	18:00	6.99 pH	15.95 °C	2,231.5 µS/cm	0.21 mg/L	53.94 NTU	-82.5 mV	13.40 ft	0.00 l/min
9/13/2018 10:48 AM	21:00	6.99 pH	15.77 °C	2,234.6 µS/cm	0.20 mg/L	57.20 NTU	-81.4 mV	13.40 ft	0.00 l/min

Samples

Sample ID:	Description:
Regal - I - 01	Collected @ 1050 Clear , no odor, no sheen

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/12/2018 12:58:44 PM
Project: RH - MW - 1
Operator Name: PL

Location Name: RH - MW - 1 **Well Diameter: 2 in** **Casing Type: PVC** **Total Depth: 20.15 ft** **Initial Depth to Water: 14.21 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 17 ft** **Estimated Total Volume Pumped: 13500 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/12/2018 12:58 PM	00:00	6.98 pH	18.15 °C	2,211.1 µS/cm	0.41 mg/L	177.70 NTU	95.4 mV	14.21 ft	300.00 ml/min
9/12/2018 1:01 PM	03:00	6.99 pH	16.95 °C	2,234.6 µS/cm	0.10 mg/L	201.51 NTU	94.5 mV	14.21 ft	300.00 ml/min
9/12/2018 1:04 PM	06:00	6.99 pH	16.54 °C	2,247.9 µS/cm	0.07 mg/L	181.47 NTU	94.0 mV	14.21 ft	300.00 ml/min
9/12/2018 1:07 PM	09:00	6.99 pH	16.41 °C	2,261.7 µS/cm	0.06 mg/L	97.77 NTU	93.7 mV	14.21 ft	300.00 ml/min
9/12/2018 1:10 PM	12:00	6.99 pH	16.34 °C	2,269.3 µS/cm	0.05 mg/L	76.26 NTU	93.3 mV	14.21 ft	300.00 ml/min
9/12/2018 1:13 PM	15:00	6.99 pH	16.31 °C	2,279.9 µS/cm	0.05 mg/L	43.75 NTU	93.0 mV	14.21 ft	300.00 ml/min
9/12/2018 1:16 PM	18:00	7.00 pH	16.25 °C	2,284.0 µS/cm	0.04 mg/L	34.43 NTU	92.6 mV	14.21 ft	300.00 ml/min
9/12/2018 1:19 PM	21:00	7.00 pH	16.22 °C	2,285.4 µS/cm	0.03 mg/L	31.83 NTU	92.1 mV	14.21 ft	300.00 ml/min
9/12/2018 1:22 PM	24:00	7.00 pH	16.22 °C	2,294.8 µS/cm	0.03 mg/L	28.52 NTU	91.9 mV	14.21 ft	300.00 ml/min
9/12/2018 1:25 PM	27:00	7.00 pH	16.18 °C	2,287.8 µS/cm	0.03 mg/L	25.22 NTU	91.5 mV	14.21 ft	300.00 ml/min
9/12/2018 1:28 PM	30:00	7.00 pH	16.16 °C	2,287.7 µS/cm	0.03 mg/L	19.17 NTU	91.3 mV	14.21 ft	300.00 ml/min
9/12/2018 1:31 PM	33:00	7.00 pH	16.16 °C	2,289.2 µS/cm	0.03 mg/L	14.89 NTU	91.2 mV	14.21 ft	300.00 ml/min
9/12/2018 1:34 PM	36:00	7.00 pH	16.16 °C	2,290.2 µS/cm	0.03 mg/L	11.13 NTU	90.9 mV	14.21 ft	300.00 ml/min
9/12/2018 1:37 PM	39:00	7.00 pH	16.15 °C	2,293.6 µS/cm	0.03 mg/L	5.68 NTU	90.7 mV	14.21 ft	300.00 ml/min
9/12/2018 1:40 PM	42:00	7.00 pH	16.13 °C	2,294.0 µS/cm	0.03 mg/L	5.05 NTU	90.5 mV	14.21 ft	300.00 ml/min

9/12/2018 1:43 PM	45:00	7.00 pH	16.14 °C	2,294.2 µS/cm	0.03 mg/L	4.51 NTU	90.4 mV	14.21 ft	300.00 ml/min

Samples

Sample ID:	Description:
RH - MW - 1	Collected @ 1345 Clear , no odor ,no sheen

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/12/2018 8:43:22 AM
Project: MW-104 (3)
Operator Name: PL

Location Name: RHMW3 **Well Diameter: 2 cm** **Casing Type: PVC** **Total Depth: 19.9 m** **Initial Depth to Water: 14.63 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 17 ft** **Estimated Total Volume Pumped: 13200 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 200 ml/min** **Final Draw Down: 0.15 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/12/2018 8:43 AM	00:00	7.18 pH	11.30 °C	2,705.4 µS/cm	5.17 mg/L	3.83 NTU	103.6 mV	14.63 ft	300.00 ml/min
9/12/2018 8:46 AM	03:00	6.99 pH	13.39 °C	1,859.4 µS/cm	2.06 mg/L	155.67 NTU	100.0 mV	14.63 ft	300.00 ml/min
9/12/2018 8:49 AM	06:00	6.99 pH	13.71 °C	1,874.2 µS/cm	1.58 mg/L	150.14 NTU	99.7 mV	14.78 ft	200.00 ml/min
9/12/2018 8:52 AM	09:00	7.00 pH	13.81 °C	1,908.9 µS/cm	1.45 mg/L	109.80 NTU	100.5 mV	14.72 ft	200.00 ml/min
9/12/2018 8:55 AM	12:00	7.00 pH	13.88 °C	1,952.6 µS/cm	1.24 mg/L	104.23 NTU	101.5 mV	14.78 ft	200.00 ml/min
9/12/2018 8:58 AM	15:00	7.00 pH	13.92 °C	1,990.9 µS/cm	1.14 mg/L	84.98 NTU	102.0 mV	14.78 ft	200.00 ml/min
9/12/2018 9:01 AM	18:00	7.00 pH	13.97 °C	2,009.7 µS/cm	1.08 mg/L	63.40 NTU	102.4 mV	14.78 ft	200.00 ml/min
9/12/2018 9:04 AM	21:00	7.00 pH	14.01 °C	2,038.9 µS/cm	1.00 mg/L	37.69 NTU	102.7 mV	14.78 ft	200.00 ml/min
9/12/2018 9:07 AM	24:00	7.00 pH	14.03 °C	2,075.0 µS/cm	0.94 mg/L	32.11 NTU	103.1 mV	14.78 ft	200.00 ml/min
9/12/2018 9:10 AM	27:00	7.01 pH	14.04 °C	2,111.0 µS/cm	0.88 mg/L	47.30 NTU	103.2 mV	14.78 ft	200.00 ml/min
9/12/2018 9:13 AM	30:00	7.01 pH	14.06 °C	2,104.7 µS/cm	0.86 mg/L	44.31 NTU	103.2 mV	14.78 ft	200.00 ml/min
9/12/2018 9:16 AM	33:00	7.01 pH	14.08 °C	2,118.6 µS/cm	0.82 mg/L	26.69 NTU	103.3 mV	14.78 ft	200.00 ml/min
9/12/2018 9:19 AM	36:00	7.01 pH	14.09 °C	2,139.3 µS/cm	0.78 mg/L	21.54 NTU	103.4 mV	14.78 ft	200.00 ml/min
9/12/2018 9:22 AM	39:00	7.01 pH	14.09 °C	2,143.2 µS/cm	0.76 mg/L	23.06 NTU	103.4 mV	14.78 ft	200.00 ml/min
9/12/2018 9:25 AM	42:00	7.01 pH	14.10 °C	2,159.4 µS/cm	0.73 mg/L	15.92 NTU	103.5 mV	14.78 ft	200.00 ml/min

9/12/2018 9:28 AM	45:00	7.01 pH	14.11 °C	2,150.9 µS/cm	0.76 mg/L	45.09 NTU	103.5 mV	14.78 ft	200.00 ml/min
9/12/2018 9:31 AM	48:00	7.01 pH	14.12 °C	2,176.8 µS/cm	0.69 mg/L	27.88 NTU	103.5 mV	14.78 ft	200.00 ml/min
9/12/2018 9:34 AM	51:00	7.02 pH	14.13 °C	2,175.3 µS/cm	0.69 mg/L	19.83 NTU	103.5 mV	14.78 ft	200.00 ml/min
9/12/2018 9:37 AM	54:00	7.01 pH	14.13 °C	2,178.1 µS/cm	0.68 mg/L	24.67 NTU	103.5 mV	14.78 ft	200.00 ml/min
9/12/2018 9:40 AM	57:00	7.01 pH	14.14 °C	2,194.4 µS/cm	0.66 mg/L	21.91 NTU	103.6 mV	14.78 ft	200.00 ml/min
9/12/2018 9:43 AM	01:00:00	7.01 pH	14.15 °C	2,195.9 µS/cm	0.65 mg/L	19.66 NTU	103.6 mV	14.78 ft	200.00 ml/min
9/12/2018 9:46 AM	01:03:00	7.01 pH	14.19 °C	2,189.0 µS/cm	0.64 mg/L	26.27 NTU	103.7 mV	14.78 ft	200.00 ml/min

Samples

Sample ID:	Description:
Rh-mw-3	Collected @ 0948.

Low-Flow Test Report:

Test Date / Time: 9/12/2018 11:48:52 AM
Project: RH-MW-7
Operator Name: PL

Location Name: RH-MW-7 **Well Diameter: 2 in** **Casing Type: PVC** **Total Depth: 20.27 ft** **Initial Depth to Water: 13.65 ft**	**Pump Type: Bladder** **Tubing Type: Teflon** **Pump Intake From TOC: 16.8 ft** **Estimated Total Volume Pumped: 12600 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.05 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/12/2018 11:48 AM	00:00	6.92 pH	18.23 °C	2,769.4 µS/cm	2.02 mg/L	94.45 NTU	71.4 mV	13.68 ft	300.00 ml/min
9/12/2018 11:51 AM	03:00	6.91 pH	16.90 °C	2,829.2 µS/cm	1.97 mg/L	55.91 NTU	78.3 mV	13.70 ft	300.00 ml/min
9/12/2018 11:54 AM	06:00	6.91 pH	16.68 °C	2,837.7 µS/cm	1.96 mg/L	47.59 NTU	83.0 mV	13.70 ft	300.00 ml/min
9/12/2018 11:57 AM	09:00	6.91 pH	16.63 °C	2,841.9 µS/cm	1.94 mg/L	18.96 NTU	86.7 mV	13.70 ft	300.00 ml/min
9/12/2018 12:00 PM	12:00	6.91 pH	16.58 °C	2,847.0 µS/cm	1.95 mg/L	12.46 NTU	90.0 mV	13.70 ft	300.00 ml/min
9/12/2018 12:03 PM	15:00	6.91 pH	16.55 °C	2,851.4 µS/cm	1.98 mg/L	8.80 NTU	92.7 mV	13.70 ft	300.00 ml/min
9/12/2018 12:06 PM	18:00	6.91 pH	16.56 °C	2,856.1 µS/cm	2.01 mg/L	9.95 NTU	95.2 mV	13.70 ft	300.00 ml/min
9/12/2018 12:09 PM	21:00	6.91 pH	16.56 °C	2,856.2 µS/cm	2.01 mg/L	10.50 NTU	97.3 mV	13.70 ft	300.00 ml/min
9/12/2018 12:12 PM	24:00	6.91 pH	16.58 °C	2,856.0 µS/cm	2.00 mg/L	4.36 NTU	99.0 mV	13.70 ft	300.00 ml/min
9/12/2018 12:15 PM	27:00	6.91 pH	16.54 °C	2,857.8 µS/cm	2.02 mg/L	48.66 NTU	100.4 mV	13.70 ft	300.00 ml/min
9/12/2018 12:18 PM	30:00	6.91 pH	16.53 °C	2,858.7 µS/cm	2.00 mg/L	13.67 NTU	101.9 mV	13.70 ft	300.00 ml/min
9/12/2018 12:21 PM	33:00	6.92 pH	16.61 °C	2,862.0 µS/cm	2.07 mg/L	35.05 NTU	103.3 mV	13.70 ft	300.00 ml/min
9/12/2018 12:24 PM	36:00	6.91 pH	16.56 °C	2,859.9 µS/cm	1.99 mg/L	8.43 NTU	104.4 mV	13.70 ft	300.00 ml/min
9/12/2018 12:27 PM	39:00	6.91 pH	16.58 °C	2,859.2 µS/cm	1.97 mg/L	9.02 NTU	105.6 mV	13.70 ft	300.00 ml/min
9/12/2018 12:30 PM	42:00	6.91 pH	16.58 °C	2,864.7 µS/cm	1.95 mg/L	8.73 NTU	106.6 mV	13.70 ft	300.00 ml/min

Samples

Sample ID:	Description:
RH-MW- 7	Collected @ 1232 No odor, no sheen, clear

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/12/2018 2:05:28 PM
Project: SD-I-01
Operator Name: JS/JR

Location Name: SD-I-01 **Well Diameter: 8 in** **Casing Type: Steel** **Total Depth: 25.4 m** **Initial Depth to Water: 12.93 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 19.2 ft** **Estimated Total Volume Pumped: 4.327 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.15 l/min** **Final Draw Down: 12.94 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Weather Conditions:
Mostly cloudy, 69° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/12/2018 2:05 PM	00:00	7.05 pH	22.76 °C	2,641.7 µS/cm	2.01 mg/L	63.54 NTU	140.1 mV	12.93 ft	0.15 l/min
9/12/2018 2:09 PM	03:38	7.07 pH	19.07 °C	2,782.7 µS/cm	0.90 mg/L	52.96 NTU	68.0 mV	12.93 ft	0.15 l/min
9/12/2018 2:12 PM	06:38	7.08 pH	18.51 °C	2,792.0 µS/cm	0.69 mg/L	50.54 NTU	56.0 mV	12.94 ft	0.15 l/min
9/12/2018 2:15 PM	09:38	7.09 pH	17.88 °C	2,823.4 µS/cm	0.62 mg/L	58.12 NTU	50.8 mV	12.94 ft	0.15 l/min
9/12/2018 2:18 PM	12:38	7.10 pH	17.88 °C	2,829.4 µS/cm	0.57 mg/L	53.76 NTU	48.2 mV	12.94 ft	0.15 l/min
9/12/2018 2:21 PM	15:38	7.10 pH	17.65 °C	2,827.0 µS/cm	0.54 mg/L	54.12 NTU	46.9 mV	12.94 ft	0.15 l/min
9/12/2018 2:24 PM	18:38	7.09 pH	17.63 °C	2,833.0 µS/cm	0.52 mg/L	52.11 NTU	46.8 mV	12.94 ft	0.15 l/min
9/12/2018 2:27 PM	21:38	7.08 pH	17.37 °C	2,829.9 µS/cm	0.49 mg/L	54.00 NTU	47.4 mV	12.94 ft	0.15 l/min
9/12/2018 2:30 PM	24:38	7.05 pH	17.43 °C	2,831.9 µS/cm	0.47 mg/L	47.56 NTU	48.6 mV	12.94 ft	0.15 l/min
9/12/2018 2:33 PM	27:38	7.02 pH	17.39 °C	2,839.2 µS/cm	0.46 mg/L	41.45 NTU	50.7 mV	12.94 ft	0.15 l/min

Samples

Sample ID:	Description:

SD-I-01	Pink purge (rusty casing), VOCs and mna

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/12/2018 3:35:19 PM
Project: SD-I-02
Operator Name: JS/JR

Location Name: SD-I-02 **Well Diameter: 6 in** **Casing Type: Steel** **Total Depth: 20.3 ft** **Initial Depth to Water: 9.7 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 15 ft** **Estimated Total Volume Pumped: 5.67 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.21 l/min** **Final Draw Down: 9.73 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Weather Conditions:
Mostly cloudy, slight breeze SW, 67° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/12/2018 3:35 PM	00:00	7.12 pH	22.95 °C	2,348.5 µS/cm	4.27 mg/L	66.39 NTU	157.1 mV	9.70 ft	0.00 l/min
9/12/2018 3:38 PM	03:00	7.12 pH	17.87 °C	2,500.1 µS/cm	0.51 mg/L	12.74 NTU	153.2 mV	9.73 ft	0.21 l/min
9/12/2018 3:41 PM	06:00	7.14 pH	17.16 °C	2,527.4 µS/cm	0.28 mg/L	11.09 NTU	151.0 mV	9.73 ft	0.21 l/min
9/12/2018 3:44 PM	09:00	7.15 pH	16.83 °C	2,533.8 µS/cm	0.22 mg/L	13.91 NTU	149.3 mV	9.73 ft	0.21 l/min
9/12/2018 3:47 PM	12:00	7.15 pH	16.69 °C	2,528.9 µS/cm	0.19 mg/L	11.84 NTU	148.2 mV	9.73 ft	0.21 l/min
9/12/2018 3:50 PM	15:00	7.13 pH	16.54 °C	2,531.5 µS/cm	0.17 mg/L	12.13 NTU	147.9 mV	9.73 ft	0.21 l/min
9/12/2018 3:53 PM	18:00	7.11 pH	16.48 °C	2,533.1 µS/cm	0.16 mg/L	10.31 NTU	148.4 mV	9.73 ft	0.21 l/min
9/12/2018 3:56 PM	21:00	7.07 pH	16.49 °C	2,533.8 µS/cm	0.15 mg/L	9.41 NTU	149.6 mV	9.73 ft	0.21 l/min
9/12/2018 3:59 PM	24:00	7.04 pH	16.44 °C	2,536.3 µS/cm	0.15 mg/L	11.74 NTU	151.0 mV	9.73 ft	0.21 l/min
9/12/2018 4:02 PM	27:00	7.00 pH	16.42 °C	2,522.9 µS/cm	0.14 mg/L	9.55 NTU	152.3 mV	9.73 ft	0.21 l/min
9/12/2018 4:05 PM	30:00	6.97 pH	16.57 °C	2,525.8 µS/cm	0.13 mg/L	10.95 NTU	153.1 mV	9.73 ft	0.21 l/min

Samples

Sample ID:	Description:
SD-I-02	VOCs, MS/MSD

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 9/11/2018 12:24:19 PM
Project: SMW12
Operator Name: PL

Location Name: Device Location **Initial Depth to Water: 13.25 ft**	**Pump Type: Bladder** **Tubing Type: Poly** **Pump Intake From TOC: 20 ft** **Estimated Total Volume Pumped: 17825 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 1.37 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 511710**

Test Notes:
Clear. No odor. No sheen.

Weather Conditions:
67 F Clear

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 5	
9/11/2018 12:24 PM	00:00	6.99 pH	23.80 °C	2.85 mS/cm	0.63 mg/L	14.30 NTU	-95.8 mV	13.25 ft	300.00 ml/min
9/11/2018 12:26 PM	02:25	6.99 pH	24.78 °C	2.85 mS/cm	0.57 mg/L	13.23 NTU	-95.4 mV	13.25 ft	300.00 ml/min
9/11/2018 12:29 PM	05:25	6.97 pH	25.80 °C	2.86 mS/cm	0.60 mg/L	13.37 NTU	-94.1 mV	13.25 ft	300.00 ml/min
9/11/2018 12:32 PM	08:25	7.10 pH	17.46 °C	1.58 mS/cm	0.75 mg/L	248.16 NTU	-86.8 mV	13.25 ft	300.00 ml/min
9/11/2018 12:35 PM	11:25	7.09 pH	16.07 °C	1.54 mS/cm	0.61 mg/L	239.56 NTU	-84.5 mV	13.40 ft	300.00 ml/min
9/11/2018 12:38 PM	14:25	7.06 pH	15.72 °C	1.38 mS/cm	1.60 mg/L	208.89 NTU	-75.2 mV	13.40 ft	300.00 ml/min
9/11/2018 12:41 PM	17:25	7.04 pH	15.61 °C	1.32 mS/cm	3.56 mg/L	147.06 NTU	-54.3 mV	13.58 ft	300.00 ml/min
9/11/2018 12:44 PM	20:25	7.03 pH	15.62 °C	1.30 mS/cm	4.98 mg/L	159.86 NTU	-34.5 mV	13.65 ft	300.00 ml/min
9/11/2018 12:47 PM	23:25	7.02 pH	15.60 °C	1.27 mS/cm	5.69 mg/L	99.06 NTU	-19.9 mV	13.68 ft	300.00 ml/min
9/11/2018 12:50 PM	26:25	7.02 pH	15.57 °C	1.27 mS/cm	5.95 mg/L	76.66 NTU	-9.6 mV	13.71 ft	300.00 ml/min
9/11/2018 12:53 PM	29:25	7.02 pH	15.57 °C	1.28 mS/cm	6.00 mg/L	79.22 NTU	-2.3 mV	13.75 ft	300.00 ml/min
9/11/2018 12:56 PM	32:25	7.02 pH	15.52 °C	1.36 mS/cm	5.53 mg/L	102.41 NTU	2.8 mV	13.80 ft	300.00 ml/min
9/11/2018 12:59 PM	35:25	7.05 pH	15.31 °C	1.43 mS/cm	4.17 mg/L	91.34 NTU	1.1 mV	13.85 ft	300.00 ml/min

9/11/2018 1:02 PM	38:25	7.03 pH	15.43 °C	1.30 mS/cm	5.54 mg/L	62.75 NTU	8.0 mV	13.85 ft	300.00 ml/min
9/11/2018 1:05 PM	41:25	7.03 pH	15.51 °C	1.30 mS/cm	5.63 mg/L	66.87 NTU	12.9 mV	13.90 ft	300.00 ml/min
9/11/2018 1:08 PM	44:25	7.03 pH	15.50 °C	1.30 mS/cm	5.59 mg/L	52.55 NTU	16.4 mV	13.90 ft	300.00 ml/min
9/11/2018 1:11 PM	47:25	7.04 pH	15.28 °C	1.40 mS/cm	4.62 mg/L	118.66 NTU	17.0 mV	14.00 ft	300.00 ml/min
9/11/2018 1:14 PM	50:25	7.03 pH	15.27 °C	1.32 mS/cm	5.34 mg/L	112.23 NTU	21.7 mV	14.18 ft	300.00 ml/min
9/11/2018 1:17 PM	53:25	7.04 pH	15.31 °C	1.34 mS/cm	5.33 mg/L	112.94 NTU	25.8 mV	14.38 ft	300.00 ml/min
9/11/2018 1:20 PM	56:25	7.05 pH	15.27 °C	1.38 mS/cm	4.91 mg/L	98.31 NTU	27.4 mV	14.62 ft	300.00 ml/min
9/11/2018 1:23 PM	59:25	7.06 pH	15.21 °C	1.35 mS/cm	5.12 mg/L	72.12 NTU	30.0 mV	14.62 ft	300.00 ml/min

Samples

Sample ID:	Description:
SMW-12	VOCs

Low-Flow Test Report:

Test Date / Time: 9/12/2018 4:58:25 PM
Project: SYS-EMW-3
Operator Name: JS/JR

Location Name: SYS-EMW-3 **Well Diameter: 2 in** **Casing Type: PVC** **Total Depth: 13.8 ft** **Initial Depth to Water: 8.29 ft**	**Pump Type: Peri Pump** **Tubing Type: Teflon** **Pump Intake From TOC: 15 ft** **Estimated Total Volume Pumped: 3.175 liter** **Flow Cell Volume: 130 ml** **Final Flow Rate: 0.1 l/min** **Final Draw Down: 8.74 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 513188**

Test Notes:

Weather Conditions:
Mostly cloudy, breezy ENE, 66° F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.5	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.5	
9/12/2018 4:58 PM	00:00	6.78 pH	22.10 °C	6,583.5 µS/cm	3.84 mg/L	303.01 NTU	-96.8 mV	8.29 ft	0.17 l/min
9/12/2018 5:01 PM	03:00	6.83 pH	19.63 °C	6,431.7 µS/cm	0.42 mg/L	99.05 NTU	-106.6 mV	8.29 ft	0.17 l/min
9/12/2018 5:04 PM	06:00	6.89 pH	19.01 °C	5,802.0 µS/cm	0.33 mg/L	64.60 NTU	-113.4 mV	8.73 ft	0.10 l/min
9/12/2018 5:07 PM	09:00	6.97 pH	18.67 °C	5,086.9 µS/cm	0.27 mg/L	44.57 NTU	-117.3 mV	8.73 ft	0.10 l/min
9/12/2018 5:10 PM	12:00	7.00 pH	18.47 °C	4,757.9 µS/cm	0.23 mg/L	49.28 NTU	-116.5 mV	8.74 ft	0.10 l/min
9/12/2018 5:13 PM	15:00	7.03 pH	18.29 °C	4,480.7 µS/cm	0.20 mg/L	31.23 NTU	-118.0 mV	8.74 ft	0.10 l/min
9/12/2018 5:16 PM	18:00	7.06 pH	18.15 °C	4,267.7 µS/cm	0.17 mg/L	25.07 NTU	-118.5 mV	8.74 ft	0.10 l/min
9/12/2018 5:19 PM	21:00	7.07 pH	18.04 °C	4,182.6 µS/cm	0.16 mg/L	30.27 NTU	-118.2 mV	8.74 ft	0.10 l/min
9/12/2018 5:19 PM	21:33	7.06 pH	18.04 °C	4,132.0 µS/cm	0.15 mg/L	27.64 NTU	-117.4 mV	8.74 ft	0.10 l/min
9/12/2018 5:22 PM	24:33	7.07 pH	17.92 °C	3,995.8 µS/cm	0.14 mg/L	30.40 NTU	-116.8 mV	8.74 ft	0.10 l/min
9/12/2018 5:25 PM	27:33	7.08 pH	17.87 °C	3,948.1 µS/cm	0.13 mg/L	25.50 NTU	-116.6 mV	8.74 ft	0.10 l/min

Samples

Sample ID:	Description:
SYS-EMW-3	VOCs

Low-Flow Test Report:

Test Date / Time: 9/12/2018 3:04:12 PM
Project: ZPMW-1
Operator Name: BW/ST

Location Name: ZPMW-1 **Well Diameter: 2 in** **Casing Type: PVC** **Screen Length: 10 ft** **Top of Screen: 10.07 ft** **Total Depth: 20.07 ft** **Initial Depth to Water: 10.15 ft**	**Pump Type: QED Sample Pro** **Tubing Type: Teflon** **Pump Intake From TOC: 15 ft** **Estimated Total Volume Pumped: 6300 ml** **Flow Cell Volume: 130 ml** **Final Flow Rate: 300 ml/min** **Final Draw Down: 0.29 ft**	**Instrument Used: Aqua TROLL 600** **Serial Number: 519017**

Test Notes:

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 0.5	+/- 10 %	+/- 10 %	+/- 10 %	+/- 10 %	+/- 0.3	
9/12/2018 3:04 PM	00:00	6.90 pH	20.71 °C	2,422.0 µS/cm	3.91 mg/L	41.68 NTU	208.3 mV	10.15 ft	300.00 ml/min
9/12/2018 3:07 PM	03:00	6.89 pH	17.39 °C	2,502.5 µS/cm	0.26 mg/L	114.17 NTU	199.0 mV	10.39 ft	300.00 ml/min
9/12/2018 3:10 PM	06:00	6.81 pH	16.61 °C	2,569.6 µS/cm	0.15 mg/L	32.84 NTU	203.0 mV	10.39 ft	300.00 ml/min
9/12/2018 3:13 PM	09:00	6.77 pH	16.34 °C	2,574.7 µS/cm	0.12 mg/L	19.75 NTU	205.4 mV	10.43 ft	300.00 ml/min
9/12/2018 3:16 PM	12:00	6.76 pH	16.13 °C	2,577.1 µS/cm	0.10 mg/L	11.27 NTU	206.2 mV	10.42 ft	300.00 ml/min
9/12/2018 3:19 PM	15:00	6.77 pH	16.03 °C	2,570.1 µS/cm	0.09 mg/L	8.32 NTU	206.3 mV	10.42 ft	300.00 ml/min
9/12/2018 3:22 PM	18:00	6.78 pH	15.96 °C	2,569.7 µS/cm	0.08 mg/L	8.54 NTU	205.7 mV	10.44 ft	300.00 ml/min
9/12/2018 3:25 PM	21:00	6.79 pH	15.89 °C	2,569.2 µS/cm	0.07 mg/L	7.35 NTU	204.8 mV	10.44 ft	300.00 ml/min

Samples

Sample ID:	Description:
ZPMW-1	Clear. No odor. VOC and metals. Sample time 1530

Created using VuSitu from In-Situ, Inc.

APPENDIX E-3

BORING LOGS

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 1 of ____ Sheets

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 2/8/17	
Client:	Montana DEQ	Time Started: 1422	Time Completed:
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: Y or N
Weather:	20's snow/rain/ice	Operator: Duane Leary	Diameter: 1.5
Logged by:	C. VanHavelick	Crew: Alonzo	Groundwater Depth:
Logger's Signature:	[signature]	Drill Method: DP-Hammer	Total Depth:
		Equipment/Rig Type: Mobil B-57	Well Completed: Y or N

BORING ID: 2C-GW-01

Location: 1640 Monad Rd

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0.5-1.5'	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 3/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SW	0	
1.5-3	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 3/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	
3-5	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 5/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	
5-9.5'	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	V. wet 9-9.5' bgs
9.5-10	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	
10-15	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 5/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	gravel / Muse 10.5, 12"
15-18.5	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 5/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	

Samples Collected: Yes/No

Sample IDs:

MiHPT Log Yes/No

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 2 of ____ Sheets

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date:	
Client:	Montana DEQ	Time Started:	Time Completed: 1524
Project Location:	Billings, Montana	Drilling Contractor:	Backfilled: Y or N
Weather:		Operator:	Diameter:
Logged by:		Crew:	Groundwater Depth:
Logger's Signature:		Drill Method:	Total Depth:
		Equipment/Rig Type:	Well Completed: Y or N

BORING ID: PC-MW-01

Location:

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
19.5-20	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GM	0	
19.5-19.5	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 3/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	
19.5-20	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GM	0	top water 19.5' bgs
20-21	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 3/2	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	
21-25	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GM	0	td 25' bgs 1524
	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			
	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			

Samples Collected: Yes/No

Sample IDs:

MiHPT Log Yes/No

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 1 of ____ Sheets

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 2/8/18	
Client:	Montana DEQ	Time Started: 1147	Time Completed: 1226
Project Location:	Billings, Montana	Drilling Contractor: JME	Backfilled: Y or N
Weather:	27°F, cloudy, partly/rainy/drizzle	Operator: Dozier, Leary	Diameter: 7.5"
Logged by:	C. Vinz/Hostetler	Crew: Alonzo, Talozdo	Groundwater Depth: ~~15~~ 10
Logger's Signature:		Drill Method: DP/Hammer	Total Depth: 15
		Equipment/Rig Type: Mobil B-57	Well Completed: Y or N

BORING ID: 2C-GW-04 **Location:** 1431 Eldorado Dr

Interval (ft bgs)	Color-Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0.5-2'	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/6	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	ML	0	
2-5'	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	gravel @ 5' bgs
5-7'	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 5/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SW GM	0	
7-10	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___ YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GM	0	
10-14	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___ YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GM	0	topwater 10' bgs
14-15	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___ YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	shale		weathered shale td 15' bgs 1226
	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___ YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 1 of ____ Sheets

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 2/7/18	
Client:	Montana DEQ	Time Started: 1450	Time Completed:
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: Y or N
Weather:	36°F, rain (lt.) gry	Operator: Duane Heavy	Diameter: 1.5
Logged by:	C. VanHaverbeke	Crew: Alonzo Takako	Groundwater Depth:
Logger's Signature:		Drill Method: B/Hammer	Total Depth:
		Equipment/Rig Type: Mobil B-57	Well Completed: Y or N

BORING ID: 3W-2C-GW-05

Location:

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-5'	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			no recovery
5-6	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 5/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	1/3 recovery
~6-10'	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 5/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	
~10-11	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SC	0	limited recovery depths?
	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			
~11-15	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	note: gravels 2" 1 layer interbedded ~14' bgs
15-18	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 5/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	top water 15.5' bgs

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 2 of ____ Sheets

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 2/7/10	
Client:	Montana DEQ	Time Started: 1450	Time Completed: 1608
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: Y or N
Weather:	36°F cloudy	Operator: Duane Heavy	Diameter: 1.5"
Logged by:	C. Vanderhoeven	Crew: Alonzo Tabalno	Groundwater Depth:
Logger's Signature:	[signature]	Drill Method: DP/Hammer	Total Depth:
		Equipment/Rig Type: Mobil B-57	Well Completed: Y or N

BORING ID: 2L-GW-05 **Location:** 1343 Eldorado Dr

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
18-19.5	Black / Gray - L M D / Brn - L M D / Red - L M D / Other ___	Red / Brown / Gray / Green / Rust / Yellow / Other / %	2.5 YR 5/3	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ___	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	CL	0	
19.5-20	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	2.5 YR 4/3	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ___	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	SM	0	
20-23.5	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	2.5 YR 4/3	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ___	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	SM	0	
23.5-25	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	2.5 YR 4/3	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ___	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	GM	0	td 25' bgs 1608
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	___ YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ___	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:			blowcount/ft 50 11 20 41 14 35 15 14 21
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	___ YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ___	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:			15 12 33 17 14 49 7 10 5 12 7 14 8 15 8 25
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	___ YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ___	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs: 2L-GW-05 - PCE Screen

Number/Size of Containers: 3 x VOA

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes: set well 3/4" OD Slot PVC @ 18-23' bgs

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 1 of 1 Sheets

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 2/4/18	
Client:	Montana DEQ	Time Started: 1521	Time Completed: 1637
Project Location:	Billings, Montana	Drilling Contractor: Underground Miller Eng.	Backfilled: Y or N
Weather:	31°F, dry, cog, snow/flurry	Operator: Duane Leady	Diameter: 8" to 7.5' bgs, 1.5" to td
Logged by:	C. Vanderveen	Crew: Alonzo Takalo	Groundwater Depth:
Logger's Signature:		Drill Method: Hammer	Total Depth: 25'
		Equipment/Rig Type: Mobil B-57	Well Completed: Y or N

BORING ID: 4B-GW-03 **Location:** ABC Supply Parking Area

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
8-10	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SC	63	badger auckuite/vac to 8' bgs
10-14	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 5/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	132	
14-15	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GM	119	
15-20	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GM	122	
20-22	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 3/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SP	119	
22-25	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GM	132	td 25' bgs 1637
	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			Blowcount/ft 3 7 10 13 63 40 45 79 117 110 89 78 113

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs: 4B-GW-03

Number/Size of Containers: 3 x VOA's

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes: Abandon borehole w/

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 1 of 1 Sheets

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 2/6/18	
Client:	Montana DEQ	Time Started: 1133	Time Completed: 1257
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: Y or N
Weather:	20°F, 14 Auw	Operator: Duane Henry	Diameter: 8" to 7.5', 1.5" to td
Logged by:	C. Vaughn	Crew: Alonzo Tabaho	Groundwater Depth: 15'
Logger's Signature:		Drill Method: Hammer	Total Depth: 25'
		Equipment/Rig Type: Mobil B-57	Well Completed: Y or N

BORING ID: 4D-GW-02

Location: JH Motors, 4540 ~~1st Ave S~~ State St

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
7.5-10'	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10YR 3/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	borehole cleared w/ sonic to 7.5' bgs
10-15	Black, Gray-L M D, Brn-L M D, Red-L M D, Other, Jan	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GM	NHS = 1575 ppb	top water 15' bgs, sheen test
15-20	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 3/1	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SP	96	
20-25	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 4/1	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GW	113	td 25' bgs 1257
	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			blow counts per ft 11 (bottom) 11 66 117 [illegible] 41 259 72 47 128 [illegible] 53 (bottom)
	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			
	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs: 3x VOA (PCE Screen) ~~1205 sample~~

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes: ~~hole abandon w/ 8 3/4 bentonite plug, 3 sand, 4 gravel~~

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 1 of ____ Sheets

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 2/7/18	
Client:	Montana DEQ	Time Started: 0911	Time Completed: 1134
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: Y or N
Weather:	29°F, overcast	Operator: Duane Leary	Diameter: 1.5"
Logged by:	C. Vanthewelden	Crew: Alonzo Tabaku	Groundwater Depth: 11'
Logger's Signature:		Drill Method: DP/Hammer	Total Depth: 20'
		Equipment/Rig Type: Mobil B-57	Well Completed: Y or N

BORING ID: SD-GW-01 **Location:** 311 S 26th St.

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0'-2.6'	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 2/2	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	blk sheen on core
2.6'-5'	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 4/2	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	
5'-5.6'	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 2.5/1	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	partial recovery @ ~7' bgs
5.6'-~10'[illegible]	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SW	0	
5.6'-~10'	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	
10-15	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	5 YR 5/2	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GW	0	groundwater @ 11' bgs
15-15	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other blue, %	GREY 2.5/1	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GW	0	

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 2 of 2 Sheets

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 2/7/18	
Client:	Montana DEQ	Time Started: 0911	Time Completed: 1134
Project Location:	Billings, Montana	Drilling Contractor: IMSE	Backfilled: Y or N
Weather:		Operator: Duane Lizary	Diameter: 1.5
Logged by:		Crew: Alonzo Zabala	Groundwater Depth: 11
Logger's Signature:		Drill Method: DP/Hammer	Total Depth: 20
		Equipment/Rig Type: Model B-57	Well Completed: Y or N

BORING ID: SD-GW-01 **Location:** 311 Sixth St

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
18-20	Black Gray L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	GLEY1 YR 3/1	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SW/SC	0	Laminated, sl. weathered
																td 20' bgs - 1134
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	YR /	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			Headspace/ft 35 30 25 18
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	YR /	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			19 48 33 61 47
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	YR /	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			72 158 68 63
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	YR /	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			42 62 71 125 459
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	YR /	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	YR /	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Go to GWIC website
Plot this site in State Library Digital Atlas
Plot this site in Google Maps

Site Name: BURLINGTON NORTHERN SANTA FE RAILWAY COMPANY
GWIC Id: 272283

Section 1: Well Owner(s)

1) BURLINGTON NORTHERN SANTA FE RAILWAY COMPANY (MAIL)
825 GREAT NORTHERN BOULEVARD
HELENA MT 59601 [05/08/2013]
2) BURLINGTON NORTHERN SANTA FE RAILWAY COMPANY (WELL)
3301 1ST AVENUE SOUTH
BILLINGS MT 59102 [05/08/2013]

Section 2: Location

Township	Range	Section	Quarter Sections
01S	26E	3	NE¼ SW¼

County
YELLOWSTONE

Geocode

Latitude	Longitude	Geomethod	Datum
45.777492	-108.5088	NAV-GPS	WGS84

Ground Surface Altitude **Ground Surface Method** **Datum** **Date**

Addition **Block** **Lot**

Section 3: Proposed Use of Water

MONITORING (1)

Section 4: Type of Work

Drilling Method: HOLLOWSTEM AUGER
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Wednesday, May 08, 2013

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	21	8.5

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
0	19	2		280.0	FLUSH THREAD	PVC-SCHED 40

Completion (Perf/Screen)

From	To	Diameter	# of	Size of	Description

Section 7: Well Test Data

Total Depth: 21
Static Water Level: 15
Water Temperature:

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

ASW-2

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	3	SANDY CLAY (FILL) BROWN
3	9	CLAY BROWN
9	14	SILTY SAND BROWN
14	21	GRAVEL WITH SAND

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name: PAUL E. BRAY
Company: HAZ TECH DRILLING INC
License No: MWC-435
Date Completed: 5/8/2013

			Openings	Openings	
19	21	2		.020	FACTORY SLOTTED

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
1.5	17	BENTONITE CHIPS	
17	21	10/20 SILICA SAND	

TRIHYDRO CORPORATION

Sheet 1 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 11-29-17	
Client:	Montana DEQ	Time Started: 0825	Time Completed: 0850
Project Location:	Billings, Montana	Drilling Contractor: Dakota Tech	Backfilled: Y or N
Weather:	35° cloudy 25mph wind	Operator: C. Gwensen	Diameter: 1.25"
Logged by:	C. VanHeuvelen	Crew: O. Tangen	Groundwater Depth: 15'
Logger's Signature:		Drill Method: DP	Total Depth: 25'
		Equipment/Rig Type: Geoprobe 7720DT	Well Completed: Y or N

BORING ID: ALSCO-GW-01

Location:

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-5'	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			fill/blacktop
5'-5'	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 3/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	
5-7	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 3/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	
7-10	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 3/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	@ 7-7.5' logs v. soft, incr. stiffness 7.5'-10'
10-12	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	
12-15	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GM	0	
15-20	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GM	0	dk gry lense @ 19.5' bgs ~2" thick

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers: see p2

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 2 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 11-29-17	
Client:	Montana DEQ	Time Started: 0825	Time Completed: 0850
Project Location:	Billings, Montana	Drilling Contractor: Dakota Tech	Backfilled: Y or N
Weather:	35°F, cloudy, n 25 mph	Operator: C. Gunnesen	Diameter: 1.25
Logged by:	C. VanHoeckel	Crew: C. Tangen	Groundwater Depth: 15'
Logger's Signature:		Drill Method: DP	Total Depth: 25
		Equipment/Rig Type: 7720 DT	Well Completed: Y or N

BORING ID: ALSCO-GW-01 **Location:**

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
20-25	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 4/3	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM	0	end boring 0850
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs: ALSCO-GW-01

Number/Size of Containers: 3 x VOA's

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes: site GW sampling 20-25' bgs w/ 2nd run
prev. pump 19-23'
purge & grab sample @ 0925

TRIHYDRO CORPORATION

Sheet 1 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 11-29-17	
Client:	Montana DEQ	Time Started: 0943	Time Completed: 0957
Project Location:	Billings, Montana	Drilling Contractor: Dakota Tech	Backfilled: Y or N
Weather:	42°F, scatt clouds, ~25 mph + gusts	Operator: Charles Gruesen	Diameter: 1.25"
Logged by:	C. Van Heuvelen	Crew: Ovay Tenigen	Groundwater Depth: 16'
Logger's Signature:		Drill Method: DD	Total Depth: 25
		Equipment/Rig Type: 7720 DT	Well Completed: Y or N

BORING ID: ALSCO-GW-02 **Location:** NE of property

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-1'	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			fill/asphalt
1'-5'	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 3/2	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	
5'-9'	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	25 YR 3/2	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	
9'-10'	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	25 YR 3/2	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	
10'-12'	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	25 YR 3/2	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	
12-15'	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 3/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GM	0	
15-20	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GM	0	~16' bgs top water

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs: ALSCO-GW-02 (9-10) 1000
2x2oz
3x4oz
Vince sample w/ TerraCore (5-9) & moisture (2oz)
2 additional micro core runs to 10' bgs for volume

Number/Size of Containers: 8

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes: SP-16 gw sample collected 19-23' bgs
sample @ 10:50, purge ~1 gal

TRIHYDRO CORPORATION

Sheet 2 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 11-29-17	
Client:	Montana DEQ	Time Started: 0943	Time Completed: 0957
Project Location:	Billings, Montana	Drilling Contractor: Dakota Tech	Backfilled: Y or N
Weather:	420 F, 15 mph, clouds, 25 mph + gusts	Operator: Charles Greensen	Diameter: 1.25"
Logged by:	C. VanHouwelingen	Crew: Ovray Tsenden	Groundwater Depth: 16'
Logger's Signature:		Drill Method: DP	Total Depth: 25
		Equipment/Rig Type: 7720DT	Well Completed: Y or N

BORING ID: ALSD-GW-02 **Location:** NE of property

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
20-25	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 7/2	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SM	0	end boring 0957
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	_____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	_____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	_____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	_____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	_____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	_____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers: 5 Ecp 1

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 11/30/17	
Client:	Montana DEQ	Time Started: 1302	Time Completed: 1326
Project Location:	Billings, Montana	Drilling Contractor: Dakota Tech	Backfilled: Y or N
Weather:	Partly cloudy	Operator: Charles Beeson	Diameter: 1.25
Logged by:	Jacob Scott	Crew: Gray Tengen	Groundwater Depth: 19
Logger's Signature:	Jacob Scott	Drill Method: DP	Total Depth: 25
		Equipment/Rig Type: 7720	Well Completed: Y or N

BORING ID: ALSCO-GW-03 **Location:** Front of ALSCO (Corner of Vaughn and Calhoun St.)

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-1	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			Asphalt/concrete
1-2	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 4/2	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SW	86	
2-5	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 4/3	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	70	
5-9	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 4/3	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	0	
9-12	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 4/3	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SM	0	
12-15	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 5/3	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM	0	DTW @ 15 fbs Poorly sorted gravel and sand
15-25	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 3/3	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SP	0	Saturated sand and gravel

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs: ALSCO-GW-03

~~PCE GW (3 VOAs)~~

Number/Size of Containers: 3 VOAs

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes: Full sweep soil sample collected @ 2-2.8 fbs

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 11-29-17	
Client:	Montana DEQ	Time Started: 1318	Time Completed: 1332
Project Location:	Billings, Montana	Drilling Contractor: Dakota Tech	Backfilled: Y or N
Weather:	50°F Sunny, low wind	Operator: Charles Gunnison	Diameter: 1.25"
Logged by:	C. Van Heyden	Crew: Oran Tengen	Groundwater Depth: 15
Logger's Signature:		Drill Method: DP	Total Depth: 25
		Equipment/Rig Type: 7720 DT	Well Completed: Y or N

BORING ID: AZSCO-GW-04 **Location:** SW of bldg

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-5'	Black, Gray-L M D, Brn-L M D, Red-L M D, Other olive	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	O	CL	limited recovery fill/asphalt 2nd run w/ macrocore
5-10	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	O	CL	
5-5.5' 10-10.5'	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	O	CL	
5.5-10.5-15	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 3/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	O	SM	transition to higher moisture 14.5
15-20	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 3/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	O	GW	15 top of water
20-25	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	O	GW	end boring 1332
	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs: AZSCO-GW-04 (14-15) 1330
(13-14) MS/MSD
3 tenacore, 1 oz moisture

Number/Size of Containers: 2x2 oz, 3x4 oz, 6 VOA, 3 tenacore, 2 oz

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected: SP-110 grab sample & split w/ D.U. - 1435 (3 VOAs) (3 VOA)

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 11-29-17	
Client:	Montana DEQ	Time Started: 1201	Time Completed:
Project Location:	Billings, Montana	Drilling Contractor: Dakota Tech.	Backfilled: Y or N
Weather:	45°F, scattered clouds, ~25 mph + gusts	Operator: Charles Gunnesen	Diameter: 1.25"
Logged by:	C. VanHouvelingen	Crew: Craig Tengen	Groundwater Depth: 16
Logger's Signature:	[signature]	Drill Method: DP	Total Depth:
		Equipment/Rig Type: 7720 DT	Well Completed: Y or N

BORING ID: ALSCO-GW-05 **Location:** NW of building

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-5"	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			fill/asphalt
5'-5.5'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 4/4	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	0	grey color upper 4"
4.5'-5'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 4/4	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	0	
5-10'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 3/3	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	0	8-10' bgs silt content incr
10'-11'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 3/3	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	0	
11-15	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 3/2	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SM	0	
15-20	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 5/2	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM	0	~16' top water

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers: see p2

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 2 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 11-29-17	
Client:	Montana DEQ	Time Started: 1201	Time Completed: 1222
Project Location:	Billings, Montana	Drilling Contractor: Dakota Tech	Backfilled: Y or N
Weather:	40's partly cloudy, lt. wind	Operator: Charles ~~[illegible]~~	Diameter: 1.25"
Logged by:	C. Vandenberg	Crew: Craig Tungen	Groundwater Depth: 16
Logger's Signature:	[signature]	Drill Method: DP	Total Depth: 25'
		Equipment/Rig Type: 7720DT	Well Completed: Y or N

BORING ID: ALSCO-GW-05 **Location:** NW of bldg

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
20-25'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 3/2	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM	0	end boring 1222
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers: 6 VOA's

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes: Set SP-16 @ 19-23' bgs
collect 3x VOAs (1255)
Vince collect 3x VOAs

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 1 of 2 Sheets

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 12-3-17	
Client:	Montana DEQ	Time Started: 0921	Time Completed: 0945
Project Location:	Billings, Montana	Drilling Contractor: Dakotatech	Backfilled: Y or N
Weather:	36°F cloudy humid	Operator: Charles Gunsun	Diameter: 1.25'
Logged by:	C. VanHeerden	Crew: Craig Tangen	Groundwater Depth:
Logger's Signature:		Drill Method: DP	Total Depth: 29.5
		Equipment/Rig Type: 7720DT	Well Completed: Y or N

BORING ID: BSL-MIP-01 **Location:** in front of 712 Central

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-9"	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			fill/gravel/asphalt 2oz VOC (0-0.5)-1000
9"-5'	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 3/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	FOC sample coll @ 4'-4.5' bgs
5-10'	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 3/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	core becomes less stiff towards 10' moisture content high @ 8' & 9.5' bgs 2" sand
10-13	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	2oz VOC (12-13) DUP (12-B)
13-14.5'	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	
14.5-15'	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 3/1	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	water @ 15' bgs
15-20	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 3/2	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			med-stf 2oz VOC (17-18) drlr note: sand heaving @ 20' bgs

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs: 4 x 2oz VOC (incl. DUP)
1 x 4oz FOC

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 2 of 2 Sheets

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 12-3-19	
Client:	Montana DEQ	Time Started: 0921	Time Completed: 0945
Project Location:	Billings, Montana	Drilling Contractor: Dakota Tech	Backfilled: Y or N
Weather:	30°F, cloudy, windy	Operator: C. Gruensen	Diameter: 1.25"
Logged by:	E. Vera Hubley	Crew: O. Thugsen	Groundwater Depth:
Logger's Signature:		Drill Method: DP	Total Depth: 29.5'
		Equipment/Rig Type: 7720	Well Completed: Y or N

BORING ID: BSL-MIP-1 **Location:** in front of 712 Central

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
20-24	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 3/1	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM	0	
24-25	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 3/1	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM	0	
25-29.5'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 3/1	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM	0	td 29.5' bgs
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	YR /	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	YR /	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	YR /	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	YR /	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	YR /	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 1 of 1 Sheets

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 3-29-18	
Client:	Montana DEQ	Time Started: 0974	Time Completed: 1102
Project Location:	Billings, Montana	Drilling Contractor: Earth Probe	Backfilled (Y) or N
Weather:	Cloudy, Snow showers 32°	Operator: Mark Tagart	Diameter: 2"
Logged by:	W. Coles	Crew: Kenny Larson	Groundwater Depth: 14'
Logger's Signature:		Drill Method: DPT	Total Depth: 25.5'
		Equipment/Rig Type: Geoprobe	Well Completed: Y or (N)

BORING ID: BSL-MIP-09 **Location:** 715 Central Ave

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-.25	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___ YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			Asphalt
.25-14	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___ YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			PIPE 0.5/92.82 ppm 1'/17.07 ppm; 5'/4037 ppb
14-25.5	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___ YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			Wet, Clay lenses present. Solvent odor
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___ YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___ YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___ YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___ YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___ YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

8'c 7545 ppb

12'c 1647 ppm

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 12-4-17	
Client:	Montana DEQ	Time Started: 0744	Time Completed: 0805
Project Location:	Billings, Montana	Drilling Contractor: Dakota Tech	Backfilled Y or N
Weather:	27°, gray/overcast	Operator: Charles Gruensen	Diameter: 1.25"
Logged by:	C Vanderwerken	Crew: Corey Tangen	Groundwater Depth: 13.5'
Logger's Signature:		Drill Method: DP	Total Depth: 25
		Equipment/Rig Type: 7720 DT	Well Completed: Y or N

BORING ID: BSL-MIP-I20 WS 20 **Location:** 711 alley adj to big sky linen

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-5'	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:		0	asphalt/fill
5'-1.5'	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 5/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	
1.5-5'	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 5/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	
5-7'	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	
7-10	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	
10-12	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	
12-14	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 3/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs: see p2

Number/Size of Containers: see p2

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 2 of 2 Sheets

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 12-4-17	
Client:	Montana DEQ	Time Started: 0724	Time Completed: 0505
Project Location:	Billings, Montana	Drilling Contractor: Dakota Tech	Backfilled: Y or N
Weather:	27°F, overcast/gray	Operator: C. Greenlaw	Diameter: 1.25
Logged by:	C. Vandenberg	Crew: D. Zumgen	Groundwater Depth: 13.5'
Logger's Signature:		Drill Method: DP	Total Depth: 25
		Equipment/Rig Type: 7720 DT	Well Completed: Y or N

BORING ID: BSL-MIP-20 **Location:** 711 alley adj to big sky linen

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
14-15	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	GLEY1 ___YR ___/___ 2.5/1	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes: VC	OH	107ppm	sandy @ base of impact water 13.5' bgs
15-19	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	GLEY1 ___YR ___/___ 2.5/1	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	2050	
19-20	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 ___YR 5/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GM	209	drlr note sand heave @ 20' bgs
20-25	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 ___YR 3/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GM	291	td: 25' bgs 0505 PID borehole = 2368ppb
	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			
	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			
	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			
	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs: 2x2oz VOC (0-0.5) - 0750
2x2oz VOC (12-13) x3 - MS/MSD - 805
impact zone 14-15'
2 x 2oz
3 x 4oz
~~5~~ 4 x 15' push
1 x 25' push

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected: MS/MSD

Notes:

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 1 of 1 Sheets

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 3-28-18	
Client:	Montana DEQ	Time Started: 1575	Time Completed: 1530
Project Location:	Billings, Montana	Drilling Contractor: Earth Probe	Backfilled: Y or N
Weather:	Cloudy, rain, 42°	Operator: Mike Taggart	Diameter: 2"
Logged by:	W. Coles	Crew: Kenny Brown	Groundwater Depth: [illegible]
Logger's Signature:		Drill Method: DPT	Total Depth: 15
		Equipment/Rig Type: Geoprobe	Well Completed: Y or N

BORING ID: BSL-MIP-T18 **Location:** 715 Central Ave.

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-.25	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			Asphalt
0.25-.5	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			PID @ 225 ppm Black Stained
0.5-13	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			PID @ 2.5' 244.6 ppm @ 5' 962 ppb
13-15	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			Black Stained Wet @ 15'
	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			
	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			
	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 11-28-17	
Client:	Montana DEQ	Time Started: 0825	Time Completed: 0935
Project Location:	Billings, Montana	Drilling Contractor: Dakota Technologies	Backfilled: Y or N
Weather:	cold 33F, clr	Operator: Charles Tranzen	Diameter: 1.25"
Logged by:	C. VanHeuvelen	Crew: Chris Tranzen	Groundwater Depth:
Logger's Signature:		Drill Method: DP	Total Depth: 25'
		Equipment/Rig Type: ~~GeoPROBE~~ 7720 DT	Well Completed: Y or N

BORING ID: CAL-MIP-2 **Location:** CAL, W. of Central Connect, S parking lot and, to alley

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-1	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 5/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	fill
1-5	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 2/2	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	Fe stain
5-10	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	25 YR 4/2	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SC		wet @ 9' bgs
15-20	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL		~19.5 incr. moisture content
20-25	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	25 YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL		end boring 0903
	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			
	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:
CAL-MIP-2(0-0.5) 1330
CAL-MIP-2(3.5-9) ~~0903~~ 0935
CAL-MIP-2(20-21) 0903
return 1330 to collect FOC
(0-1) 4oz - 1535
(5-9) 4oz - 1545
(11-12) 4oz 1550

Number/Size of Containers: 3x2-oz (voc only)

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 11/28/17	
Client:	Montana DEQ	Time Started: 1030	Time Completed: 1033
Project Location:	Billings, Montana	Drilling Contractor: Dakota Tech	Backfilled: Y or N
Weather:	35°F clear sunny	Operator: Charles Gruenson	Diameter: 1.5
Logged by:	C. Vandeventer	Crew: Orzu Tangen	Groundwater Depth: 7' bgs
Logger's Signature:		Drill Method: DP	Total Depth: 25
		Equipment/Rig Type: ~~6620DT~~ 7720DT	Well Completed: Y or N

BORING ID: CAL-MIP-4 **Location:** Alley behind central laundry

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-1	Black, Gray-LMD, Brn-LMD, Red-LMD, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 2/1	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-FMC, Sand-FMC, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-FMC, Sand-FMC, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	fill, tr gravel
1-4.5	Black, Gray-LMD, Brn-LMD, Red-LMD, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-FMC, Sand-FMC, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-FMC, Sand-FMC, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	
4.5-5	Black, Gray-LMD, Brn-LMD, Red-LMD, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-FMC, Sand-FMC, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-FMC, Sand-FMC, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	
5-9	Black, Gray-LMD, Brn-LMD, Red-LMD, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 2/1	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-FMC, Sand-FMC, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-FMC, Sand-FMC, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	7' bgs wet
9-11	Black, Gray-LMD, Brn-LMD, Red-LMD, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 3/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-FMC, Sand-FMC, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-FMC, Sand-FMC, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	
11-14	Black, Gray-LMD, Brn-LMD, Red-LMD, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 3/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-FMC, Sand-FMC, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-FMC, Sand-FMC, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	
14-16	Black, Gray-LMD, Brn-LMD, Red-LMD, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/2	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-FMC, Sand-FMC, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-FMC, Sand-FMC, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs: CAL-MIP-4(0-0.5)-1030

~~1-2.5 non~~

~~5-6 (duplicate recovery 1st time)~~

Number/Size of Containers: 3 x 2oz

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected: yes

Notes:

TRIHYDRO CORPORATION

Sheet 2 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 11/28/17	
Client:	Montana DEQ	Time Started: 1030	Time Completed: 1033
Project Location:	Billings, Montana	Drilling Contractor: Dakota Tech.	Backfilled: Y or N
Weather:	38°F clear/sunny	Operator: Charles Grunson	Diameter: 1.25
Logged by:	Dan Anderson	Crew: Crazy Tanner	Groundwater Depth: 17 bgs
Logger's Signature:		Drill Method: DP	Total Depth: 25'
		Equipment/Rig Type: 7720DT	Well Completed: Y or N

BORING ID: CAL-MIP-04 **Location:** Alley behind central laundry

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
16-18	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 4/3	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SC	0	
18-20	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 4/3	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GC	0	
20-25	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 3/4	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GC	0	end barrel 1033 neg. additional
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	_____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:		497	borehole f/ vol. → @ 24.5' bgs
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	_____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	_____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	_____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	_____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs: 4x25' vums
2x15' vums
2x5' vums

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected: 20171128-C (6-6.5') 1200

Notes:

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 1 of 2 Sheets

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 11/15/17	
Client:	Montana DEQ	Time Started: 0951	Time Completed: 1142
Project Location:	Billings, Montana	Drilling Contractor: Dakota Tech	Backfilled: Y or N
Weather:	25°F, light, clouds	Operator: Logan McLouth	Diameter: 1.25"
Logged by:	Charles Vanderveken	Crew: Geoff Hoppstawan	Groundwater Depth: ~12'
Logger's Signature:	[signature]	Drill Method: DP	Total Depth: 29.5'
		Equipment/Rig Type: Geoprobe 6610DT	Well Completed: Y or N

BORING ID: MHGW CAL-MIP-8 **Location:** N. lot CAL site

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
25-3'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	MH CL	0	Fe stain upper 0.7"
3-5	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SM	0	
5-10	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SM	0	
10-15.5	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	0	@5' cly-sft med plasticity tr qtz snd nodules
15.5-16.5	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	0	▽ 19'
16.5-19.5	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SM	0	
19.5-29.5	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM	0	

Samples Collected: Yes/No Yes MiHPT Log: Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 2 of 2 Sheets

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 11/15/17	
Client:	Montana DEQ	Time Started: 0951	Time Completed: 1142
Project Location:	Billings, Montana	Drilling Contractor: Dakota Tech	Backfilled: Y or N
Weather:	29°F, light clouds	Operator: Logan McLaugh	Diameter: 1.25"
Logged by:	Grant Henrichsen	Crew: G.H., A.V., S.S., ST, CVH	Groundwater Depth: n/a'
Logger's Signature:		Drill Method: DP	Total Depth: 29.5'
		Equipment/Rig Type: Geoprobe DT	Well Completed: Y or N

BORING ID: CAL-MIP-8 **Location:** N. Lot CAL site

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-25	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM	0	
25-29.5	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM	0	Refusal @ 29.5' bgs 1142 ~.2" gray clay @ bottom
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 1 of 2 Sheets

Project Name:	Billings PCE Groundwater/Facility Remedial Investigation	Date: 11/15/17	
Client:	Montana DEQ	Time Started: 1205	Time Completed: 1319
Project Location:	Billings, Montana	Drilling Contractor: Logan Mtl-LLC	Backfilled: Y or N
Weather:	37°	Operator: Dakota Technologies	Diameter: 1.25" Dual Core
Logged by:	C. Hawthorne	Crew: AV, SS, ST, CVH, LMP, GH	Groundwater Depth: a 12'
Logger's Signature:		Drill Method: Direct Push	Total Depth: 32.5
		Equipment/Rig Type: Geoprobe 6610DT	Well Completed: Y or N

BORING ID: CAL-MIP-9 **Location:** N. lot @ CAL site

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0"-1'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SM	0	Sample 0-0.5' Sample 1-2'
1'-5'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) SL. High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	0	
5-6'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SM	0	sample 5.5-6.5'
6'-9'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	0	≈ perched ~6' bgs
9-10'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	0	
10-15'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	0	
15-19'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	0	

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs: CAL-MIP-9

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 2 of 2 Sheets

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 11/15/17	
Client:	Montana DEQ	Time Started: 1205	Time Completed: 1319
Project Location:	Billings, Montana	Drilling Contractor: Dakota Technologies	Backfilled: Y or N
Weather:	37° Cvny/Windy	Operator: Logan McLouth	Diameter: 1.25"
Logged by:	CVH	Crew: AV, SS, ST, CVH, LM, GH	Groundwater Depth: 22'
Logger's Signature:		Drill Method: DP	Total Depth: 32.5
		Equipment/Rig Type: 6610DT	Well Completed: Y or N

BORING ID: CAL-MIP-9

Location:

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
19-20'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM	0	Sample 19-19.5
20-25'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM	0	Sat. @ 24' bgs
25-29	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM	0	~~td~~ ~~Ot~~ ~~1307~~
29-30	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	~~Low (0-20 lqd)~~ Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:		0	weathered sh
30-32.5	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:		0	td = 32.5' bgs weathered sh. 1319
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: Yes/No

Sample IDs:

MiHPT Log Yes/No

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 11/28/17	
Client:	Montana DEQ	Time Started: 1410	Time Completed: 1428
Project Location:	Billings, Montana	Drilling Contractor: Dakota Tech.	Backfilled: Y or N
Weather:	42° clr, sunny	Operator: Charles Gronson	Diameter: 1.25"
Logged by:	C. Van Heuvelen	Crew: Owen Tangen	Groundwater Depth: 6'
Logger's Signature:		Drill Method: DPT	Total Depth: 25
		Equipment/Rig Type: 7720 DT	Well Completed: Y or N

BORING ID: MIP-T03 (CAL) **Location:** E. of CAL-MIP-04

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-2	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 2/1	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	
2-5	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 5/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	
5-8	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	saturated 6-7' bgs
8-10	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	
10-15	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	transition to soft dry 13' bgs, moisture incr. @ same depth
15-18.5	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SC	0	saturated @ 18.5' bgs
18.5-20	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs: VOCs

Number/Size of Containers: 12

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected: n/a

Notes:

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 2 of 2 Sheets

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 11/28/17	
Client:	Montana DEQ	Time Started: 1410	Time Completed: 1428
Project Location:	Billings, Montana	Drilling Contractor: Dakota Tech	Backfilled: Y or N
Weather:	42° cloudy sunny	Operator: Charles Gronson	Diameter: 1.25"
Logged by:	C Vanderveen	Crew: Owen Jensen	Groundwater Depth: 6'
Logger's Signature:		Drill Method: DP	Total Depth: 25
		Equipment/Rig Type: 7720 DT	Well Completed: Y or N

BORING ID: MIP-103 (CAL) **Location:** E. of CAL-MIP-04

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
20-25	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 4/3	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GW	0	end boring 1428
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	_____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	_____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	_____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	_____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	_____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	_____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs: VOC's collect bulkdensity pH, particle sz from 3 zones: clay, sand, gravel

Number/Size of Containers: 12

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected: n/a

Notes:

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 1 of 1 Sheets

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 11/17/17	
Client:	Montana DEQ	Time Started: 1130	Time Completed: 1150
Project Location:	Billings, Montana	Drilling Contractor: Dakota Technologies	Backfilled: Y or N
Weather:	scatt clouds/gusty	Operator: Logan McLaughlin	Diameter: 1.25"
Logged by:	C. Vaughan/Bell	Crew: CVH, AV, LM	Groundwater Depth: ~15' bgs
Logger's Signature:	[signature]	Drill Method: DP	Total Depth: 15'
		Equipment/Rig Type: 6610 DT / Dual Core	Well Completed: Y or N

BORING ID: DTHRC-MIP-01 **Location:** District 7, Adj. to HRDC building

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0"-4.5'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	0	@ BK
4.5'-5'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SC	0	
5-9.5	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	46	collect sample @ ~~7.5-8.5~~ 7-9' bgs
9.5-10	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SM	0	
10-11.5	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SM	0	
11.5-15	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM	0	@ 15' bgs td 15' bgs 1150
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs: DTHRC-MIP-01

Number/Size of Containers: 2x2oz, 4oz x2

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected: none

Notes: gloves did between jars

SM run from 5 to ~~to~~ fill jars

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 12/1/17	
Client:	Montana DEQ	Time Started: 1028	Time Completed: 10.50
Project Location:	Billings, Montana	Drilling Contractor: Dakota Tech	Backfilled: Y or N
Weather:	Sunny	Operator: Charles Brenson	Diameter: 1.25
Logged by:	Jacob Scott	Crew: Oray Tengen	Groundwater Depth: 15
Logger's Signature:	Jacob Scott	Drill Method: DP	Total Depth: 25
		Equipment/Rig Type: 7720	Well Completed: Y or N

BORING ID: HLS-GW-03 **Location:** Alley by Hospital Laundry Services

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
1-4	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 5/3	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	0	Clay/silt w/ thin layers of black soil
4-13	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 5/2	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	103	103 ppb at 7.5 fbg Head Space Sample 145ppb
13-14	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 5/3	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	0	
14-15	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	2.5 YR 4/2	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SM	0	GW at 15 fbg.
15-~~20~~ 25	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	2.5 YR 4/2	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM	0	Coarse gravels and sand
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	YR /	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	YR /	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs: HLS-GW-03 7-8

Number/Size of Containers: 5 ~~[illegible]~~

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 12/1/17	
Client:	Montana DEQ	Time Started: 0820	Time Completed: 1010
Project Location:	Billings, Montana	Drilling Contractor: Dakota Tech	Backfilled: (Y) or N
Weather:	Sunny	Operator: Charles Beenson	Diameter: 7.25
Logged by:	Jacob Scott	Crew: Oray Tengen	Groundwater Depth: 15
Logger's Signature:	Jacob Scott	Drill Method: DP	Total Depth: 25
		Equipment/Rig Type: 7720	Well Completed: (Y) or N

BORING ID: HLS-GW-04 **Location:** Alley by Hospital Laundry Services

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-1.5	Black Gray - L M D (Brn) L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 3/3	Cobbly Grvlly (Sandy) Silty Clayey	(GVL) F M C Sand - F M C Silt Clay _____	Trace (1-10%) (Little (10-20%)) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose (Loose) M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	(Dry) Moist Wet Saturated	(None Noted) Slight Moderate Strong Notes:	SP	32	
1.5-5	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown (Gray) Green Rust Yellow Other %	10 YR 5/2	Cobbly Grvlly Sandy (Silty) Clayey	GVL - F M C Sand - F M C Silt (Clay) _____	Trace (1-10%) (Little (10-20%)) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med (Stiff) Very Stiff Hard	Very Loose Loose M. Dense (Dense) Very Dense Ext. Dense	(Low (0-20 lqd)) Med (30-50 lqd) High (>50 lqd)	Dry (Moist) Wet Saturated	(None Noted) Slight Moderate Strong Notes:	CL	17	Head space Sample 63ppb
5-7.5	Black Gray - L M D (Brn) - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 4/3	Cobbly Grvlly Sandy (Silty) Clayey	GVL - F M C Sand - F M C Silt (Clay) _____	Trace (1-10%) (Little (10-20%)) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft (Med) Stiff Very Stiff Hard	Very Loose Loose M. Dense (Dense) Very Dense Ext. Dense	(Low (0-20 lqd)) Med (30-50 lqd) High (>50 lqd)	Dry (Moist) Wet Saturated	(None Noted) Slight Moderate Strong Notes:	CL	0	
7.5-10.5	Black Gray - L M D (Brn) - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 4/3	Cobbly Grvlly Sandy (Silty) Clayey	GVL - F M C (Sand) - F M C Silt Clay _____	Trace (1-10%) (Little (10-20%)) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft (Med) Stiff Very Stiff Hard	Very Loose Loose (M. Dense) Dense Very Dense Ext. Dense	(Low (0-20 lqd)) Med (30-50 lqd) High (>50 lqd)	Dry (Moist) Wet Saturated	(None Noted) Slight Moderate Strong Notes:	SM	0	
10.5-16	Black Gray - L M D (Brn) - L M D Red - L M D Other	Red Brown (Gray) Green Rust Yellow Other %	2.5 YR 3/3	Cobbly Grvlly (Sandy) Silty Clayey	GVL - F M C (Sand) F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose (Loose) M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry (Moist) Wet Saturated	(None Noted) Slight Moderate Strong Notes:	SW	0	Soil is saturated starting at 14 ft.
16-25	Black (Gray) - L M D Brn - L M D Red - L M D Other	(Red) Brown Gray Green Rust Yellow Other %	2.5 YR 5/2	Cobbly (Grvlly) (Sandy) Silty Clayey	(GVL) - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) (And (30-50%))	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose (Loose) M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist (Wet) Saturated	(None Noted) Slight Moderate Strong Notes:	GP	0	Drilling stopped at 25 ft due to soil heaving.
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: (Yes) No MiHPT Log Yes/No

Sample IDs: HLS-GW-04 3-4; MS/MSD

GW Sample: PCE Screening 3 VOAs

Number/Size of Containers: 15 + 3 VOAs

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 12/2/17	
Client:	Montana DEQ	Time Started: 0758	Time Completed: 0816
Project Location:	Billings, Montana	Drilling Contractor: Dakota Tech	Backfilled: Y or N
Weather:	Partly Cloudy	Operator: Charles Brenson	Diameter: 1.25
Logged by:	Jacob Scott	Crew: Orly Tengen	Groundwater Depth: 15
Logger's Signature:	Jacob Scott	Drill Method: DP	Total Depth: 25
		Equipment/Rig Type: 7725 DT	Well Completed: Y or N

BORING ID: HLS-GW-05 **Location:** Alley by Hospital Laundry Services

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-1	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 2/2	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SP	0	Top Soil
1-8	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 4/3	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	0	
8-11	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 4/2	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SM	0	
11-13	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	2.5 YR 4/2	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SW		
13-15	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 3/1	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM		Limited Recovery due to gravel
15-25	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 3/1	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			@ 15-20 ft bgs
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____ YR ____/____	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 1 of 2 Sheets

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 3-19-15	
Client:	Montana DEQ	Time Started: 1355	Time Completed: 1446
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: Y or N
Weather:	40's part cloudy	Operator: Duane Leary	Diameter: 1.5 / 4 1/4" ID / 8" OD HSA
Logged by:	C VanHeyeland	Crew: Jose Pereda	Groundwater Depth: 10.68' bTOC
Logger's Signature:		Drill Method: HSA - Hammer	Total Depth: 25'
		Equipment/Rig Type: Mobile B-57	Well Completed: Y or N

BORING ID: MW-100 **Location:** 303 Concord

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.	blowcount/ft
8"-1'	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 3/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SP	0	6, 10, 17, 18	drill 8" bgs w/ HSA to clr asphalt
1'-2'	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 3/1	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0		tr Fe stain
2-4	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0		
4-5	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	25 YR 4/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	ML	0		
5-9	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 5/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	4, 7, 11, 20, 29	
9-10	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 5/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0		
10-15	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			7, 14, 18, 18, 18	no recovery, nitrx

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 2 of 2 Sheets

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 3-19-18	
Client:	Montana DEQ	Time Started: 1355	Time Completed: 1446
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: Y or N
Weather:	40's Part cloudy	Operator: Duane Lenny	Diameter: 1.5" / HSA 4 1/4" ID / 8" OD
Logged by:	C. Vanderhelden	Crew: Jose Pereda	Groundwater Depth: 10.65' total
Logger's Signature:		Drill Method: HSA-hammer	Total Depth: 25' bgs
		Equipment/Rig Type: Mobile B-57	Well Completed: Y or N

BORING ID: MW-100

Location:

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.	blowcounts/ft
15-18	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red Brown / Gray Green / Rust Yellow / Other / %	2.5 YR 5/2	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	SP	0	1 7 44 43 69	
18-20	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red Brown / Gray Green / Rust Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	GM	0		
20-25	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red Brown / Gray Green / Rust Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	GM	0		td=25' bgs, 1446
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red Brown / Gray Green / Rust Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:				
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red Brown / Gray Green / Rust Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:				
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red Brown / Gray Green / Rust Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:				
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red Brown / Gray Green / Rust Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:				
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red Brown / Gray Green / Rust Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:				

Samples Collected: Yes/No

Sample IDs:

MiHPT Log Yes/No

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 3-26-18	
Client:	Montana DEQ	Time Started: 0923	Time Completed: 1200
Project Location:	Billings, Montana	Drilling Contractor: Earth Probe	Backfilled: Y or (N) Well installed
Weather:	Partly Cloudy 33°F	Operator: Mark Taggart	Diameter: 6.25"
Logged by:	W. Coles	Crew: Kenny Larson	Groundwater Depth: 14'
Logger's Signature:		Drill Method: DPT/HSA	Total Depth: 22'
		Equipment/Rig Type: Geo probe	Well Completed (Y) or N 21'

BORING ID: MW-101 Location: 1246 Central Avenue

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-1	Black (Gray) - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___ YR ___/___	Cobbly Grvlly Sandy (Silty) Clayey	(GVL - F M C) Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense (Dense) Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry (Moist) Wet Saturated	(None Noted) Slight Moderate Strong Notes:	—	—	Alley; gravel fill
1-16	Black Gray - L M D (Brn) - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___ YR ___/___	Cobbly Grvlly Sandy (Silty) Clayey	GVL - F M C Sand - F M C Silt (Clay) ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med (Stiff) Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	(Low (0-20 lqd)) (Med (30-50 lqd)) High (>50 lqd)	Dry (Moist) (Wet) Saturated	(None Noted) Slight Moderate Strong Notes:			Wet @ 14'
16-18	Black Gray - L M D (Brn) - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___ YR ___/___	Cobbly Grvlly Sandy (Silty) Clayey	GVL - F M C (Sand - F M C) Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense (Dense) Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist (Wet) Saturated	(None Noted) Slight Moderate Strong Notes:			
18-22	Black (Gray) - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___ YR ___/___	Cobbly Grvlly Sandy Silty Clayey	(GVL - F M C) Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense (Dense) Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist (Wet) Saturated	(None Noted) Slight Moderate Strong Notes:			Well screened from 11'-21' BGS
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___ YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			Flush mount Completion
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___ YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other___	Red Brown Gray Green Rust Yellow Other %	___ YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: Yes/(No) MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 1 of 2 Sheets

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 3/19/18	
Client:	Montana DEQ	Time Started: 1003	Time Completed: 1031
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: Y or (N) well
Weather:	40's Sunny	Operator: Duane Leary	Diameter: 1.5" / HSA 4 1/4" ID / 8" OD
Logged by:	C. Van Hoveln	Crew: Jose Peralta	Groundwater Depth: 11.74
Logger's Signature:		Drill Method: HSA - Hammer	Total Depth: 24.5'
		Equipment/Rig Type: Mobile B-57	Well Completed: (Y) or N

BORING ID: MW-103

Location: 741 St. John's Ave

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0'-1'	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	10 YR 3/3	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	CL		7 10 16 18 drill to 5' bgs w/ HSA, st. sampling
1'-5'	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	10 YR 4/1	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	CL		
5-10	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	2.5 YR 4/3	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	CL		9 9 15 21 tr Fe stain
10-10.5	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	2.5 YR 5/4	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	CL		24 5 6 6 7 11
10.5-13	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	2.5 YR 3/3	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	ML/H		
13-14	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	2.5 YR 3/3	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	CL		
14-15	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	2.5 YR 3/3	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	ML/H		

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

MW-103

TRIHYDRO CORPORATION

Sheet 2 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 3/19/18	
Client:	Montana DEQ	Time Started: 1003	Time Completed: 1031
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: Y or (N) mylll
Weather:	40's sunny lt. breeze	Operator: Duane Leary	Diameter: 1.5" / HSA 4.1/4 ID / 8" OD
Logged by:	C. Vanderpoolen	Crew: Jose Pineda	Groundwater Depth: 11.74
Logger's Signature:		Drill Method: HSA - Hammer	Total Depth: 24.5
		Equipment/Rig Type: Mobile B-57	Well Completed: (Y) or N

BORING ID: MW-103

Location:

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional Info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
15-17	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	2.5 YR 4/3	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL		5 13 16 17 18
17-20	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 3/2	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM		
20-25	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM		22 54 65 112 70 auger to td = 25' bgs
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			1031
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 1 of 2 Sheets

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 3/22/18	
Client:	Montana DEQ	Time Started: 1023	Time Completed: 1128
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: Y or (N)
Weather:	40's clr, sunny	Operator: Duane Leavy	Diameter: 1.5" / 4 1/4 ID / 8" OD
Logged by:	C. Vanderveen	Crew: Jose Revedo	Groundwater Depth: 13.22
Logger's Signature:	[signature]	Drill Method: HSA	Total Depth: 25
		Equipment/Rig Type: Mobile B-57	Well Completed: (Y) or N

BORING ID: MW-104

Location: Central Ave, triangle property across from Albertsons

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Blowcounts/ft	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-1	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:		0	14, 10, 12, 21, 19	grass, organic, fill
1-1.5'	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 3/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SW	0		
1.5-5'	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	ML	0		
5-7	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	ML	0	9, 12, 14, 19, 22	
7-9	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0		
9-10	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 3/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0		
10-10.5	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 3/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	7, 8, 18, 33, 34	

Samples Collected: Yes/No

Sample IDs:

MiHPT Log Yes/No

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 2 of 2 Sheets

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 3/22/18	
Client:	Montana DEQ	Time Started: 1023	Time Completed: 1128
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: Y or N
Weather:	40's clr, sunny	Operator: Duane Leary	Diameter: 1.5 / 4 1/4 ID / 8" OD
Logged by:	C. VanHeuvelen	Crew: Jose Pereda	Groundwater Depth: 13.22
Logger's Signature:		Drill Method: HSA	Total Depth: 25
		Equipment/Rig Type: Mobile B-57	Well Completed: Y or N

BORING ID: MW-104

Location: Central, across from Albertsons

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb) (blowcounts per ft)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
10.5-13.5	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	10 YR 4/2	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	CL	0	
13.5-15	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	10 YR 4/2	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	SM	0	
15-20	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	GW		top water ~15' bgs
20-25	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:			no recovery td = 25' bgs 1129
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:			
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:			
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:			
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:			

Samples Collected: Yes/No

MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name: Billings PCE	Date: 4-19-18	
Client: MDEQ	Time Started: 0825	Time Completed: 0944
Project Location: Billings MT	Drilling Contractor: IME	Backfilled: Y or N
Weather: 34-62, Hazy/scatt. clouds	Operator: Duane Leary	Diameter: 4 1/4" x 8"
Logged by: C. Vanderkelen	Crew: Jose Pereda	Groundwater Depth:
Logger's Signature:	Drill Method: HSA	Total Depth: 25
	Equipment/Rig Type: Mobile B-57	Well Completed: Y or N

BORING ID: MW-105 **Location:** BNSF property, N. of track

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.	blowcount/ ft	
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	____YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ____	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:				9 8 9 10 11	clear fill w/ gravel u6" 0-5' no recovery
5-10	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	2.5 YR 3/4	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ____	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	CL	0		4 14 16 29 36	
10-13.5	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	____YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ____	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	GM	0		44 44 61 40 23	moisture content increase towards sud contact
13.5-15	Black / Gray - L M D / Brn - L M D / Red - L M D / Other ____	Red / Brown / Gray / Green / Rust / Yellow / Other / %	GLEY2 ____YR 2.5/1	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ____	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes: HC	SM	75.6 ppm			strong fuel odor top water ~14' bgs
15-20	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	____YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ____	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	GM	762 ppb		7 14 19 36 38	
20-25	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	10 YR 2/2	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ____	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	SM	4351 ppb		37 34 27 47 74	td = 25' bgs 0944 borehole 10.7 ppm
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	____YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ____	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:					

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 2 Sheets

SOIL BORING LOG

Project Name: Billings PCE	Date: 4-19-18	
Client: MDEQ	Time Started: 1158	Time Completed: 1313
Project Location: Billings MT	Drilling Contractor: IME	Backfilled: Y or N
Weather: 50's, sunny	Operator: Duane Leary	Diameter: 4 1/4 x 8
Logged by: C. Van Hesteren	Crew: Jose Pereda	Groundwater Depth:
Logger's Signature:	Drill Method: HSA	Total Depth: 28'
	Equipment/Rig Type: mobile B-57	Well Completed: Y or N

BORING ID: MW-106

Location: BNSF/MRL property, N. of 4560 State Ave

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.	Blowcount/ft
1-5	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ____/____	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			11 41 29 15 14	1' recovered ? fill	
5-10	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 3/4	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	0	7 11 14 16 17	transitions to ~~becomes~~ soft @ ~7'	
10-13	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 3/4	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	0	2 8 13 16 29		
13-14	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 3/4	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	ML	0			
14-15	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 3/4	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	0			
15-16	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 3/2	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL		11 14 42 53 58		
16-18	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 3/2	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	ML			top water ~16' bgs Fe stains	

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 2 of 2 Sheets

SOIL BORING LOG

Project Name: Billings PCE	Date: 4-19-18	
Client: MDEQ	Time Started: 1158	Time Completed: 1313
Project Location: Billings MT	Drilling Contractor: IME	Backfilled: Y or N
Weather: 50's sunny	Operator: Duane Leary	Diameter: 4 1/4 x 8
Logged by: C. Van Heuvelen	Crew: Jose Pereda	Groundwater Depth:
Logger's Signature:	Drill Method: HSA	Total Depth: 28
	Equipment/Rig Type: Mobile B-57	Well Completed: Y or N

BORING ID: MW-106

Location: BNSF property, N. of 4560 State Ave.

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
18-20	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM	0		
20-28	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GW	0	36 54 69 31 44	
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				td = 28' bgs, 1313
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 5/1/18	
Client:	Montana DEQ	Time Started: 0900	Time Completed: 1300
Project Location:	Billings, Montana	Drilling Contractor: INE	Backfilled: Y or N
Weather:	40s RAINY / OVERCAST	Operator: DWANE LEARY	Diameter: 6" Auger 2" PVC well
Logged by:	VICKI BIERWIRTH	Crew: JOSE PEREDA	Groundwater Depth:
Logger's Signature:	Vicki Bierwirth	Drill Method: HSA	Total Depth: 26
		Equipment/Rig Type: MOBILE B57	Well Completed: Y or N

BORING ID: MW-107 (4B-GW-03) **Location:** 4360 STATE AVE. BEHIND VFW. East of ABC Supply Co.

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-5'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM	0	19 5 6 12 12	little recovery
5-8'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SC	0	5 7 7	
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				See log 4B-GW-03 for remaining lithology
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				TD=26' bgs
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes: See log 4B-GW-03

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 1 of 2 Sheets

Project Name: Billings PCE	Date: 3-27-18		
Client: MDEQ	Time Started: 0837	Time Completed: 0956	
Project Location: Billings MT	Drilling Contractor: IME	Backfilled: Y or N	
Weather: 30's, scatt clouds sunny	Operator: Duane Lefavy	Diameter: 1.5 / 4 1/4 ID / 8 OD	
Logged by: C. Van Heuvelen	Crew: Jose Peredo	Groundwater Depth: ~~14' Est Water~~	14.16' btoc
Logger's Signature:	Drill Method: HSA	Total Depth: 30' bgs	
	Equipment/Rig Type: Mobile B-57	Well Completed: Y or N	

BORING ID: MW-108

Location: 4024 1st Ave. South

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.	Blowcounts/ft
8"-1'	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	fill	~~fl~~	7, 7, 11, 10, 8	drill w 8" w/ HSA to clr asphalt
1-3.5	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 5/6	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL			
3.5-5	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 3/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM			
5-9	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM		2, 3, 8, 12, 12	
	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:				~~th~~
9-10	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL			
10-11	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 3/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL		9, 46, 40, 77, 114	

Samples Collected: Yes/No

Sample IDs:

MiHPT Log Yes/No

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 2 of 2 Sheets

Project Name: Billings PCE	Date: 3-27-18	
Client: MDEQ	Time Started: 0837	Time Completed: 0956
Project Location: Billings MT	Drilling Contractor: IME	Backfilled: Y or N
Weather: 35, scattered clouds, sunny	Operator: Duane Leary	Diameter: 1.5 / 4"/4 ID / 8 OD
Logged by: C. Vanderwerken	Crew: Jose Pereda	Groundwater Depth: ~~6-3 below~~ 14.6' btoc
Logger's Signature:	Drill Method: HSA	Total Depth: 39' bgs
	Equipment/Rig Type: Mobile B-57	Well Completed: Y or N

BORING ID: MW-108

Location:

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.	blowcounts/ft
11-15	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ___	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	GW				
15-20	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ___	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	GW			strong fuel odor bluish black (GLEY2 2.5/1) stain @ 16'-20'	
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ___	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:				top water @ 16.5' bgs no samples collected 20-td = 20' bgs	
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ___	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:				0956	
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ___	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:					
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ___	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:					
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ___	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:					
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ___	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:					

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 1 of 1 Sheets

Project Name: Billings PCE	Date: 3/26/18		
Client: MDEQ	Time Started: 0558	Time Completed: 1026	
Project Location: Billings MT	Drilling Contractor: MWE	Backfilled: Y or N	
Weather: 40's clrd	Operator: Duane Leavy	Diameter: 1.5/ 2 1/4 ID/ 8 OD	
Logged by: C. VanHeerden	Crew: Jose Revada	Groundwater Depth:	
Logger's Signature:	Drill Method: HSA	Total Depth: 29.3'	
	Equipment/Rig Type: Mobile B-57	Well Completed: Y or N	

BORING ID: MW-109 **Location:** 302 S. 36th St.

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	blowcounts/ft	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0'-1.25'	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 3/2	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	fill	108	6, 10, 12, 14, 8	clear ~8" of asphalt w/ auger
1.25'-4'	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 3/2	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0		
4-5	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 3/2	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	ML	0		
5-10	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 3/2	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	ML	0	4, 9, 11, 11	54 ppb @ ~8.5' bgs
10-11	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 3/2	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	ML	15 @ 10.5'	7, 33, 34, 70, 75	
11-15	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___ YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GW	0		
15-20	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___ YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GW	178 @ 15.5'	54, 36, 37, 34, 39	top water ~18.5' bgs; no logging from 20-30' bgs; int = 30' bgs, 1026

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 1 of 2 Sheets

Project Name: Billings PCE	Date: 3-26-18	
Client: MDEQ	Time Started: 1217	Time Completed: 1324
Project Location: Billings MT	Drilling Contractor: IME	Backfilled: Y or N
Weather: 40's, clr/sunny	Operator: Duane Leary	Diameter: 1.5/4.1/4" ID / 8" OD
Logged by: C. VanHeuvelen	Crew: Jose Parada	Groundwater Depth: 16.34' btoc
Logger's Signature:	Drill Method: HSA	Total Depth: 30' bgs
	Equipment/Rig Type: mobile B-57	Well Completed: Y or N

BORING ID: MW-110 **Location:** 224 S. 33rd St

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.	
0-1.25	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 2.5/1	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	ML	0	7, 13, 14, 14, 7	drill w/ 8" w/ auger to clr asphalt
1.25-2.5	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 3/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0		
2.5-5	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	ML	0		
5-8	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	3, 5, 12, 15, 17	
8-10	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 5/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	ML	0		
10-12	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 5/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	ML	0	12, 17, 24, 56	
12-14.5	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 3/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	11		

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 2 of 2 Sheets

SOIL BORING LOG

Project Name: Billings PCE	Date: 3-26-18	
Client: MDEQ	Time Started: 1217	Time Completed: 1324
Project Location: Billings MT	Drilling Contractor: IME	Backfilled: Y or N
Weather: 40's cld - sunny	Operator: Duane Leavy	Diameter: 1.5 / 4¼" / 8"
Logged by: C. VanHeuveling	Crew: Jose Pereda	Groundwater Depth: 16.34' btoc
Logger's Signature:	Drill Method: HSA	Total Depth: 30' bgs
	Equipment/Rig Type: mobile B-5	Well Completed: Y or N

BORING ID: MW-110 **Location:** 224 S. 33rd

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.	
14.5-15	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GW	50		@ ~16' bgs	
15-20	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GW	146 0	18 27 49 38 26	top water ~ 18' bgs	
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				TD = 30' bgs, 1324	
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:					
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:					
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:					
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:					

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 5/1/18	
Client:	Montana DEQ	Time Started: 1430	Time Completed: 1700
Project Location:	Billings, Montana	Drilling Contractor: INE	Backfilled: Y or (N)
Weather:	40s OVERCAST	Operator: DUANE LEARY	Diameter: 6" HINGER 2" PVC WELL
Logged by:	VICKI BIERWIRTH	Crew: JOSE PEREDA	Groundwater Depth:
Logger's Signature:	Vicki Bierwirth	Drill Method: HSA	Total Depth: 25
		Equipment/Rig Type: MOBILE B57	Well Completed: (Y) or N

BORING ID: MW-111 **Location:** 1095. 28th St. BILLINGS, MT

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc. (sample blow/foot)
0-6'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense (A2) Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CH	0	4 9 13 16	6" of asphalt 6" of fill
6-7	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med (A3) Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM	0	5 43 80 101	8.5' → large cobble prevent sample recovery from 8.5'-10'
7-8.5	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) A2 Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med (A3) Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM	0		
~~8.5~~ 10'-15'	Black Gray - L M D Brn - L M D Red - L M D Other white	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM	0	56 136 152 134 97	
15-20'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM	0	29 34 45 73 61	
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 1 of 1 Sheets

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 3-23-18	
Client:	Montana DEQ	Time Started: 0826	Time Completed: 0911
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: Y or N
Weather:	30's overcast	Operator: Duane Leary	Diameter: 1.5 / 4 1/4 ID / 8 OD
Logged by:	C. VanHeuvelen	Crew: Jose Pineda	Groundwater Depth: 2 (well) LAOC
Logger's Signature:		Drill Method: HSA	Total Depth: 14 bgs
		Equipment/Rig Type: mobile B-57	Well Completed: Y or N

BORING ID: MW-113 **Location:** 2309 2nd Ave

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.	
8'-15'	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	fill		14, 7, 8, 7	clean u 8" w/ HSA begin sampling
15'-~15	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/1	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0		limited recovery CaCO / Fe stains
~15-~16	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 3/2	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	34, 26, 14, 33, 54	limited recovery
~16-~10	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GW	0		
10-~14	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GW	0	22, 71, 109, 105, 67	limited recovery
	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:				RORA @ 14.5, top shale set well @ 14.5, 0911 (14' td)
	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:				

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 3/23/18	
Client:	Montana DEQ	Time Started: 1034	Time Completed: 1148
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: Y or N
Weather:	40's Sizzlt clouds - sunny	Operator: Duane Leavy	Diameter: 1.5/4 1/4 ID / 8" OD
Logged by:	C. Vergt Heuvelen	Crew: Dose Rendon	Groundwater Depth: 13.97' btoc
Logger's Signature:		Drill Method: HSA	Total Depth: 25' bgs
		Equipment/Rig Type: Mobile B-57	Well Completed: Y or N

BORING ID: MW-114 **Location:** 185. 27th St (REX)

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.	
8" - 1.5	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	fill		10 9 20 25 26	drill w 8" w/ HSA to clear asphalt
1.5 - 5	Black / ~~Gray - L M D~~ / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	10 YR 4/4	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / ~~Dense~~ / ~~Very Dense~~ / Ext. Dense	~~Low (0-20 lqd)~~ / ~~Med (30-50 lqd)~~ / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	ML	0		
5-6	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	10 YR 4/4	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	~~Low (0-20 lqd)~~ / ~~Med (30-50 lqd)~~ / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	ML	0	11 18 19 22 24	
6-8	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	10 YR 4/4	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	SM	0		
8-10	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	10 YR 5/6	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	~~Low (0-20 lqd)~~ / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	ML	0		
10-12	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	10 YR 4/4	Cobbly / Grvlly / Sandy / Silty / ~~Clayey~~	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	SM	0	7 8 26 62 37	mottled w/ gry spots
12-14	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	10 YR 4/3	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	ML			

Samples Collected: Yes/No MIHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 2 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 3/23/18	
Client:	Montana DEQ	Time Started: 1034	Time Completed: 1148
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: Y or N
Weather:	40's scatt clouds - sunny, v/lt breeze	Operator: Duane Leary	Diameter: 1.5/4 1/4 ID / 8" OD
Logged by:	C. Van Heuvelen	Crew: Jose Tereda	Groundwater Depth: 13.97' below
Logger's Signature:		Drill Method: HSA	Total Depth: 25' bgs
		Equipment/Rig Type: Mobile B-57	Well Completed: Y or N

BORING ID: MW-114 **Location:** 18. S. 27th St.

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.	
14-15	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GW	0			
15-20	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GW	0	38 39 53 41 42	top water ~16' bgs	
20-25	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				no recovery td = 25' bgs, 1148	
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:					
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:					
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:					
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:					

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 3/20/18	
Client:	Montana DEQ	Time Started: 0842	Time Completed: 1021
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: Y or N
Weather: 70's sunny		Operator: Dwayne Leary	Diameter: 1.5" / 4"OD / 8" OD
Logged by: C. Vanthevelde		Crew: Jose Pradza	Groundwater Depth: 7.56
Logger's Signature:		Drill Method: HSA - hammer	Total Depth: ~~24.5~~ 25
		Equipment/Rig Type: Mobile B-57	Well Completed: Y or N

BORING ID: MW-115 **Location:** 2302 Minnesota Ave

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.	
3"-1'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	fill	0	7 8 14 28 20	drill 8" bgs w/ HSA to clr asphalt
1-2	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	2.5 YR 4/2	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	ML	0		
2-4	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	2.5 YR 4/2	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	0		
4-5	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	2.5 YR 3/1	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SM	0		tr gravel
5-10	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SW	0	58 43 46 18 14	rig chatter
10-15	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GW	0	40 38 33 24 34	
15-16	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SP	0	17 33 43 43 52	

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

MW-115

TRIHYDRO CORPORATION

Sheet 2 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 3/20/18	
Client:	Montana DEQ	Time Started: 0542	Time Completed: 1021
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: Y or N
Weather:		Operator: Duane Leary	Diameter: 1.5 / 4 1/4 ID / 8" OD
Logged by:		Crew: Dusty Perez	Groundwater Depth: 9.56'
Logger's Signature:		Drill Method: HSA	Total Depth: 25
		Equipment/Rig Type: mobile B-57	Well Completed: Y or N

BORING ID: MW-115

Location:

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
16-20	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GW	0	
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			ROP Δ ~23' bgs, drlr thinks sh bedrx, no recovery TD=25' bgs 1021
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: Yes/No MIHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 3/23/18	
Client:	Montana DEQ	Time Started:	Time Completed: 1523
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: Y or N
Weather:	50's partly cloudy	Operator: Duane Leary	Diameter: 1.5 / 4 1/4" ID / 8" OD
Logged by:	C. Vanderweyden	Crew: Jose Pereda	Groundwater Depth: 12.66' btoc
Logger's Signature:		Drill Method: HSA	Total Depth: 25' bgs
		Equipment/Rig Type: Mobile B-57	Well Completed: Y or N

BORING ID: MW-116 **Location:** 6 29th St. S. (in front of mission) blowcount/ft

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.	
8"-1.5'	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Gray / Rust / Other / %	YR /	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	fill		19 8 16 19 15	drill ~8" w/ HSA to clear asphalt
1.5'-4.5'	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Gray / Rust / Other / %	10 YR 4/4	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	CL	0		
4.5-5	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Gray / Rust / Other / %	10 YR 4/4	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	SM	0		
5-7	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Gray / Rust / Other / %	2.5 YR 4/2	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	CL	0	5 10 13 18	
7-9.5	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Gray / Rust / Other / %	2.5 YR 4/2	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	ML	0	23	
9.5-10	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Gray / Rust / Other / %	2.5 YR 3/1	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	SM	0		
10-13	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Gray / Rust / Other / %	2.5 YR 4/3	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	SM	0	9 23 48 41 30	

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 2 of 2 Sheets

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 3/23/18	
Client:	Montana DEQ	Time Started: 1421	Time Completed: 1523
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: Y or N
Weather:	50's, scatt. clouds, 14 gusts	Operator: Duane Leary	Diameter: 1.5/4.1/4/3
Logged by:	C. VanHeuvelen	Crew: Jose Rivera	Groundwater Depth: 12 de' latoc
Logger's Signature:		Drill Method: HSA	Total Depth: 25' bgs
		Equipment/Rig Type: Mobile B-57	Well Completed: Y or N

BORING ID: MW-116 **Location:** 629th St. S.

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
13-15	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:	GW	0	top water ~14' bgs no more samples collected drill 10' more
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:			td = 25' bgs, 1523
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:			
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:			
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:			
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:			
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:			
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red / Brown / Gray / Green / Rust / Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 4/28/18	
Client:	Montana DEQ	Time Started: 1329	Time Completed: 1600
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: Y or N
Weather:	SUNNY	Operator: DUANE LEARY	Diameter: 2" PVC WELL 6" AUGER
Logged by:	V. BIERWIRTH	Crew: JOSE PEREDA	Groundwater Depth:
Logger's Signature:	Vicki Bierwirth	Drill Method: HSA	Total Depth: 23' bgs
		Equipment/Rig Type: MOBILE B57	Well Completed: Y or N

BORING ID: MW-117 **Location:** 2525 1st Ave North, Billings, MT

How count / Cook

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-1'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	FILL	0	8 9 14 10 14		
1-6'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CH	0			
6-8'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey some	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SC	0	5 10 13 19 ~~14~~		
8-10'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM	0			
10-15'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes: Petro	GM	177 557 8641 809	21 58 ~~75~~ 40	2370 ppb from 15' bgs	
15-20'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes: Petro	GM	1 1667 2043	57 73 58 37 31		
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:					Bedrock at 22' bgs flowing sands

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 4/25/18	
Client:	Montana DEQ	Time Started: 0830	Time Completed: 1130
Project Location:	Billings, Montana	Drilling Contractor: ME	Backfilled: Y or (N)
Weather:	50's SUNNY	Operator: D. LEARY	Diameter: 2" PVC WELL 6" AUGER
Logged by:	V. BIERWIRTH	Crew: J. PLREDA	Groundwater Depth:
Logger's Signature:	Vinci Bierwirth	Drill Method: HSA	Total Depth: 26
		Equipment/Rig Type: MOBILE B57	Well Completed: (Y) or N

BORING ID: MW-118 **Location:** 415 N 30th St. Intersection of N 29th St + 4 Ave. NW Corner.

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Sample Blow Counts / Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-1'	Black (Gray) - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly (Sandy) Silty Clayey	(GVL) - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	(Dry) Moist Wet Saturated	(None Noted) Slight Moderate Strong Notes:	FILL	0	36 10 16 19 22	
1-~~4~~ 6'	Black Gray - L M D (Brn) - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly (Sandy) Silty Clayey	GVL - F M C Sand - F M C Silt (Clay) ____	Trace (1-10%) (Little (10-20%)) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med (Stiff) Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	(Low (0-20 lqd)) Med (30-50 lqd) High (>50 lqd)	Dry (Moist) Wet Saturated	(None Noted) Slight Moderate Strong Notes:	SC	0	~~7~~ ~~12~~	
6-7'	Black Gray - L M D (Brn) - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy (Silty) Clayey	GVL - F M C (Sand - F M C) Silt Clay ____	Trace (1-10%) (Little (10-20%)) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense (Very Dense) Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry (Moist) Wet Saturated	(None Noted) Slight Moderate Strong Notes:	SM	0	7 17 26 39 119	
7-10'	Black (Gray) - L M D (Brn) - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	(Cobbly) Grvlly Sandy Silty Clayey	GVL - F M C (Sand - F M C) Silt Clay ____	(Trace (1-10%)) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense ~~Dense~~ (Very Dense) Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry (Moist) Wet Saturated	(None Noted) Slight Moderate Strong Notes:	SP	0		
10-14'	Black (Gray) - L M D (Brn) - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly (Sandy) Silty Clayey	(GVL) - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) (Some (20-30%)) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense (Ext. Dense)	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry (Moist) Wet Saturated	(None Noted) Slight Moderate Strong Notes:	GM ~~GP~~	0	43 72 65 30 19	
14-15'	Black Gray - L M D (Brn) - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy (Silty) Clayey	GVL - F M C (Sand - F M C) Silt Clay ____	(Trace (1-10%)) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	(Very Loose) Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist (Wet) Saturated	(None Noted) Slight Moderate Strong Notes:	SM	0	59 41 39 24 23	
15-20'	Black (Gray) - L M D (Brn) - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly (Sandy) Silty Clayey	(GVL) - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) (Some (20-30%)) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose (M. Dense) Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist (Wet) (Saturated)	(None Noted) Slight Moderate Strong Notes:	GM ~~GP~~		59 41 39 24 23	Saturated at 18' bgs

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 2 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 4/28/18	
Client:	Montana DEQ	Time Started: 0650	Time Completed: 1130
Project Location:	Billings, Montana	Drilling Contractor: INE	Backfilled: Y or N
Weather:	50's SUNNY	Operator: D. LEARY	Diameter: 6" AUGER 2" PVC
Logged by:	V. BIERWIRTH	Crew: J. PEREDA	Groundwater Depth:
Logger's Signature:	Vicki Bierwirth	Drill Method: HSA	Total Depth: 26'
		Equipment/Rig Type: MOBILE - B57	Well Completed: Y or N

BORING ID: MW-118

Location: Intersection of N 29th St. & 4 Ave. NW Corner.

sample blow count

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
20-25'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			100	100 blows for 5" no recovery Presumably GP Bedrock was reached at 25' bls. Flowing sands.
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

SOIL BORING LOG

Sheet 1 of 1 Sheets

Project Name: Billings PCE	Date: 3-25-18	
Client: MDEQ	Time Started: 0957	Time Completed: 1056
Project Location: Billings MT	Drilling Contractor: IME	Backfilled: Y or (N)
Weather: 40's gry/overcast	Operator: Duane Leary	Diameter: 1.5 / 4 1/4" ID / 8" OD
Logged by: C. Vanhouvelen	Crew: Jose Revelda	Groundwater Depth: ~~4.17 bgs~~ 12.43' TOC
Logger's Signature:	Drill Method: HSA	Total Depth: 24 bgs
	Equipment/Rig Type: Mobile B-57	Well Completed: Y or (N)

BORING ID: MW-119

Location: 3203 3rd Ave North

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.	blowcount/ft	
8"-1'	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	fill			7, 13, 15, 12, 7	drill ~5" to clear concrete/asphalt w/ HSA
1-3	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 3/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	ML	0			
3-4.5	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 3/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0			
4.5-5	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 4/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0			
5-10	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GW	0		5, 15, 34, 50, 71	
10-15	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:				100	~6" recovered gravels
	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:					1045 drill to ROPA & then set well — all gravel/no logging ~17' bgs soften/top of water? TD = 24' bgs, 1056

Samples Collected: Yes/No

Sample IDs:

MiHPT Log Yes/No

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 4/30/18	
Client:	Montana DEQ	Time Started: 0400	Time Completed: 1030
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: Y or (N)
Weather:	high 40s Cloudy	Operator: DUANE LEITRY	Diameter: 6" AUGER 2" PVC WELL
Logged by:	VICKI BIERNWIRTH	Crew: JOE PEREDA	Groundwater Depth:
Logger's Signature:	Vicki Biernwirth	Drill Method: HSA	Total Depth: 22
		Equipment/Rig Type: MOBILE B57	Well Completed: (Y) or N

BORING ID: MW-120 **Location:** 26 CLARK AVE, BILLINGS, MT

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	blow count/ sample	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-5'	Black Gray - L M D (Brn) - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly (Sandy) Silty Clayey	GVL - F M C Sand - F M C Silt (Clay) _____	Trace (1-10%) Little (10-20%) (Some (20-30%)) And (30-50%)	Grvlly Sandy (Silty) Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med (Stiff) Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) (High (>50 lqd)) Notes:	Dry (Moist) Wet Saturated	None Noted (Slight) Moderate Strong Notes:	CH	0 0 269 774	17 11 17 20 23	6" Asphalt.
5-8.5'	Black Gray - L M D (Brn) - L M D Red - L M D (Other) white	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly (Sandy) Silty Clayey	GVL - F M C Sand - F M C Silt (Clay) _____	Trace (1-10%) Little (10-20%) (Some (20-30%)) And (30-50%)	Grvlly Sandy (Silty) Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff (Very Stiff) Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	(Low (0-20 lqd)) Med (30-50 lqd) High (>50 lqd)	Dry (Moist) Wet Saturated	None Noted (Slight) Moderate Strong Notes:	CL	0 0 75 8 57	8 10 24 53 54	
8.5-15	Black (Gray) - L M D (Brn) - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly (Sandy) Silty Clayey	(GVL) - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) (Some (20-30%)) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose (M. Dense) Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet (Saturated)	(None Noted) Slight Moderate Strong Notes:	GM	0	17 19 13 17 8	Wet at 8.5-11' interval
15-18	Black Gray - L M D (Brn) - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy (Silty) Clayey	GVL - F M C (Sand) - F M C Silt Clay _____	(Trace (1-10%)) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	(Very Loose) Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet (Saturated)	(None Noted) Slight Moderate Strong Notes:	SM	0	2 29 40 33 29	Flowing sands
18-20	Black (Gray) - L M D (Brn) - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly (Sandy) Silty Clayey	(GVL) - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) (Some (20-30%)) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose (M. Dense) Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet (Saturated)	(None Noted) Slight Moderate Strong Notes:	GM	0		
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 4/25/16	
Client:	Montana DEQ	Time Started: 1150	Time Completed:
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: Y or (N)
Weather:	47° PARTLY CLOUDY	Operator: DILANE LEIARY	Diameter: 6" Borehole 2" PVC
Logged by:	V. BIERWIRTH	Crew: JOSE PEREDA	Groundwater Depth: 10.5'
Logger's Signature:	Vicki Bierwirth	Drill Method: HSA	Total Depth: 23' bgs
		Equipment/Rig Type: MOBILE - B67	Well Completed: (Y) or N

BORING ID: MW-121 **Location:** 430 MILES AVE, BILLINGS, MT

blow count / foot

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-5'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM	0	12 29 17 17 18	
5-8.5'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SC	0	8 12 14 16 18	
8.5'-11.5'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CH	0	7 10 14 15 48	
11.5'-13.5'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SC	0		
13.5'-14.5'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SM	0		
14.5'-15'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM	0		
15-17'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SM	0	40 56 45 65 54	

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 2 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 4/26/15	
Client:	Montana DEQ	Time Started: 1150	Time Completed:
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: Y or (N)
Weather:	62° PARTLY CLOUDY	Operator: DUANE LEARY	Diameter: 6" Borehole 2" PVC
Logged by:	V. BIERNWIRTH	Crew: JOSE PEREDA	Groundwater Depth: 10.5'
Logger's Signature:	Viki Biernwirth	Drill Method: HSA	Total Depth: 23' bgs
		Equipment/Rig Type: MOBILE B-57	Well Completed: (Y) or N

BORING ID: **Location:**

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
17'-20'	Black (Gray) - L M D (Brn) - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly (Sandy) Silty Clayey	(GVL - F M C) Sand - F M C Silt Clay _____	Trace (1-10%) (Little (10-20%)) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	(Very Loose) Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet (Saturated)	(None Noted) Slight Moderate Strong Notes:	GM	0	
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 2 Sheets

SOIL BORING LOG

Project Name: BILLINGS PCE	Date: 4/25/18		
Client: MTDEQ	Time Started: 0850	Time Completed: 0955	
Project Location: BILLINGS, MT	Drilling Contractor: IME	Backfilled: Y or (N)	
Weather: 47° PARTLY CLOUDY, SLIGHT BREEZE	Operator: DUANE LEARY	Diameter: 6" borehole 2" PVC	
Logged by: VICKI BIERWIRTH	Crew: JOSE PEREDA	Groundwater Depth: 11.2	
Logger's Signature: Vicki Bierwirth	Drill Method: HSA	Total Depth: 23 ft bgs	
	Equipment/Rig Type: MOBILE B-57	Well Completed: (Y) or N	

BORING ID: MW-122 **Location:** 610 COOK AVE, BILLINGS, MT

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.	blow count/foot
0-0.6'	Black Gray - L M D (Brn) - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	FILL	0	7 9 11 14 16	Fill Material.
0.6'-5'	Black Gray - L M D (Brn) - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly (Sandy) Silty Clayey	GVL - F M C Sand - F M C Silt (Clay) _____	Trace (1-10%) Little (10-20%) (Some (20-30%)) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft (Med) Stiff Very Stiff Hard	Very Loose (Loose) ~~M. Dense~~ WB Dense Very Dense Ext. Dense	Low (0-20 lqd) (Med (30-50 lqd)) High (>50 lqd)	Dry (Moist) Wet Saturated	(None Noted) Slight Moderate Strong Notes:	CL	0		
5-10'	Black Gray - L M D (Brn) - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy (Silty) Clayey	GVL - F M C (Sand - F M C) Silt Clay _____	Trace (1-10%) (Little (10-20%)) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose (M. Dense) Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry (Moist) Wet Saturated	(None Noted) Slight Moderate Strong Notes:	SM	0	7 12 13 12 17	
10-12.5'	Black Gray - L M D (Brn) - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy (Silty) Clayey	GVL - F M C (Sand - F M C) Silt Clay _____	(Trace (1-10%)) (Little (10-20%)) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose (Loose) M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist (Wet) ~~Saturated~~ WB	(None Noted) Slight Moderate Strong Notes:	SM	0	4 8 58 79 106	
12.5-15'	(Black) (Gray) - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly (Sandy) Silty Clayey	(GVL - F M C) Sand - F M C Silt Clay _____	Trace (1-10%) (Little (10-20%)) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose (M. Dense) Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist (Wet) ~~Saturated~~ WB	None Noted Slight Moderate Strong Notes:	GM	0		
15-17.5'	Black Gray - L M D (Brn) - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy (Silty) Clayey	GVL - F M C (Sand - F M C) Silt Clay _____	(Trace (1-10%)) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose (Loose) M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet (Saturated)	None Noted Slight Moderate Strong Notes:	SM	0	64 46 20 18 33	
17.5-20'	Black Gray - L M D (Brn) - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly (Sandy) Silty Clayey	(GVL - F M C) Sand - F M C Silt Clay _____	(Trace (1-10%)) (Little (10-20%)) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose (Loose) M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet (Saturated)	None Noted Slight Moderate Strong Notes:	GM	0		

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 4/26/18	
Client:	Montana DEQ	Time Started: 0820	Time Completed:
Project Location:	Billings, Montana	Drilling Contractor: INC	Backfilled: Y or N
Weather:	47° SUNNY	Operator: DUANE LEARY	Diameter: 6" Auger 2" PVC
Logged by:	V. BIERWIRTH	Crew: JOSE PEREDIA	Groundwater Depth:
Logger's Signature:	Vicki Bierwirth	Drill Method: HSA	Total Depth: 26' bls
		Equipment/Rig Type: MOBILE - B57	Well Completed: Y or N

BORING ID: MW-123 **Location:** 902 MILES AVENUE, BILLINGS, MT

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc. (sample blows/foot)
0-1'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	FILL MATERIAL	0	13 9 10 23 27	FILL MATERIAL
1-5'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	0	4 4 5 5	
5-10'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SM	0	4 3 5 5 6	Wet @ 9' bgs
10-16'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay Trace	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CH	0	5 10 24 35 51	
16-17'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	0	10 35 48 51 50	
17-20'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GP GM	0		
20-23'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SM	0	39 60 44 43 72	

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 2 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 4/26/18	
Client:	Montana DEQ	Time Started: 0520	Time Completed:
Project Location:	Billings, Montana	Drilling Contractor: IMC	Backfilled: Y or (N)
Weather:	42° SUNNY	Operator: DUANE LEARY	Diameter: 6" AUGER 2" PVC
Logged by:	V. BIERWIRTH	Crew: JOE PEREDA	Groundwater Depth:
Logger's Signature:	Vicki Bierwirth	Drill Method: HSA	Total Depth: 24' bgs
		Equipment/Rig Type: MOBILE-B57	Well Completed: (Y) or N

BORING ID: MW-123 **Location:** 902 MILES AVE, BILLINGS, MT

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
23-26'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GP GM	0	
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 4/27/18	
Client:	Montana DEQ	Time Started: 1045	Time Completed: 1330
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: Y or N
Weather:	60° SUNNY	Operator: Duane Lewis	Diameter: 2" well, 6" auger
Logged by:	V BIERWIRTH	Crew: Jose Perez	Groundwater Depth:
Logger's Signature:	Vicki Bierwirth	Drill Method: HSA	Total Depth: 25'
		Equipment/Rig Type: Mobile B57	Well Completed: Y or N

BORING ID: MW-124 **Location:** 1201 COOK AVENUE, BILLINGS, MT

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-1'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	FILL	0	
1-5'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SM	0	
5-6'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	~~GR~~ GM	0	
6-9'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SM	0	
9-14'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SC	0	
14'-~~18'~~ 20	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SC	0	Wet @ 18' bgs
20-25'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	~~GR~~ GM	0	

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of ____ Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 4-16-18	
Client:	Montana DEQ	Time Started: 1142	Time Completed: ~~1142~~ 1408
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: Y or N
Weather:	warm 40's sunny	Operator: Duane Leavy	Diameter: 8 1/4" ID / 12" OD
Logged by:	C. VanHeuvelen	Crew: Jose Pereda	Groundwater Depth:
Logger's Signature:		Drill Method: HSA	Total Depth: 27.5' conductor
		Equipment/Rig Type: Mobile B-57	Well Completed: Y or N

BORING ID: MW-126 **Location:** 711 Central

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.	blowcount/ft.
0-1'	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	fill		9, 14, 14, 16	drlg-clr asphalt 2' bgs
1-3.5'	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 5/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0		
3.5-5'	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 5/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	ML	0		
5-7	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	4, 6, 6, 8, 10	
7-10	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0		
10-11	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	7, 6, 9, 12	
11-14	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 5/2	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0		

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 2 of 7 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 4-16-18	
Client:	Montana DEQ	Time Started: 1147	Time Completed: 1408
Project Location:	Billings, Montana	Drilling Contractor: TME	Backfilled: Y or N
Weather:	warm, 60's+, sunny, v. lt. breeze	Operator: Duane Leamy	Diameter: 8¼ID/12"OD
Logged by:	C. Vanthoenacker	Crew: Jose Pereda	Groundwater Depth:
Logger's Signature:		Drill Method: HSA	Total Depth: 27.5' conductor
		Equipment/Rig Type: Mobile B-57	Well Completed: Y or N

BORING ID: MW-126 **Location:** 711 Central

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.	blowcounts/ft
14-15	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay,	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0		
15-15.5	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 3/2	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay,	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0		4, 6, 12, 36, 33
15.5-19	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	2.5 YR 4/4	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay,	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SW	0		
19-20	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay,	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GM	0	-drlr stated sand flowing into augers	
20-23	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay,	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SW	0	caving?/flowing?	
23-25	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay,	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GM	0		
	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay,	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			RDP Δ @ ~25.5' top bedrx. conductor td = 27.5 1408, set 6" conductor	

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 3 of ____ Sheets

SOIL BORING LOG

Project Name: Billings PCE	Date: 4-20-18	
Client: MDEQ	Time Started: 1101	Time Completed: 1237
Project Location: Billings MT	Drilling Contractor: IME	Backfilled: Y or N
Weather: warm, 80's-90's sunny	Operator: Duane Leary	Diameter: 2" core
Logged by: C. Van Heuvelen	Crew: Jose Reveda	Groundwater Depth:
Logger's Signature:	Drill Method: HSA - core	Total Depth:
	Equipment/Rig Type: Mobile B-57	Well Completed: Y or N

BORING ID: MW-126 (core) **Location:** 711 Central

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
24.5-25	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SHALE -		st. core run #1 @ 1101 ~24.5' bgs v. hard, unweathered
25-30	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	slt - hard, fractured, unwx.,		~28' bgs, soft 6" & 2nd MW began to flow note: core is jumbled - broken pcs
30-35	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	slt -		v. little recovery, softer darker color, td=35', 1237
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			note: no flow @ 2nd wells on core run #3, 30-35
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None No Slight Modera Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	Non S Mo S Note			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	Non S Mo Strong Notes:			

Johnson SCREENS
TYPE 304
STAINLESS STEEL

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 4-17-18 + 4/24/18	
Client:	Montana DEQ	Time Started: 0852 0945	Time Completed: ~~1408~~
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: Y or (N)
Weather:	43°F, dry (rain last night) 43°F Sunny (rain/snow 4/23)	Operator: Duane Leary	Diameter: 8 1/4" x 12"
Logged by:	C. Vanderpreegen Vicki Bierwirth	Crew: Jose Pereda	Groundwater Depth:
Logger's Signature:	Vicki Bierwirth	Drill Method: HSA	Total Depth: ~~27.5' conductor~~
		Equipment/Rig Type: mobile B-57	Well Completed: (Y) or N

BORING ID: MW-127 **Location:** BSL

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
9"-5'	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red Brown, Gray Green, Rust Yellow, Other, %	____YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay, ____	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GM		17, 62, 46, 50	dvl ~4" to clr asphalt
5-10	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red Brown, Gray Green, Rust Yellow, Other, %	____YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay, ____	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GM		10, 60, 101, 59, 42	
10-15	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red Brown, Gray Green, Rust Yellow, Other, %	____YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay, ____	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SW		19, 23, 13, 8, 8	wet @ 15, sand content incr. @ 12'
15-20	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red Brown, Gray Green, Rust Yellow, Other, %	____YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay, ____	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GM			~~Resp~~ water @ 15' bgs sand flow @ ~18-19'
20-25	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red Brown, Gray Green, Rust Yellow, Other, %	____YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay, ____	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:				no sample, sand/gravel return @ sort, flowing sand in augers
25-30	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red Brown, Gray Green, Rust Yellow, Other, %	____YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay, ____	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:				4/18/18 1135 td = 30.4' set 6" conductor ~28.3' bedrock
30-35	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red Brown, Gray Green, Rust Yellow, Other, %	____YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay, ____	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:				no recovery

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 2 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: ~~4/17/18~~ 4/24/18	
Client:	Montana DEQ	Time Started: ~~0852~~ 0945	Time Completed:
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: Y or N
Weather:	~~40's overcast~~ 43°F Sunny	Operator: Duane Leavy	Diameter: 8 1/4" x 12"
Logged by:	C. Vanderveldt / V. Bierworth	Crew: Jose Rivera	Groundwater Depth:
Logger's Signature:	V. Bierworth	Drill Method: HSA	Total Depth: 45
		Equipment/Rig Type: mobile B-57	Well Completed: Y or N

BORING ID: MW-127 **Location:** BSL

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
~~35~~ ~~40~~ 35	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	Ø	poor recovery. ~1ft.
40	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SHALE	Ø	highly fractured - many broken pieces, poor recovery ~1ft. dry.
40-45	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SHALE	Ø	high fractured - some ~10% of pieces v. competent. dry. poor recovery ~2ft.
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 9/27/18	
Client:	Montana DEQ	Time Started: 0820	Time Completed: 1030
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: Y or N
Weather:	60 SUNNY	Operator: Duane Leary	Diameter: 2" well, 6" auger
Logged by:	VICKI BIERWIRTH	Crew: Jose Peredo	Groundwater Depth:
Logger's Signature:	Vicki Bierwirth	Drill Method: HSA	Total Depth: 24'
		Equipment/Rig Type: Mobile B57	Well Completed: Y or N

BORING ID: MW-128 **Location:** 909 COOK AVENUE, BILLINGS, MT

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-1'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	FILL	0	
1-5'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	ML	0	
5-10'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	ML	0	
10-14'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SC	0	
14-18'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SM	0	
18-20'	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	~~GR~~ GM	0	
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 5-16-18	
Client:	Montana DEQ	Time Started: 1415	Time Completed: 1800
Project Location:	Billings, Montana	Drilling Contractor: 2-M-E	Backfilled: Y or N
Weather:	Sunny 90°	Operator: Bose	Diameter: 6" Auger 2" well
Logged by:	Devon Forrest	Crew: Augers	Groundwater Depth: 15.5
Logger's Signature:	[signature]	Drill Method: HSA	Total Depth: 27
		Equipment/Rig Type: Mobile B57	Well Completed: Y or N

BORING ID: MW-129 **Location:** Behind H2, near RR Tracks

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-2	Black, Gray, Brn, Red, Other (L M D)	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL, Sand (F M C), Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL, Sand (F M C), Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	Fill	31	Uncontrolled Fill w/ building debris (brick)
2-4	Black, Gray, Brn, Red, Other (L M D)	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL, Sand (F M C), Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL, Sand (F M C), Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SC	8	
4-6	Black, Gray, Brn, Red, Other (L M D)	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL, Sand (F M C), Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL, Sand (F M C), Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	
6.5-10.5	Black, Gray, Brn, Red, Other (L M D)	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL, Sand (F M C), Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL, Sand (F M C), Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL w/ Sand	0	
10.5-13.5	Black, Gray, Brn, Red, Other (L M D)	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL, Sand (F M C), Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL, Sand (F M C), Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	
13.5-15.5	Black, Gray, Brn, Red, Other (L M D)	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL, Sand (F M C), Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL, Sand (F M C), Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GM	0	Silty gravel w/ Sand; Large Cobble @ 15.5'
15.5-26	Black, Gray, Brn, Red, Other (L M D)	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL, Sand (F M C), Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL, Sand (F M C), Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GM	0; 982 @ 21' bgs	Only 1' Sampled, 24/7 BHF; Sand Heave @ 20' bgs; Hydrocarbon Odor @ 21' bgs.

BCs
0-5: 2, 3, 10, 14, 1'
5-10: 3, 5, 10, 14, 21
10-15: 7, 7, 9, 13, 5
15-20: 24H
20-25: 29, 56, 57, 100, 100

Samples Collected: Yes/No Sample IDs: Aliquot from MW-HW5 (2) 40z jars from MW-129 0' - 25'

MiHPT Log Yes/No

Number/Size of Containers:
Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)
Duplicate Collected:
Notes:

Background PID: 0-20 ppb

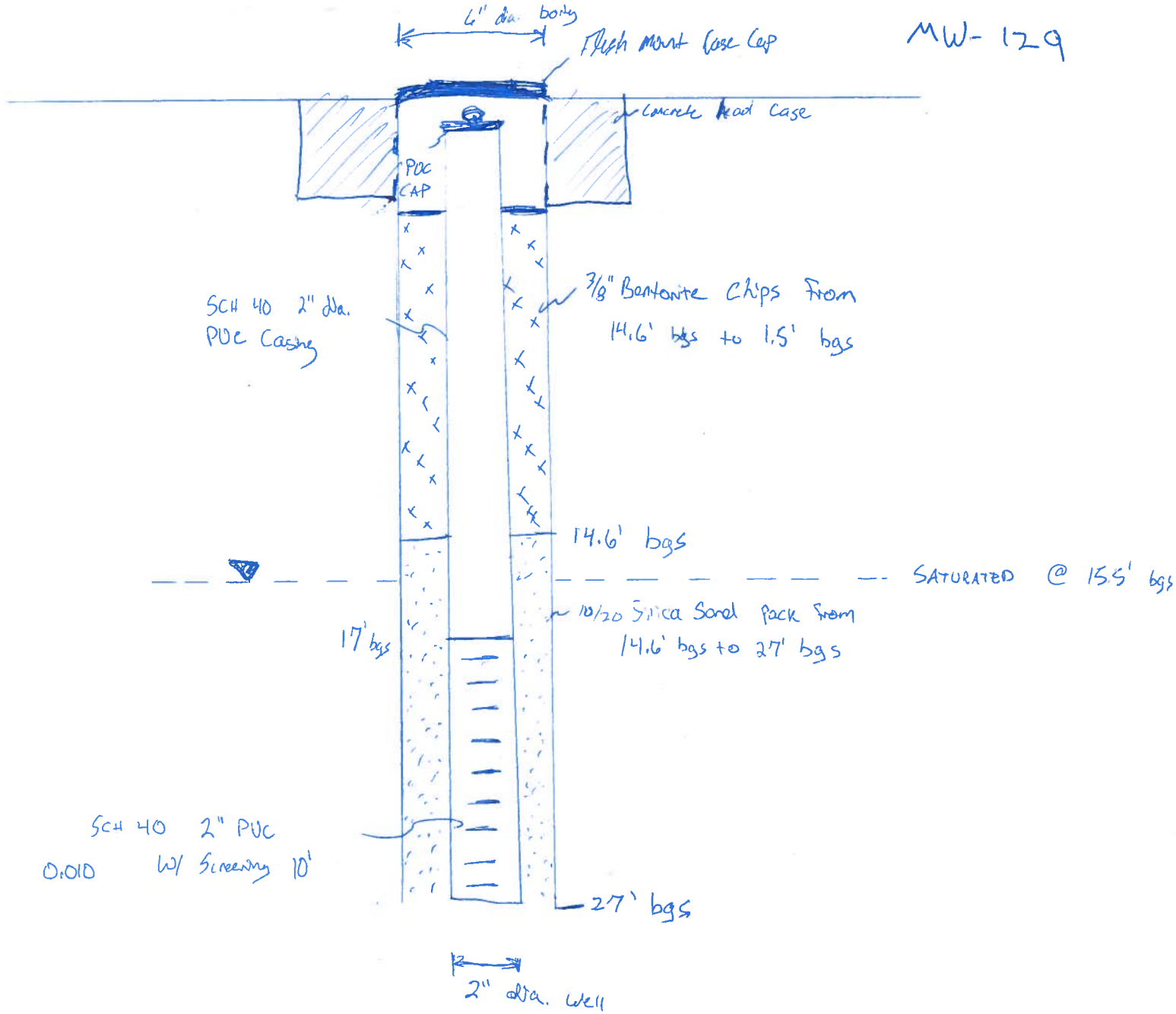
Hole redrilled after getting stuck @ end. Well set to 27' bgs.

Well drawing on BACK →

5-16-18

Drew Forrest

MW-129



NOT TO SCALE

TRIHYDRO CORPORATION

Sheet 1 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 5/14/18	
Client:	Montana DEQ	Time Started: 13:45	Time Completed:
Project Location:	Billings, Montana	Drilling Contractor: Inburg Weller	Backfilled: Y or N
Weather:	Warm, Sunny	Operator: Jose Perez	Diameter: 6" Auger 2" PVC Well
Logged by:	S. SEITZ	Crew: Austin	Groundwater Depth:
Logger's Signature:	S. Seitz	Drill Method: HSA	Total Depth:
		Equipment/Rig Type: Mobile B57	Well Completed: Y or N

BORING ID: MW-130

Location: 250 Daniels - East of former Sysco transportation building

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-1	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other 10% Black, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay, asphalt gravel	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CH	44 PID*	Blow cnts 3, 5, 3, 12 0-5 ft. PID @ 44 ppb
1-5	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	—		no recovery Rock in tube
5-6	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:		4 ppb	2/3/2/2 Blow cnts 5-10 BC
6-10	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:		4-14 ppb	Poorly sorted sand - only fine grain
10-12	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, % 25 Black	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:		8 ppb	2/2/6/10 10-15 BC 40% Gravel * well sorted sand w/ trace gravel
12-13	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:		12 ppb	Silt saturated for 6"
13-15	Black, Gray-L M D, Brn-L M D, Red-L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL-F M C, Sand-F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:		18 ppb	Silty clay

* Ambient air PID = 0.0-0.7 ppm

* likely compress soft soil

Samples Collected: Yes/No

MiHPT Log Yes/No

Sample IDs:

No samples

Number/Size of Containers: NA

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes: No samples

TRIHYDRO CORPORATION

Sheet 2 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 5/14/18	
Client:	Montana DEQ	Time Started:	Time Completed:
Project Location:	Billings, Montana	Drilling Contractor: Inberg Miller	Backfilled: Y or N
Weather:	70°F Warm, Sunny	Operator: Jose Peroda	Diameter: 4" Auger 2" well PVC
Logged by:	S. SE 172	Crew: Austin	Groundwater Depth: 15-22 saturated
Logger's Signature:		Drill Method: HSA	Total Depth: 25'
		Equipment/Rig Type: Mobile B57	Well Completed: Y or N

BORING ID: MW-130

Location: 250 Daniels St. - Billings Row west side near former SYSCO trucking

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
15-19	Black, Gray, Brn, Red, Other (L M D)	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL, Sand (F M C), Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL, Sand (F M C), Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated (16' bgs)	None Noted, Slight, Moderate, Strong, Notes:		101 ppb	BC 15-20 3/5/14/17 — Saturated @ ≅ 16' bgs wet again after; Fine sand w/trace silt
18-19	Black, Gray, Brn, Red, Other (L M D)	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL, Sand (F M C), Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL, Sand (F M C), Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated (8'bgs)	None Noted, Slight, Moderate, Strong, Notes:		10 ppb	Sand as; grades to silt and silt w/trace clay
19-22.5	Black, Gray, Brn, Red, Other (L M D)	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0 ppb	above BC; to clay
22.5-23	Black, Gray, Brn, Red, Other (L M D)	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated (8')	None Noted, Slight, Moderate, Strong, Notes:		14 ppb	BC 20-25 10/14 — wet to saturated @ 22.5' bgs
23-24	Black, Gray, Brn, Red, Other (L M D)	Red, Brown, Gray, Green, Rust, Yellow, Other 20% Black, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:		92 ppb	24/48/74 — Fine to med sand saturated
24-25	Black, Gray, Brn, Red, Other (L M D)	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GW	40 ppb	Gravel saturated
	Black, Gray, Brn, Red, Other (L M D)	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs: NO samples

Number/Size of Containers: NA

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes: NO samples

(Not to scale)

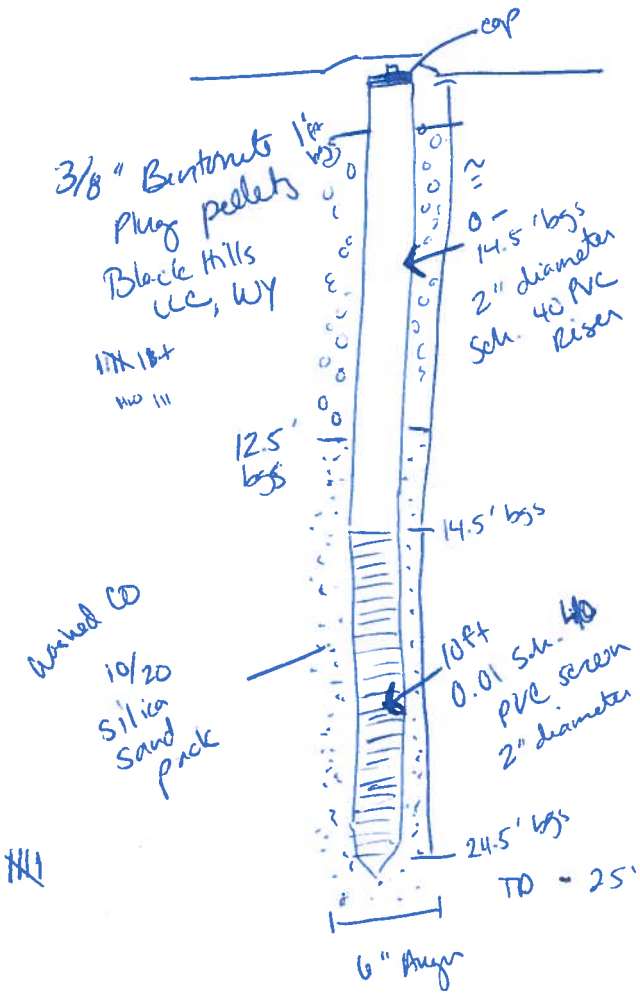
5/14/18

SJS

MW-130 Well Construction

Well Construction 5/14

15:30 -



TD - 25' bgs - slump to ≅ 24.5' bgs

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 5/15/18	
Client:	Montana DEQ	Time Started: 1130	Time Completed: 1330
Project Location:	Billings, Montana	Drilling Contractor: INBERG-MILLER	Backfilled: Y or (N)
Weather:	Warm, Sunny ≅ 70°F	Operator: JOSE PERREIRA	Diameter: 6" Auger, 2" well
Logged by:	S. SEITZ	Crew: AUSTIN	Groundwater Depth: 12
Logger's Signature:		Drill Method: HSA	Total Depth: 22
		Equipment/Rig Type: MOBILE B57	Well Completed: (Y) or N

BORING ID: MW-132

Location: West of 2424 Minnesota Ave., In west side of S 25th St.

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-1	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, asphalt	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	asphalt slight	48 ppb	16 BC 10 0-5 12 5-10 15 14
1-3	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	13 ppb	
3-8	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:		0-13 ppb	Clayey Silt w/ a little fine sand
8-12	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:		0 ppb	5/10/39/73/85 BC 5-10
12-22	Black, Gray - L M D, Brn - L M D, Red - L M D, Other → various	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			43/47/52/61/71 BC 10-15 Saturated @ 12' bgs Same as 8-12, but
very little recovery 15-20	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			49/57/61/124/117 BC 15-20 V. little recovery @ 15-22
	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			Same as above

*Ambient PID between 0-5 ppb observed

Samples Collected: Yes/No (No) MiHPT Log Yes/No

Sample IDs: N/A

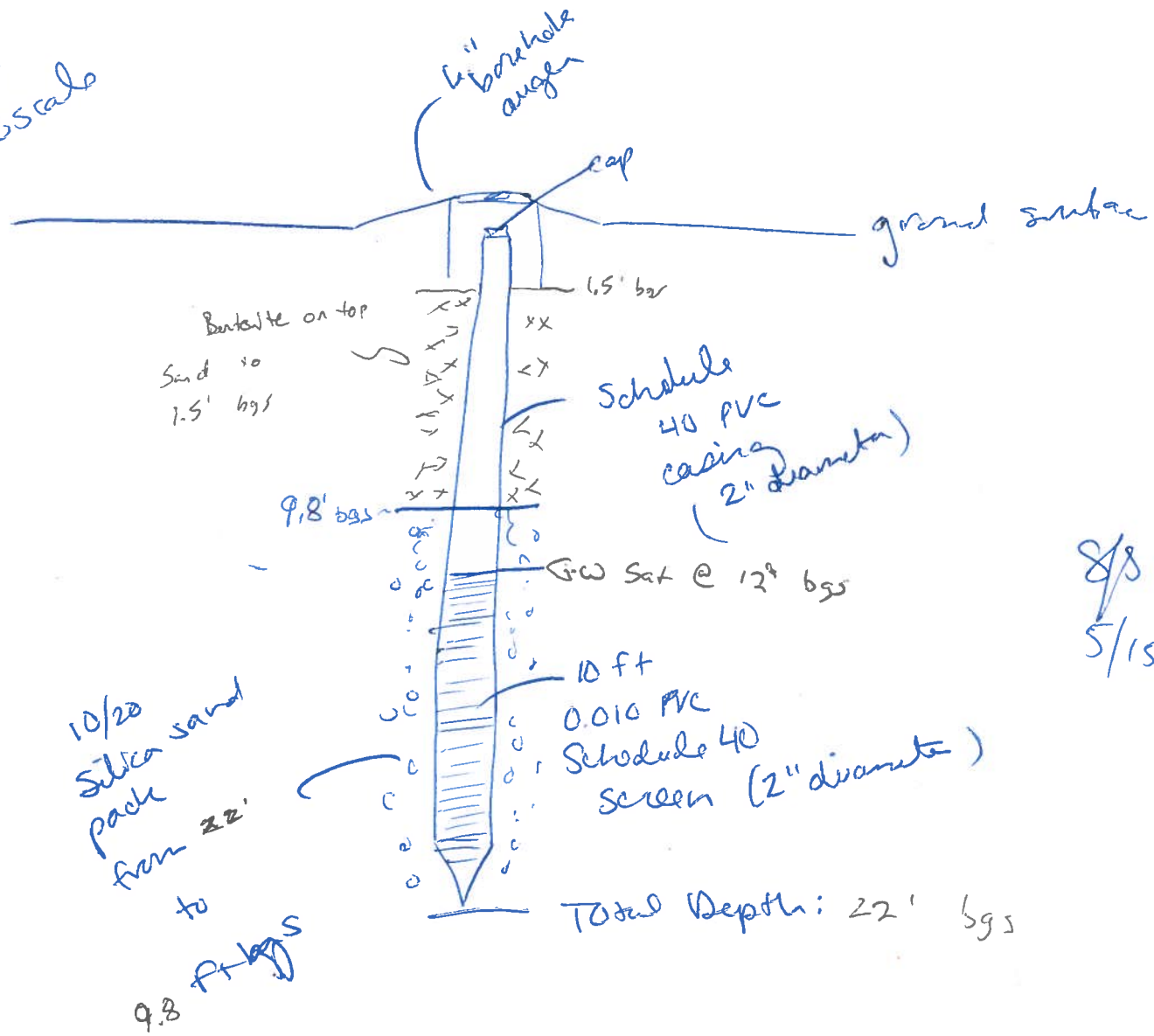
Number/Size of Containers: 0

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

Not to scale



8/8
5/15/18

TRIHYDRO CORPORATION

Sheet 1 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 5/15/10	
Client:	Montana DEQ	Time Started: 0800	Time Completed:
Project Location:	Billings, Montana	Drilling Contractor: INBERG MILLER	Backfilled: Y or N
Weather:	Warm, slight wind ≈ 40°F	Operator: JOE PEREDA	Diameter: 6" AUGER 2" WELL
Logged by:	S. SEITZ	Crew: AUSTIN	Groundwater Depth:
Logger's Signature:	S Seitz	Drill Method: HSA	Total Depth: 22' bgs
		Equipment/Rig Type: MOBILE B57	Well Completed: Y or N

BORING ID: MW-133

Location: North of 2424 Minnesota Ave just east of 1st driveway

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-0.5	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, asphalt	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	Slaft	* 8 ppb	BC 4/6/11
0.5-5	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, % 15% white	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	8-17 ppb	5/13/10
5-7 sand asphalt	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:		8 ppb	6/13/10 BC
7-7.5	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:		14 ppb	6/14/10
7.5-8.0	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:		8 ppb	
8.0-9.0	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other various gray colored, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:		8 ppb	well sorted med-coarse sand
9.0-10.5	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	YR /	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GM	8 ppb	

* Ambient ppb = B3-20 ppb

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers: 1x3 see next page

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

MW-133 well construction on back

TRIHYDRO CORPORATION

Sheet 2 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date:	
Client:	Montana DEQ	Time Started:	Time Completed:
Project Location:	Billings, Montana	Drilling Contractor:	Backfilled: Y or N
Weather:		Operator:	Diameter:
Logged by:	S. SEITZ	Crew:	Groundwater Depth:
Logger's Signature:	SS	Drill Method:	Total Depth:
		Equipment/Rig Type:	Well Completed: Y or N

BORING ID: MW-133

Location:

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
11.5-16.5	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other % varied rock gravel	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:		0ppb	BC 51 44 45 49/33	large grained (rounded gravel sandy gravel w/ fine to coarse gravels
16.5-22	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:		0-20 ppb	24/41 29 43/104	Fine to med sand w/some rounded gravels
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs: 20180515 - MW133 (11.5-12.0)

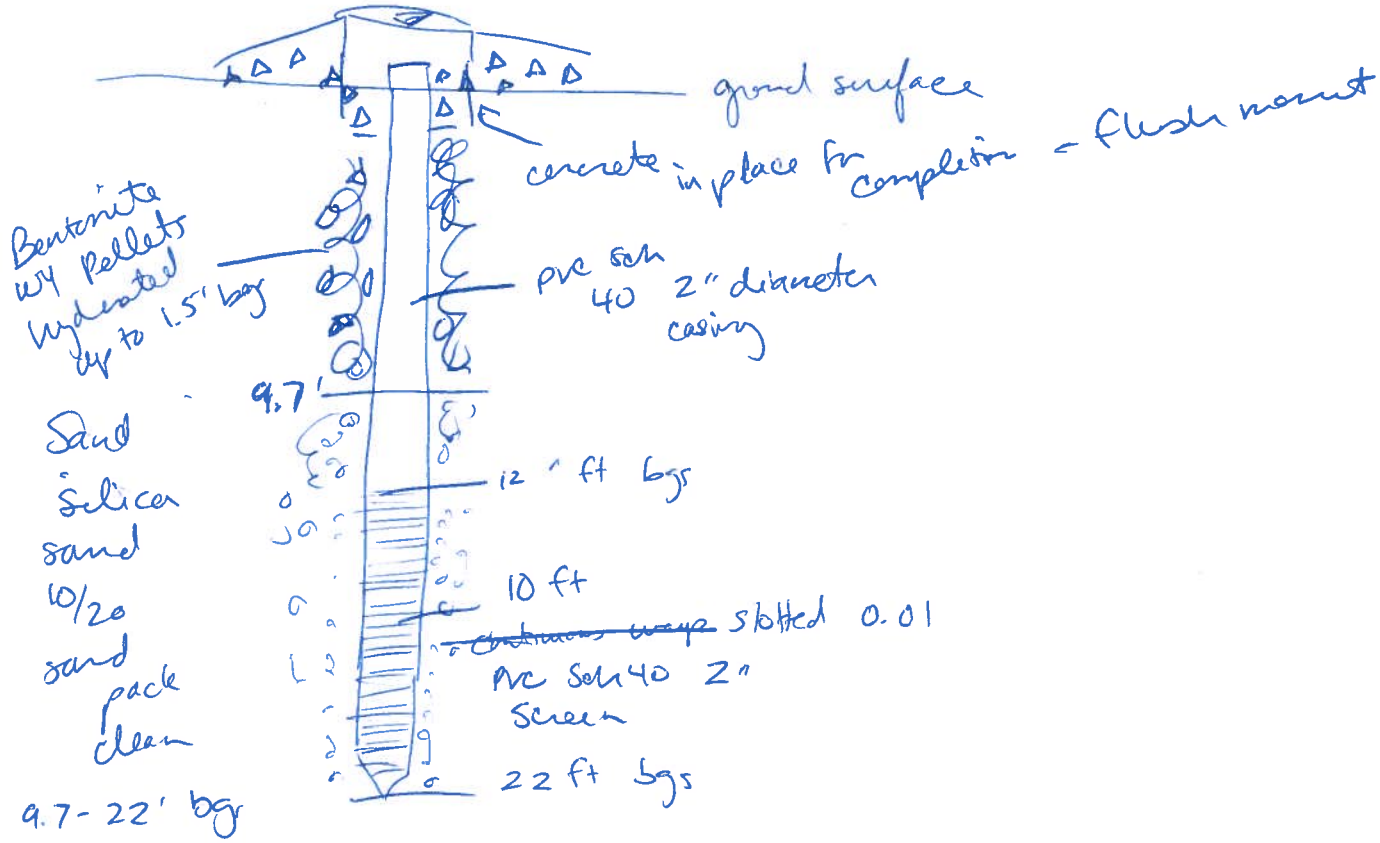
Number/Size of Containers: 1 2oz jar - no headspace

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected: NO

Notes: Smear zone sample @ MW133 (collected 11.5-12.0' bgs) SS

Well Construction MW-133



TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 5-16-18	
Client:	Montana DEQ	Time Started: 0800	Time Completed: 1330
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: Y or N
Weather:	Sunny ~ 80° flash	Operator: Jose	Diameter: 6" Auger, 2" Well
Logged by:	Dawn Forrest	Crew: Austin	Groundwater Depth: 10'
Logger's Signature:		Drill Method: HSA	Total Depth: 20'
		Equipment/Rig Type: Mobe B57	Well Completed: Y or N

BORING ID: MW-134 **Location:** N of 1st Ave on 24th St

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0 0-1.5	Black, Gray, L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	Fill	4	0-.3 Asph; Fill
1.5	Black, Gray - L M D, Brn, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SC	8	
8-10	Black, Gray - M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GM	17	Sat @ 10' bgs; ~~Large Cobble @ 13.5'~~
10-20	Black, Gray, L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GM	0	Large Cobble @ 13.5'
	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			EOB @ 20' BGS
	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			
	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			

BC
0-5 19 13 13
5-10 34 59 6
10-13 54 74 83 40 72
13-20

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs: Aliquot Samples will be taken of all cuttings MW-134 ⇒ (7) 4 oz Soil Jars 0'-20'

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

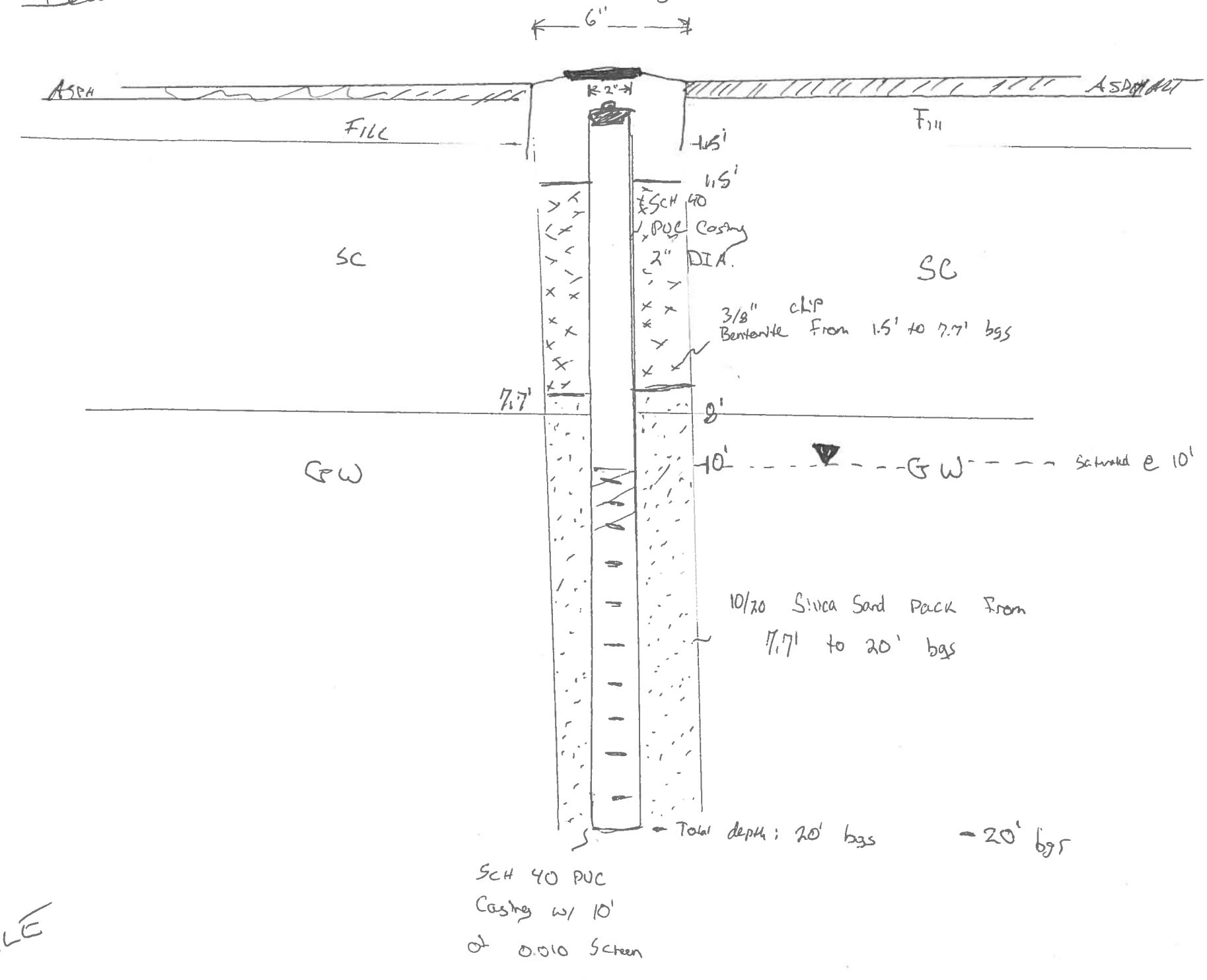
Duplicate Collected:

Notes: Background PID 4-30 ppb

Well diagram on back →

Eg 16' 10
Devon Forrest

MW-134



NOT TO SCALE

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 5-17-18	
Client:	Montana DEQ	Time Started: 0830	Time Completed:
Project Location:	Billings, Montana	Drilling Contractor: IME	Backfilled: (Y) or N
Weather:	70° Sunny	Operator: JOSE	Diameter: 2" well, 6" Auger
Logged by:	DEVON FORREST	Crew: Austin	Groundwater Depth: 16'
Logger's Signature:		Drill Method: HSA - Hydro Vac	Total Depth: 27'
		Equipment/Rig Type: Mobile B57	Well Completed: (Y) or N

BORING ID: MW-135 **Location:** Behind Goulion grain - near RR tracks

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-1.5	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	____YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ____	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	FILL	NT	Hydro Vac - Visual insp. of ~~Bonny~~ side wall
1.5-11.5	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	____YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ____	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	NT 0	Hydrovac to 8' Sample starting @ 9'
11.5-16	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	____YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ____	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GM	0	SAT @ ~16'
16-27	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	____YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ____	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GM	0	Dense material @ 26' bgs.
	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	____YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ____	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			
	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	____YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ____	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			
	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	____YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ____	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			

9-14: 39, 22, 28, 33

14-19: 24, 22, 40, 52, 3

19-24: 15, 41, 73, 74, 10

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs: Allowed of Multiple wells

MW-135 has (2) 4 oz soil jars from 9'-27'

Number/Size of Containers: No Water Samples initially

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

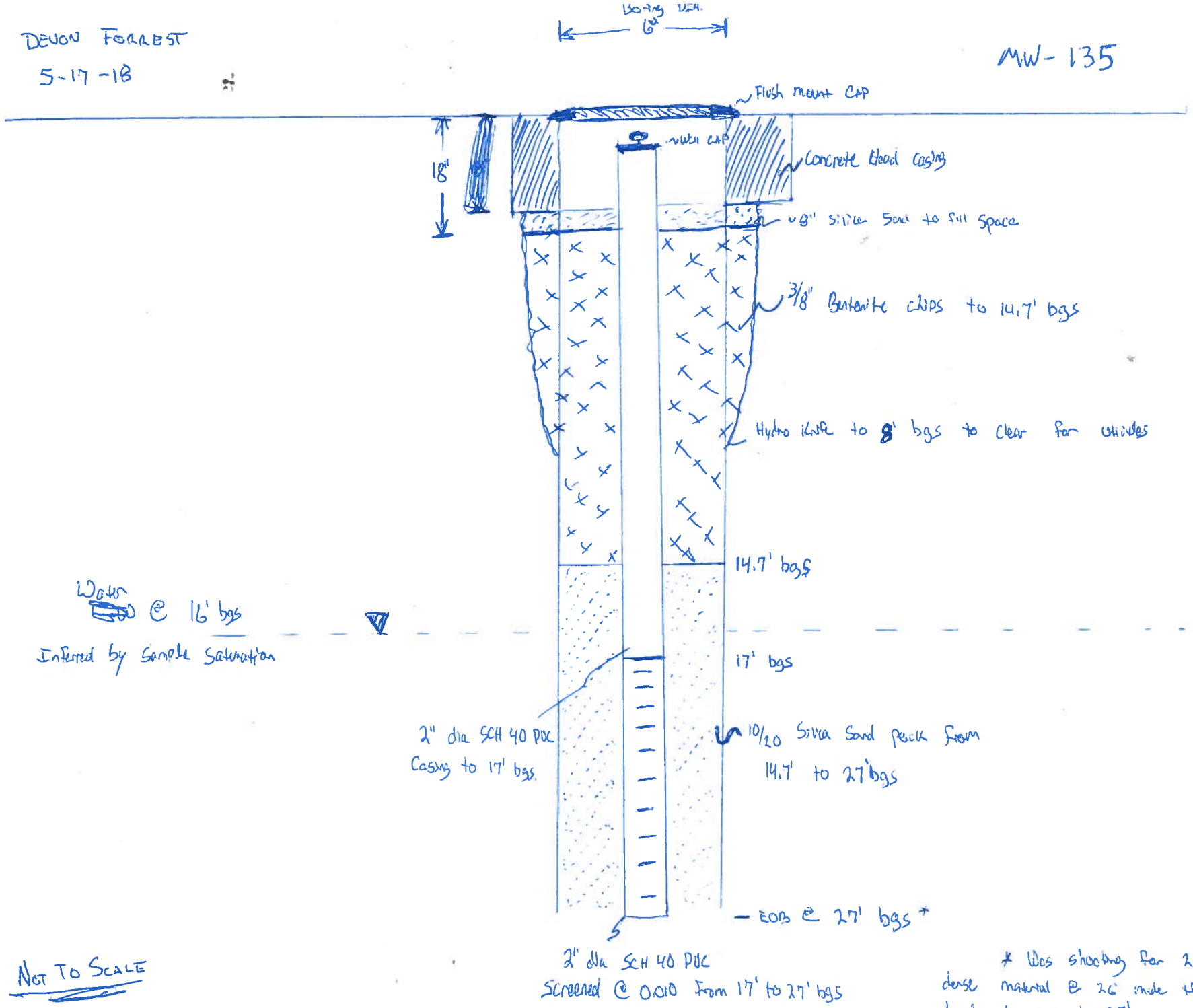
Hydro Vac to 8' bgs to clear for Utilities

Well drilling on back →

DEVON FORREST

5-17-18

MW-135



NOT TO SCALE

* Was shooting for 26', but dense material @ 26' made the driller (Jos decide to go to 27'

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 3-28-18	
Client:	Montana DEQ	Time Started: 0820	Time Completed: 0900
Project Location:	Billings, Montana	Drilling Contractor: Earth Probe	Backfilled (Y) or N
Weather:	47°F, Cloudy w/rain	Operator: Mark Taggart	Diameter: 2"
Logged by:	W. Coles	Crew: Kenny Larson	Groundwater Depth: 16'
Logger's Signature:		Drill Method: DPT	Total Depth: 20'
		Equipment/Rig Type: Geoprobe	Well Completed: Y or (N)

BORING ID: REX-MIP-03 **Location:** 19 S. Broadway

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-0.25	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			Asphalt
0.25-1	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			PID @ 398 ppm Black stained
1-7	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			PID @ 3' 97 ppm @ 5' 771 ppb
7-14	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			PID @ 14' 876 ppb dry to moist
14-20	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			Black staining @ 15'
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: (Yes/No) MiHPT Log Yes/(No)

Sample IDs: REX-MIP-03

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 3-28-18	
Client:	Montana DEQ	Time Started: 0930	Time Completed: 0950
Project Location:	Billings, Montana	Drilling Contractor: Earth Probe	Backfilled: Y or N
Weather:		Operator: Mark Taggart	Diameter: 2"
Logged by:	W. Coles	Crew: Kenny Larson	Groundwater Depth:
Logger's Signature:		Drill Method: DPT	Total Depth: 15
		Equipment/Rig Type: Geo Probe	Well Completed: Y or N

BORING ID: REX-MIP-04 **Location:** 19 S. Broadway

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-0.25	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			Asphalt
.25-3	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			PID @ 4842 ppb
3-9	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			Dry-Moist
9-10	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			PID @ 4877 ppb
10-15	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			PID @ 617 ppb
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date:	3-28-18		
Client:	Montana DEQ	Time Started:	0905	Time Completed:	0915
Project Location:	Billings, Montana	Drilling Contractor:	Earth Probe	Backfilled (Y or N):	Y
Weather:	37° Cloudy Rain	Operator:	Mark Taggart	Diameter:	2"
Logged by:	W. Coles	Crew:	Kenny Letson	Groundwater Depth:	ND
Logger's Signature:		Drill Method:	DPT	Total Depth:	5'
		Equipment/Rig Type:	Geoprobe	Well Completed:	Y or N

BORING ID: REX-MIP-07 **Location:** 19 S. Broadway

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-.25	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red Brown / Gray Green / Rust Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ___	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:			Asphalt
.25-5	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red Brown / Gray Green / Rust Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ___	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:			Black staining .25-1' PID @ 1' 172ppm, 4' 87ppm
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red Brown / Gray Green / Rust Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ___	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:			
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red Brown / Gray Green / Rust Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ___	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:			
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red Brown / Gray Green / Rust Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ___	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:			
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red Brown / Gray Green / Rust Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ___	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:			
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other ___	Red Brown / Gray Green / Rust Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ___	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:			
	Black / Gray - L M D / Brn - L M D / Red - L M D / Other	Red Brown / Gray Green / Rust Yellow / Other / %	___YR ___/___	Cobbly / Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay / ___	Trace (1-10%) / Little (10-20%) / Some (20-30%) / And (30-50%)	Grvlly / Sandy / Silty / Clayey	GVL - F M C / Sand - F M C / Silt / Clay	Very Soft / Soft / Med / Stiff / Very Stiff / Hard	Very Loose / Loose / M. Dense / Dense / Very Dense / Ext. Dense	Low (0-20 lqd) / Med (30-50 lqd) / High (>50 lqd)	Dry / Moist / Wet / Saturated	None Noted / Slight / Moderate / Strong / Notes:			

Samples Collected: Yes/No (Yes) MiHPT Log Yes/No (No)

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 3-28-18	
Client:	Montana DEQ	Time Started: 0955	Time Completed: 1116
Project Location:	Billings, Montana	Drilling Contractor: Earth Probe	Backfilled (Y) or N
Weather:	Cloudy 42°F, Rain	Operator: Mark Taygart	Diameter: 2"
Logged by:	W. Coles	Crew: Kenny Fetsom	Groundwater Depth: 16'
Logger's Signature:		Drill Method: DPT	Total Depth: 25
		Equipment/Rig Type: Geo Probe	Well Completed: Y or (N)

BORING ID: REX-MIP-08 **Location:** ~~7th St~~ 19 S. Broadway

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-.25	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			Asphalt
.25-1.25	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			Dry to wet
1.25-13.5	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			Wet Layer @ 9'
13.5-25	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			Strong HC odor
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: (Yes)/No MiHPT Log Yes/(No)

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 12/21/17	
Client:	Montana DEQ	Time Started: 0825	Time Completed: 1532
Project Location:	Billings, Montana	Drilling Contractor: Dakota Tech	Backfilled: Y or N
Weather:	Clear, 11°F	Operator: Logan McLeod	Diameter: 1.25
Logged by:	Jacob Scott	Crew: Mike Jensen	Groundwater Depth: 16.5
Logger's Signature:	Jacob Scott	Drill Method: Direct Push	Total Depth: 25
		Equipment/Rig Type:	Well Completed: Y or N

BORING ID: REX-MIP-08

Location: REX Cleaners (Alley)

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-1	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 4/1	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:		27 ppb	(0,5)
1-7	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 6/6	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
7-7.5	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 6/4	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
7.5-9.5	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 6/6	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
9.5-12	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 4/6	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
12-13.5	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 6/4	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			13.5 hit course Gravel
-16	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	YR /	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:
REX-MIP-08 (0-0.5)
REX-MIP-08 (1-2)
REX-MIP-08 (5-5.5)
REX-MIP-08 (9.5-10)
REX-MIP-08 (12-12.5)
REX-MIP-08 ( )

Number/Size of Containers: 18 2oz, 18 4oz

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 2 of 2 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date:	
Client:	Montana DEQ	Time Started:	Time Completed:
Project Location:	Billings, Montana	Drilling Contractor:	Backfilled: Y or N
Weather:		Operator:	Diameter:
Logged by:		Crew:	Groundwater Depth:
Logger's Signature:		Drill Method:	Total Depth:
		Equipment/Rig Type:	Well Completed: Y or N

BORING ID: **Location:**

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
16-25	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 5 / 1	Cobbly Grvlly Sandy Silty Clayey	GVL F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:		170 ppm	(18.5) Saturated @ 16.5 fbg
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	_____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			*Unable to drill below 25 fbg due to equipment issues.*
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	_____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	_____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	_____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	_____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	_____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay _____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 3-27-18	
Client:	Montana DEQ	Time Started: 0821	Time Completed: 0850
Project Location:	Billings, Montana	Drilling Contractor: Earth Probe	Backfilled (Y) or N
Weather:	Partly Cloudy 40°F	Operator: Mark Taggart	Diameter: 2"
Logged by:	W. Coles	Crew: Kenny Larson	Groundwater Depth: 17'
Logger's Signature:		Drill Method: DPT	Total Depth: 20
		Equipment/Rig Type: Geoprobe	Well Completed: (Y) or N

BORING ID: WETZ-GW-01 **Location:** ROW 30th St. in front of Wetzels / 117 N 4th 30th St.

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-10	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			Not Logged, Previously drilled location
10-20	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			Wet @ 17'
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - ~~L M D~~ Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	____YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ____	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: (Yes)/No MiHPT Log Yes/No

Sample IDs: WETZ-GW-01 (10-15')
PCE Screen

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date:	
Client:	Montana DEQ	Time Started: 1547	Time Completed: 1610
Project Location:	Billings, Montana	Drilling Contractor: Dakota Tech	Backfilled: Y or N
Weather:	40's, dold, scattered clouds, light wind	Operator: Charles Gunsen	Diameter: 1.25"
Logged by:	C. VanHeusden	Crew: Gray Tangen	Groundwater Depth: –
Logger's Signature:		Drill Method: DP	Total Depth: 9
		Equipment/Rig Type: 7720	Well Completed: Y or N

BORING ID: WETZ-GW-01 **Location:** Front of Wetzel cleaners in street

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-1'	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			fill/cement/asphalt
1-5'	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/2	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	1st run 9' refusal, move over, 2nd run - refusal at 5'
5-6	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/2	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	CL	0	
6-8	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 4/3	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	SM	0	
8-9	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	10 YR 2/2	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:	GM	0	11/29/17 1610 hand auger pts due to gravel issues
	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			
	Black, Gray - L M D, Brn - L M D, Red - L M D, Other	Red, Brown, Gray, Green, Rust, Yellow, Other, %	___YR ___/___	Cobbly, Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay, ___	Trace (1-10%), Little (10-20%), Some (20-30%), And (30-50%)	Grvlly, Sandy, Silty, Clayey	GVL - F M C, Sand - F M C, Silt, Clay	Very Soft, Soft, Med, Stiff, Very Stiff, Hard	Very Loose, Loose, M. Dense, Dense, Very Dense, Ext. Dense	Low (0-20 lqd), Med (30-50 lqd), High (>50 lqd)	Dry, Moist, Wet, Saturated	None Noted, Slight, Moderate, Strong, Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 11/30/17	
Client:	Montana DEQ	Time Started: 0810	Time Completed: 0830
Project Location:	Billings, Montana	Drilling Contractor: Dakota Tech	Backfilled: Y or N
Weather:	Partly Cloudy	Operator: Chandler Berenson	Diameter: 1.25
Logged by:	Jerold Scott	Crew: Gray Tanner	Groundwater Depth: –
Logger's Signature:	Jerold Scott	Drill Method: DP	Total Depth: 10
		Equipment/Rig Type: 7720	Well Completed: Y or N

BORING ID: WETZ-GW-01 **Location:** Front of Wetzel Cleaners (in street)

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-1	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				concrete/asphalt/fill (offset)
1-5	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 4/2	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	0	
5-7	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 4/3	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	0	Clay w/ possible limestone clasts
7-9	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 4/4	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SC	0	
9-10	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 7/2	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM	0	Gravel, Refusal offset @ 0830
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 11/30/17	
Client:	Montana DEQ	Time Started: 0830	Time Completed: 0843
Project Location:	Billings, Montana	Drilling Contractor: Dakota Tech	Backfilled: Y or N
Weather:	Partly Cloudy	Operator: Charles Branson	Diameter: 1.25
Logged by:	Jacob Stoll	Crew: Greg Tangen	Groundwater Depth: –
Logger's Signature:	Jacob Stoll	Drill Method: DP	Total Depth: 11.5
		Equipment/Rig Type: 7720	Well Completed: Y or N

BORING ID: WET2-GW-01 **Location:** Front of Wetzel Cleaners (in street)

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-1	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				(offset) Concrete/Asphalt
1-5	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 4/3	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	0		
5-7	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 4/3	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CL	0		
7-8	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 4/4	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	SM	0		
8-10	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 6/2	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GM	0		@ 0843 offset due to refusal at 11.5 bgs
10-11	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 7/2	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GC	0		
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:				

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 2-27-18	
Client:	Montana DEQ	Time Started: 0645	Time Completed: 0775
Project Location:	Billings, Montana	Drilling Contractor: Earth Probe	Backfilled: Y or N
Weather:	Partly Cloudy 33°F	Operator: Mark Inggert	Diameter: 2"
Logged by:	W. Coles	Crew: Kenny Hixson	Groundwater Depth: 16'
Logger's Signature:		Drill Method: DPT	Total Depth: 20'
		Equipment/Rig Type: Geoprobe	Well Completed: Y or N

BORING ID: WETZ-GW-02 **Location:** Alley behind Wetzels / 117 N 30th ST.

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-10	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			Not Logged, previous drilled location
10-20	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			Wet @16'BGS Hydrocarbon + Solvent odor
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: ~~Yes/No~~ Yes MiHPT Log Yes/No

Sample IDs: ~~MW-101 (10-14')~~

MW-101 (10-15')

PCE Screen

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes:

TRIHYDRO CORPORATION

Sheet 1 of 1 Sheets

SOIL BORING LOG

Project Name:	Billings PCE Groundwater Facility Remedial Investigation	Date: 11/30/17	
Client:	Montana DEQ	Time Started: ~~1118~~ 1113	Time Completed: 1117
Project Location:	Billings, Montana	Drilling Contractor: Dakota Tech	Backfilled: Y or N
Weather:	Partly Cloudy	Operator: Charles Brenson	Diameter: 1.25
Logged by:	Jacob Scott	Crew: Oray Jensen	Groundwater Depth: –
Logger's Signature:	Jacob Scott	Drill Method: DP	Total Depth: 9
		Equipment/Rig Type: 7720	Well Completed: Y or N

BORING ID: WETZ-GW-02 **Location:** Alley behind Wentz Cleaners

Interval (ft bgs)	Color Major	Color Minor	Munsell Color	Primary Adjective	Primary Noun	Modifier	Secondary Adjective	Secondary Noun	Consistency - Cohesive	Consistency - Non-cohesive	Plasticity	Moisture	Odor	USCS	PID (ppb)	Notes: Additional info, sample taken, odor descriptor, sheen, nodules, structure, vegetation, etc.
0-4.5	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			No Recovery
4.5-5	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 4/2	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CI	73 @	1117 hit refusal at 9 bgs
5-7.5	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR 4/2	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	CI	0	
7.5-9	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	10 YR 5/2	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:	GP	0	Very Coarse gravel
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			
	Black Gray - L M D Brn - L M D Red - L M D Other	Red Brown Gray Green Rust Yellow Other %	___YR ___/___	Cobbly Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay ___	Trace (1-10%) Little (10-20%) Some (20-30%) And (30-50%)	Grvlly Sandy Silty Clayey	GVL - F M C Sand - F M C Silt Clay	Very Soft Soft Med Stiff Very Stiff Hard	Very Loose Loose M. Dense Dense Very Dense Ext. Dense	Low (0-20 lqd) Med (30-50 lqd) High (>50 lqd)	Dry Moist Wet Saturated	None Noted Slight Moderate Strong Notes:			

Samples Collected: Yes/No MiHPT Log Yes/No

Sample IDs:

Number/Size of Containers:

Analyses to be Performed: VOC - Full Suite - SPLP VOCs - Fate&Transport Parameters (circle)

Duplicate Collected:

Notes: Headspace 4.5' bgs: 4605 ppb

APPENDIX E-4

SOIL SAMPLING FIELD FORMS

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL-MIP

Date: 11/15/2017

Sample ID: CAL-MIP-09 (5.5-6.5)

Time: 1220

Grid #: -8, -1

Sampler: SS/ST/CV/AV

Depth(s): 5.5 - 6.5 ft bgs

Associated MiHPT or DP Location: CAL-MIP-09

Lithology Log: YES / No

Field Measurements: See log

Comments: See log
Unsaturated above a perched area
Perched @ ≅ 6' bgs
fine sand

Photos: Yes w/log

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SS

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL-MIP

Date: 11/15/17

Sample ID: CAL-MIP-09 (19-19.5)

Time: 1220

Grid #: -8, -1

Sampler: SS/SV/AV/ST

Depth(s): 19-19.5 or 20 ft bgs

Associated MiHPT or DP Location: CAL-MIP-09

Lithology Log: YES / No

Field Measurements: See log (0 ppb)

Comments:
Fines @ bottom of moist clay & right @ top of moist to saturated fine sand and gravels below

Photos:

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: ~~AOI~~ CAL - MIP

Date: 11/15/2017

Sample ID: CAL-MIP-09(0-0.5)

Time: 1220

Grid #: -8,-1

Sampler: SS/ST/CV/AV

Depth(s): 0 - 0.5 ft bgs

Associated MiHPT or DP Location: CAL-MIP-09

Lithology Log: YES / No

Field Measurements: yes - see log

Comments: Lithology on separate log

Photos: yes w/log

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID:

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: D7-MIP-1

Date: 11/17/17

Sample ID: D7HRC-MIP-1

Time: 1150

Grid #: 13,8

Sampler: A. Vann, C. VanHaveken

Depth(s): 7.9'

Associated MiHPT or DP Location: MIP-1

Lithology Log: YES / No to 15' bgs

Field Measurements: see log

Comments:

Photos: yes,

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 8

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL

Date:

Sample ID: QA/QC

Time:

Grid #:

Sampler:

Depth(s):

Associated MiHPT or DP Location:

Lithology Log: YES / No

Field Measurements:

Comments:

Equipment Blank - ~~2017 1128-C~~ 2017 1128-B → Rinsate from D.P. cutting shoe
Field Blank - 2017 1128-A
Blind Dup - 2017 1128-C - CAL-MIP-04 (6-6.5) duplicate
TRIP BLANK - 2017 1128-D

Photos:

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 11

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL-MIP

Date: 11/28/17

Sample ID: CAL-MIP-2(0-0.5)

Time: 0830

Grid #: -8, -1 (8.5-9) (20-21)

Sampler: CVH, JS

Depth(s): 0-0.5

Associated MiHPT or DP Location: CAL-MIP-2

Lithology Log: YES / No

Field Measurements: See log

Comments:

Photos: 445

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 3

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL-MIP-04

Date: 11/28/17

Sample ID: CAL-MIP-04(0-0.5)

Time: 1030

Grid #: -8,-1

Sampler: CV/JS

Depth(s): 0-0.5

Associated MiHPT or DP Location: CAL-MIP-04

Lithology Log: YES / No

Field Measurements:
No PID readings other than background (i.e. associated w/ traffic, drill rig, etc). ~0 ppb

Comments:

Photos: Yes, in field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 4. Not enough recovery for 5th jar for EPH.

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL-MIP-04

Date: 11/28/17

Sample ID: CAL-MIP-04 (1-2)

Time: 1050

Grid #: -8 11

Sampler: CV/JS

Depth(s): 1-2

Associated MiHPT or DP Location: CAL-MIP-04

Lithology Log: YES / No

Field Measurements:
None Measured, PID @ background ~0 ppb

Comments:
Sample collected based off MIP

Photos: yes, field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 5

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL

Date: 11/28/17

Sample ID: CAL-MIP-04 (3-3.5)

Time: 1100

Grid #: -8,1

Sampler: CV/JS

Depth(s): 3-3.5

Associated MiHPT or DP Location: CAL-MIP-04

Lithology Log: YES / No

Field Measurements:
PID ~0ppb

Comments: /

Photos: yes, field direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 5

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL-MIP-04

Date: 11/28/17

Sample ID: CAL-MIP-04(6-6.5)

Time: 1145

Grid #: -8,1

Sampler: CV/JS

Depth(s): 6-6.5

Associated MiHPT or DP Location: CAL-MIP-04

Lithology Log: YES / No

Field Measurements:
PID only @ background ~0ppb

Comments:
-

Photos: yes, in field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: ~~5~~ 4 insufficient sample volume.

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: 20171128-C sampled @ 1200

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL

Date: 11/28/17

Sample ID: CAL-MIP-04 (23-23.5)

Time: 1210

Grid #: ~8.1

Sampler: CV/JS

Depth(s): 23-23.5

Associated MiHPT or DP Location: CAL-MIP-04

Lithology Log: YES / No

Field Measurements:
497 ppb

Comments: Poor recover @ depth. 5 pushes completed, minimal sample recovery - VPH jar has some headspace
EPH/PAH not collected.

Photos: Field Divert.

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 3

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL-MIP-04

Date: 11/28/17

Sample ID: CAL-MIP-04 (14-14.5)

Time: 1215

Grid #: -8.1

Sampler: CV/JS

Depth(s): 14-14.5

Associated MiHPT or DP Location: CAL-MIP-04

Lithology Log: YES / No

Field Measurements:
PID @ background ~0

Comments:

Photos: yes, in field diary

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 5

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL

Date: 11/28/17

Sample ID: CAL-MIP-04 (1-2) SPLP

Time: 1255

Grid #: ~8, 1

Sampler: CV/JS

Depth(s): 1-2

Associated MiHPT or DP Location: CAL-MIP-04

Lithology Log: YES / No

Field Measurements:

0 ppb

Comments:

/

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL

Date: 11/28/17

Sample ID: CAL-MIP-04 (~~SP4~~ 3-5) SPLP

Time: 1300

Grid #: ~8.1

Sampler: CV/JS

Depth(s): 3-5

Associated MiHPT or DP Location: CAL-MIP-04

Lithology Log: YES / No

Field Measurements:

0ppb

Comments:

/

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL

Date: 11/28/17

Sample ID: CAL-MIP-T03(0-0.5).

Time: 1410

Grid #: -8.1

Sampler: JS/CV

Depth(s): Surface (0.0-0.5)

Associated MiHPT or DP Location:

Lithology Log: (YES) / No

Field Measurements: 0ppb

Comments:

Photos: Field Direct

Analysis (circle): (VOCs (2 oz jar)) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/(no) Duplicate Sample ID: _____

(Surface Soil (0-2 feet bgs)) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL

Date: 11/28/17

Sample ID: CAL MIP - T03 (4.5-5)

Time: 1420

Grid #: -8.1

Sampler: JS/CV

Depth(s): 4.5 - 5

Associated MiHPT or DP Location: CAL - MIP - T03

Lithology Log: YES / No

Field Measurements: 0 ppb

Comments:

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL

Date: 11/28/17

Sample ID: MIP-T03 (3.5-4.5) SPLP

Time: 1430

Grid #: -8.1

Sampler: JS/CW

Depth(s): 3.5-4.5

Associated MiHPT or DP Location: CAL-MIP-T03

Lithology Log: (YES) / No

Field Measurements: 0 ppb

Comments:

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | (VOC SPLP Analysis (4 oz jar)) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/(no) Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or (Subsurface Soil (greater than 2 feet bgs))? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL

Date: 11/28/17

Sample ID: CAL-MIP-TO3-GRAVEL

Time: 1450

Grid #: -8 11

Sampler: CV/JJ

Depth(s): 20-25

Associated MiHPT or DP Location: CAL-MIP-TO3

Lithology Log: YES / No

Field Measurements:

0ppb.

Comments:

/

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag) | pH (2oz jar

Number of Jars: 3

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL

Date: 11/28/17

Sample ID: CAL-MIP-T03-CLY

Time: 1455

Grid #: -8, 1

Sampler: CV/JS

Depth(s): 10 - 18.5

Associated MiHPT or DP Location: CAL-MIP-T03

Lithology Log: YES / No

Field Measurements:

0ppb

Comments:

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag) pH (2 oz jar)

Number of Jars: 3

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAC

Date: 11/28/17

Sample ID: CAL-MIP-T03-SND

Time: 1500

Grid #: -8, 1

Sampler: CV/JS

Depth(s): 5-7.5

Associated MiHPT or DP Location: ~~CAL-TIP~~ CAL-MIP-T03

Lithology Log: YES / No

Field Measurements:

0

Comments:

Sand for particle size analysis collected from 15-17 ft.

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag) pH 2oz jar

Number of Jars: 3

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL

Date: 11/28/17

Sample ID: CAC-MIP-02(0-1)

Time: 1535

Grid #: -8, 1

Sampler: CV

Depth(s): 0-1

Associated MiHPT or DP Location: CAL-MIP-02

Lithology Log: YES / No

Field Measurements:

0 ppb

Comments:

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL

Date: 11/28/17

Sample ID: CAL-MIP-02(8-9)

Time: 1545

Grid #: -8, 1

Sampler: CV

Depth(s): 8-9

Associated MiHPT or DP Location: CAL-MIP-02

Lithology Log: YES / No

Field Measurements:

0 ppb

Comments:

Photos: FID

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL

Date: 11/28/17

Sample ID: CAL-MIP-02(11-12) FOC

Time: 1550

Grid #: 8,1

Sampler: CV

Depth(s): 11-12

Associated MiHPT or DP Location: CAL-MIP-02

Lithology Log: YES / (No)

Field Measurements: 0 ppb

Comments: ✓

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

(FOC (4 oz jar)) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/(no) Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: Solar

Date: 11/29/2017

Sample ID: QA/QC

Time: /

Grid #: /

Sampler: CV/JJ/ST

Depth(s): /

Associated MiHPT or DP Location: /

Lithology Log: YES / No

Field Measurements:

20171129-A	FIELD BLANK	1730	VOC, VPH/EPH, SVOC & Metals
20171129-B	EQUIPMENT BLANK	1725	"
20171129-C	TRIP BLANK	—	VOCs.

Comments:

A - 11 Jars
B - 11 Jars
C - 2 VOAs.

Photos:

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 24

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: ALSCO

Date: 11/29/17

Sample ID: ALSCO-GW-02

Time: 1000

Grid #: 2-6

Sampler: CV/JS

Depth(s): 9-10

Associated MiHPT or DP Location:

Lithology Log: YES / No

Field Measurements: 0 ppb

Comments:
interval above gravel; ALSCO split collected @ 8-9 ft bgs using Terra core. Moisture sample also collected.

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 5

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID:

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: ALSCO

Date: 11/29/17

Sample ID: ALSCO-GM-04

Time: 1335

Grid #: Z-6

Sampler: CV/JS

Depth(s): 14-15

Associated MiHPT or DP Location:

Lithology Log: YES / No

Field Measurements: 0 ppb

Comments:

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 5

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: Solar

Date: 11/30/17

Sample ID: 20171130-A

Time:

Grid #: /

Sampler:

Depth(s): /

Associated MiHPT or DP Location: /

Lithology Log: YES / No

Field Measurements: QA/QC Samples
2030 - 20171130-A - Field Blank
2045 - 20171130-B - Equipment Blank
20171130-C - Trip Blank

Comments:

Photos:

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: _____

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: ALSCO

Date: 11/30/17

Sample ID: ALSCO-GW-03

Time: 1405

Grid #:

Sampler: CVH/JS

Depth(s): 2-2.8

Associated MiHPT or DP Location:

Lithology Log: YES / No

Field Measurements:
PID hits in surface soil appear to be related to road mix used during paving repairs. No impacts observed at depth

Comments:

Photos: field direct

Analysis (circle): VOCs (2 oz jar) | ~~EPH+PAH~~ (two 4 oz jars, must collect together) | VPH (2 oz jar)
→ 4oz

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 5

Analysis notes:
During sampling wind out of SW. Strong odor noted. PID spiked to 665ppb, no traffic passing at that time.

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: Billings MT

Date: 12-1-17

Sample ID: HLS-GW-03 (7-8)

Time: 1130

Grid #: 2, -1

Sampler: CAA/DS

Depth(s): 7-8' bgs

Associated MiHPT or DP Location: HLS-GW-03

Lithology Log: YES / No

Field Measurements:
Head space - 145 ppb @ 7.5' bgs

Comments:

Photos:
field direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)
↳ 4oz

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 5

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: SOAR

Date: 12/1/17

Sample ID: QA/QC

Time:

Grid #: /

Sampler: CV/SS/ST

Depth(s): /

Associated MiHPT or DP Location: /

Lithology Log: / YES / No

Field Measurements:

20171201-A Field Blank @ 1715h
2017 1201-B Equipment Blank @ 1730h
2017 1201-C Trip Blank

Comments:

Photos:

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: _____

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: Billings MT

Date: 12/1/17

Sample ID: HLS-GW-04 (3-4)

Time: 0920

Grid #: 2, -1

Sampler: [illegible] / JS

Depth(s): 3-4' bgs

Associated MiHPT or DP Location: HLS-GW-04

Lithology Log: YES / No

Field Measurements:
Head space - 63 ppb

Comments:

Photos:
field direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)
↳ 4oz

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 15 (MS/MSD)

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: HLS-GW-04 (3-4) MS + HLS-GW-04 (3-4) MSD

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: BSL - 71st Central

Date: 12/5/17

Sample ID: BSL - MIP - 01 (0-0.5)

Time: 1000

Grid #: -1, -1

Sampler: CV

Depth(s): 0-0.5

Associated MiHPT or DP Location: BSL - MIP - 01

Lithology Log: YES / No

Field Measurements: 0ppb

Comments:

Photos: ~~Field D~~ none

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: BSL

Date: 12/3/17

Sample ID: BSL-MIP-01 (17-18)

Time: 0950

Grid #: -1, -1

Sampler: ST

Depth(s): 17-18

Associated MiHPT or DP Location: BSL-MIP-01

Lithology Log: YES / No

Field Measurements:
0 ppb

Comments:

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: BSL - ~~Bull Plus~~ 712 (central)

Date: 12/3/17

Sample ID: BSL-MIP-01 (12-13)

Time: 0940

Grid #: -1.-1

Sampler: ST

Depth(s): 12 - 13

Associated MiHPT or DP Location: BSL-MIP-01

Lithology Log: YES / No

Field Measurements: 0 ppb

Comments:

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: 20171203-A

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: BSL - MIP - 01

Date: 12/3/17

Sample ID: BSL - MIP - 01 (4-4.5)

Time: 0935

Grid #: 1,1

Sampler: ST

Depth(s): 4-4.5

Associated MiHPT or DP Location: BSL - MIP - 01

Lithology Log: YES / No

Field Measurements: 0 ppb

Comments: Silt soil, difficult to pack

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: BSL

Date: 12/4/17

Sample ID: BSL - MIP - 20 (0-0.5)

Time: 0750

Grid #: 1, 1

Sampler: CV/ST

Depth(s): 0 - 0.5

Associated MiHPT or DP Location: BSL - MIP - 20

Lithology Log: YES / No

Field Measurements: 0 ppb

Comments:

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: BSL

Date: 12/4/17

Sample ID: BSL-MIP-20 (12-13)

Time: 0805

Grid #: 1.1

Sampler: CV

Depth(s): 12-13

Associated MiHPT or DP Location: BSL-MIP 20

Lithology Log: (YES) / No

Field Measurements: 0 ppb

Comments:

Photos: FD

Analysis (circle): (VOCs (2 oz jar)) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 3

Analysis notes:

Duplicate collected? (Yes)/no Duplicate Sample ID: MS / MSD

Surface Soil (0-2 feet bgs) or (Subsurface Soil (greater than 2 feet bgs))? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: BSL

Date: 12/14/17

Sample ID: BSL-MIP-20(14-15)

Time: 0815

Grid #: 1,1

Sampler: CV

Depth(s): 14-15

Associated MiHPT or DP Location: BSL-MIP-20

Lithology Log: YES / No

Field Measurements: 167 ppm

Comments: Dark sand clay layer lens with gray stained sands above + below. Strong Odor.

Photos: F.D.

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 5

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: REX Cleaners

Date: 12/21/17

Sample ID: REX-MIP-08

Time: 0825

Grid #: ~

Sampler: JJ

Depth(s): 0-0.5

Associated MiHPT or DP Location: REX-MIP-08

Lithology Log: (YES) / No

Field Measurements: 27 ppb @ 0.5 fbg

Comments:

Photos: Field Direct

VOC's & Vph only

Analysis (circle): VOCs (2 oz jar) x2 | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 6

Analysis notes:

Duplicate collected? Yes/(no) Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: REX Cleaners

Date: 12/21/17

Sample ID: REX-MIP-08

Time: 0830

Grid #: —

Sampler: JS

Depth(s): 1-2

Associated MiHPT or DP Location: REX-MIP-08

Lithology Log: YES / No

Field Measurements:

Comments:

Photos: Field Direct

VOCs, VPH, EPH only

Analysis (circle): VOCs (2 oz jar) x2 | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 6

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: REX Cleaners

Date: 12/21/17

Sample ID: REX-MIP-08

Time: 1330

Grid #: ~

Sampler: JS

Depth(s): 5-5.5

Associated MiHPT or DP Location: REX-MIP-08

Lithology Log: YES / No

Field Measurements: N/A

Comments:

Photos: Field Direct

VOCs, VPH, SVOCs, Metals

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 6

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: REX Cleaners

Date: 12/21/17

Sample ID: REX-MIP-08

Time: 1345

Grid #: –

Sampler: JS

Depth(s): 9.5-10

Associated MiHPT or DP Location: REX-MIP-08

Lithology Log: (YES) / No

Field Measurements:

Comments:

Photos: Field Direct

VOCs, VPH, SVOCs, metals

Analysis (circle): (VOCs (2 oz jar)) | (EPH+PAH (two 4 oz jars, must collect together)) | (VPH (2 oz jar))

FOC (4 oz jar) | (SVOCs+Metals (one 4 oz jar for both)) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 6

Analysis notes:

Duplicate collected? Yes/(no) Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or (Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: REX Cleaners

Date: 12/21/17

Sample ID: REX-MIP-08

Time: 1400

Grid #: —

Sampler: JS

Depth(s): 17-17.5

Associated MiHPT or DP Location: REX-MIP

Lithology Log: (YES) / No

Field Measurements: 170 ppm @ 18.5 Fbg

Comments:

Photos: Field Direct

(VOCs, VPH, SVOC's, metals)

Analysis (circle): (VOCs (2 oz jar)) | (EPH+PAH (two 4 oz jars, must collect together)) | (VPH (2 oz jar))

FOC (4 oz jar) | (SVOCs+Metals (one 4 oz jar for both)) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 6

Analysis notes:

Duplicate collected? Yes (no) Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or (Subsurface Soil (greater than 2 feet bgs))? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: REX-Clearcrs

Date: 12/21/17

Sample ID: REX-MIP-08

Time: 1425

Grid #: ~

Sampler: JS

Depth(s): 23 - 23.5

Associated MiHPT or DP Location: REX-MIP-08

Lithology Log: (YES) / No

Field Measurements:

Comments:

Photos: Field Direct

VOCs, VPH

Analysis (circle): (VOCs (2 oz jar)) | (EPH+PAH (two 4 oz jars, must collect together)) | (VPH (2 oz jar))

FOC (4 oz jar) | (SVOCs+Metals (one 4 oz jar for both)) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 6

Analysis notes:

Duplicate collected? Yes / (no) Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or (Subsurface Soil (greater than 2 feet bgs))? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: REX – Cleaners

Date: 12/21/2017

Sample ID: 20171221-A

Time: 0800

Grid #:

Sampler: JR

Depth(s): –

Associated MiHPT or DP Location: REX-MIP-08

Lithology Log: YES / No

Field Measurements:

Comments: Field Blank

Photos:

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 11

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: REX - Cleaners

Date: 12/21/2017

Sample ID: 20171221-B

Time:

Grid #:

Sampler: JR

Depth(s):

Associated MiHPT or DP Location: REX-MIP-08

Lithology Log: YES / No

Field Measurements:

Comments: Equipment Blank - distilled water through an unused soil recovery liner.

Photos:

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 11

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL-MIP

Date: 11/15/2017

Sample ID: CAL-MIP-09 (5.5-6.5)

Time: 1220

Grid #: -8, -1

Sampler: SS/ST/CV/AV

Depth(s): 5.5 - 6.5 ft bgs

Associated MiHPT or DP Location: CAL-MIP-09

Lithology Log: YES / No

Field Measurements: See log

Comments: See log
Unsaturated above a perched area
Perched @ ≅ 6' bgs
fine sand

Photos: Yes w/log

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SS

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL-MIP

Date: 11/15/17

Sample ID: CAL-MIP-09 (19-19.5)

Time: 1220

Grid #: -8, -1

Sampler: SS/SV/AV/ST

Depth(s): 19-19.5 or 20 ft bgs

Associated MiHPT or DP Location: CAL-MIP-09

Lithology Log: YES / No

Field Measurements: See log (0 ppb)

Comments:
Fines @ bottom of moist clay & right @ top of moist to saturated fine sand and gravels below

Photos:

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: ~~AOI~~ CAL - MIP

Date: 11/15/2017

Sample ID: CAL-MIP-09(0-0.5)

Time: 1220

Grid #: -8,-1

Sampler: SS/ST/CV/AV

Depth(s): 0 - 0.5 ft bgs

Associated MiHPT or DP Location: CAL-MIP-09

Lithology Log: YES / No

Field Measurements: yes - see log

Comments: Lithology on separate log

Photos: yes w/log

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID:

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: D7-MIP-1

Date: 11/17/17

Sample ID: D7HRC-MIP-1

Time: 1150

Grid #: 13,8

Sampler: A. Vann, C. VanHaveken

Depth(s): 7.9'

Associated MiHPT or DP Location: MIP-1

Lithology Log: YES / No to 15' bgs

Field Measurements: see log

Comments:

Photos: yes,

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 8

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL

Date:

Sample ID: QA/QC

Time:

Grid #:

Sampler:

Depth(s):

Associated MiHPT or DP Location:

Lithology Log: YES / No

Field Measurements:

Comments:

Equipment Blank - ~~2017 1128-C~~ 2017 1128-B → Rinsate from D.P. cutting shoe
Field Blank - 2017 1128-A
Blind Dup - 2017 1128-C - CAL-MIP-04 (6-6.5) duplicate
TRIP BLANK - 2017 1128-D

Photos:

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 11

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL-MIP

Date: 11/28/17

Sample ID: CAL-MIP-2(0-0.5)

Time: 0830

Grid #: -8, -1 (8.5-9) (20-21)

Sampler: CVH, JS

Depth(s): 0-0.5

Associated MiHPT or DP Location: CAL-MIP-2

Lithology Log: YES / No

Field Measurements: See log

Comments:

Photos: 445

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 3

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL-MIP-04

Date: 11/28/17

Sample ID: CAL-MIP-04(0-0.5)

Time: 1030

Grid #: -8,-1

Sampler: CV/JS

Depth(s): 0-0.5

Associated MiHPT or DP Location: CAL-MIP-04

Lithology Log: YES / No

Field Measurements:
No PID readings other than background (i.e. associated w/ traffic, drill rig, etc). ~0 ppb

Comments:

Photos: Yes, in field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 4. Not enough recovery for 5th jar for EPH.

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL-MIP-04

Date: 11/28/17

Sample ID: CAL-MIP-04 (1-2)

Time: 1050

Grid #: -8 11

Sampler: CV/JS

Depth(s): 1-2

Associated MiHPT or DP Location: CAL-MIP-04

Lithology Log: YES / No

Field Measurements:
None Measured, PID @ background ~0 ppb

Comments:
Sample collected based off MIP

Photos: yes, field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 5

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL

Date: 11/28/17

Sample ID: CAL-MIP-04 (3-3.5)

Time: 1100

Grid #: -8,1

Sampler: CV/JS

Depth(s): 3-3.5

Associated MiHPT or DP Location: CAL-MIP-04

Lithology Log: YES / No

Field Measurements:
PID ~0ppb

Comments: /

Photos: yes, field direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 5

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL-MIP-04

Date: 11/28/17

Sample ID: CAL-MIP-04(6-6.5)

Time: 1145

Grid #: -8,1

Sampler: CV/JS

Depth(s): 6-6.5

Associated MiHPT or DP Location: CAL-MIP-04

Lithology Log: YES / No

Field Measurements:
PID only @ background ~0ppb

Comments:
-

Photos: yes, in field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: ~~5~~ 4 insufficient sample volume.

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: 20171128-C sampled @ 1200

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL

Date: 11/28/17

Sample ID: CAL-MIP-04 (23-23.5)

Time: 1210

Grid #: ~8.1

Sampler: CV/JS

Depth(s): 23-23.5

Associated MiHPT or DP Location: CAL-MIP-04

Lithology Log: YES / No

Field Measurements:
497 ppb

Comments: Poor recover @ depth. 5 pushes completed, minimal sample recovery - VPH jar has some headspace
EPH/PAH not collected.

Photos: Field Divert.

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 3

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL-MIP-04

Date: 11/28/17

Sample ID: CAL-MIP-04 (14-14.5)

Time: 1215

Grid #: -8.1

Sampler: CV/JS

Depth(s): 14-14.5

Associated MiHPT or DP Location: CAL-MIP-04

Lithology Log: YES / No

Field Measurements:
PID @ background ~0

Comments:

Photos: yes, in field diary

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 5

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL

Date: 11/28/17

Sample ID: CAL-MIP-04 (1-2) SPLP

Time: 1255

Grid #: ~8, 1

Sampler: CV/JS

Depth(s): 1-2

Associated MiHPT or DP Location: CAL-MIP-04

Lithology Log: YES / No

Field Measurements:

0 ppb

Comments:

/

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL

Date: 11/28/17

Sample ID: CAL-MIP-04 (~~SP4~~ 3-5) SPLP

Time: 1300

Grid #: ~8.1

Sampler: CV/JS

Depth(s): 3-5

Associated MiHPT or DP Location: CAL-MIP-04

Lithology Log: YES / No

Field Measurements:

0ppb

Comments:

/

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL

Date: 11/28/17

Sample ID: CAL-MIP-T03(0-0.5).

Time: 1410

Grid #: -8.1

Sampler: JS/CV

Depth(s): Surface (0.0-0.5)

Associated MiHPT or DP Location:

Lithology Log: (YES) / No

Field Measurements: 0ppb

Comments:

Photos: Field Direct

Analysis (circle): (VOCs (2 oz jar)) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/(no) Duplicate Sample ID: _____

(Surface Soil (0-2 feet bgs)) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL

Date: 11/28/17

Sample ID: CAL MIP - T03 (4.5-5)

Time: 1420

Grid #: -8.1

Sampler: JS/CV

Depth(s): 4.5 - 5

Associated MiHPT or DP Location: CAL - MIP - T03

Lithology Log: YES / No

Field Measurements: 0 ppb

Comments:

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL

Date: 11/28/17

Sample ID: MIP-T03 (3.5-4.5) SPLP

Time: 1430

Grid #: -8.1

Sampler: JS/CW

Depth(s): 3.5-4.5

Associated MiHPT or DP Location: CAL-MIP-T03

Lithology Log: (YES) / No

Field Measurements: 0 ppb

Comments:

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | (VOC SPLP Analysis (4 oz jar)) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/(no) Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or (Subsurface Soil (greater than 2 feet bgs))? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL

Date: 11/28/17

Sample ID: CAL-MIP-TO3-GRAVEL

Time: 1450

Grid #: -8 11

Sampler: CV/JJ

Depth(s): 20-25

Associated MiHPT or DP Location: CAL-MIP-TO3

Lithology Log: YES / No

Field Measurements:

0ppb.

Comments:

/

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag) | pH (2oz jar

Number of Jars: 3

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL

Date: 11/28/17

Sample ID: CAL-MIP-T03-CLY

Time: 1455

Grid #: -8, 1

Sampler: CV/JS

Depth(s): 10 - 18.5

Associated MiHPT or DP Location: CAL-MIP-T03

Lithology Log: YES / No

Field Measurements:

0ppb

Comments:

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag) pH (2 oz jar)

Number of Jars: 3

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAC

Date: 11/28/17

Sample ID: CAL-MIP-T03-SND

Time: 1500

Grid #: -8, 1

Sampler: CV/JS

Depth(s): 5-7.5

Associated MiHPT or DP Location: ~~CAL-TIP~~ CAL-MIP-T03

Lithology Log: YES / No

Field Measurements:

0

Comments:

Sand for particle size analysis collected from 15-17 ft.

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag) pH 2oz jar

Number of Jars: 3

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL

Date: 11/28/17

Sample ID: CAC-MIP-02(0-1)

Time: 1535

Grid #: -8, 1

Sampler: CV

Depth(s): 0-1

Associated MiHPT or DP Location: CAL-MIP-02

Lithology Log: YES / No

Field Measurements:

0 ppb

Comments:

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL

Date: 11/28/17

Sample ID: CAL-MIP-02(8-9)

Time: 1545

Grid #: -8, 1

Sampler: CV

Depth(s): 8-9

Associated MiHPT or DP Location: CAL-MIP-02

Lithology Log: YES / No

Field Measurements:

0 ppb

Comments:

Photos: FID

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: CAL

Date: 11/28/17

Sample ID: CAL-MIP-02(11-12) FOC

Time: 1550

Grid #: 8,1

Sampler: CV

Depth(s): 11-12

Associated MiHPT or DP Location: CAL-MIP-02

Lithology Log: YES / (No)

Field Measurements: 0 ppb

Comments: ✓

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

(FOC (4 oz jar)) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/(no) Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: Solar

Date: 11/29/2017

Sample ID: QA/QC

Time: /

Grid #: /

Sampler: CV/JJ/ST

Depth(s): /

Associated MiHPT or DP Location: /

Lithology Log: YES / No

Field Measurements:

20171129-A	FIELD BLANK	1730	VOC, VPH/EPH, SVOC & Metals
20171129-B	EQUIPMENT BLANK	1725	"
20171129-C	TRIP BLANK	—	VOCs.

Comments:

A - 11 Jars
B - 11 Jars
C - 2 VOAs.

Photos:

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 24

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: ALSCO

Date: 11/29/17

Sample ID: ALSCO-GW-02

Time: 1000

Grid #: 2-6

Sampler: CV/JS

Depth(s): 9-10

Associated MiHPT or DP Location:

Lithology Log: YES / No

Field Measurements: 0 ppb

Comments:
interval above gravel; ALSCO split collected @ 8-9 ft bgs using Terra core. Moisture sample also collected.

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 5

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID:

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: ALSCO

Date: 11/29/17

Sample ID: ALSCO-GM-04

Time: 1335

Grid #: Z-6

Sampler: CV/JS

Depth(s): 14-15

Associated MiHPT or DP Location:

Lithology Log: YES / No

Field Measurements: 0 ppb

Comments:

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 5

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: Solar

Date: 11/30/17

Sample ID: 20171130-A

Time:

Grid #: /

Sampler:

Depth(s): /

Associated MiHPT or DP Location: /

Lithology Log: YES / No

Field Measurements: QA/QC Samples
2030 - 20171130-A - Field Blank
2045 - 20171130-B - Equipment Blank
20171130-C - Trip Blank

Comments:

Photos:

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: _____

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: ALSCO

Date: 11/30/17

Sample ID: ALSCO-GW-03

Time: 1405

Grid #:

Sampler: CVH/JS

Depth(s): 2-2.8

Associated MiHPT or DP Location:

Lithology Log: YES / No

Field Measurements:
PID hits in surface soil appear to be related to road mix used during paving repairs. No impacts observed at depth

Comments:

Photos: field direct

Analysis (circle): VOCs (2 oz jar) | ~~EPH+PAH~~ (two 4 oz jars, must collect together) | VPH (2 oz jar)
→ 4oz

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 5

Analysis notes:
During sampling wind out of SW. Strong odor noted. PID spiked to 665ppb, no traffic passing at that time.

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: Billings MT

Date: 12-1-17

Sample ID: HLS-GW-03 (7-8)

Time: 1130

Grid #: 2, -1

Sampler: CAA/DS

Depth(s): 7-8' bgs

Associated MiHPT or DP Location: HLS-GW-03

Lithology Log: YES / No

Field Measurements:
Head space - 145 ppb @ 7.5' bgs

Comments:

Photos:
field direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)
↳ 4oz

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 5

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: SOAR

Date: 12/1/17

Sample ID: QA/QC

Time:

Grid #: /

Sampler: CV/SS/ST

Depth(s): /

Associated MiHPT or DP Location: /

Lithology Log: / YES / No

Field Measurements:

20171201-A Field Blank @ 1715h
2017 1201-B Equipment Blank @ 1730h
2017 1201-C Trip Blank

Comments:

Photos:

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: _____

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: Billings MT

Date: 12/1/17

Sample ID: HLS-GW-04 (3-4)

Time: 0920

Grid #: 2, -1

Sampler: [illegible] / JS

Depth(s): 3-4' bgs

Associated MiHPT or DP Location: HLS-GW-04

Lithology Log: YES / No

Field Measurements:
Head space - 63 ppb

Comments:

Photos:
field direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)
↳ 4oz

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 15 (MS/MSD)

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: HLS-GW-04 (3-4) MS + HLS-GW-04 (3-4) MSD

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: BSL - 71st Central

Date: 12/5/17

Sample ID: BSL - MIP - 01 (0-0.5)

Time: 1000

Grid #: -1, -1

Sampler: CV

Depth(s): 0-0.5

Associated MiHPT or DP Location: BSL - MIP - 01

Lithology Log: YES / No

Field Measurements: 0ppb

Comments:

Photos: ~~Field D~~ none

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: BSL

Date: 12/3/17

Sample ID: BSL-MIP-01 (17-18)

Time: 0950

Grid #: -1, -1

Sampler: ST

Depth(s): 17-18

Associated MiHPT or DP Location: BSL-MIP-01

Lithology Log: YES / No

Field Measurements:
0 ppb

Comments:

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: BSL - ~~Bull Plus~~ 712 (central)

Date: 12/3/17

Sample ID: BSL-MIP-01 (12-13)

Time: 0940

Grid #: -1.-1

Sampler: ST

Depth(s): 12 - 13

Associated MiHPT or DP Location: BSL-MIP-01

Lithology Log: YES / No

Field Measurements: 0 ppb

Comments:

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: 20171203-A

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: BSL - MIP - 01

Date: 12/3/17

Sample ID: BSL - MIP - 01 (4-4.5)

Time: 0935

Grid #: 1,1

Sampler: ST

Depth(s): 4-4.5

Associated MiHPT or DP Location: BSL - MIP - 01

Lithology Log: YES / No

Field Measurements: 0 ppb

Comments: Silt soil, difficult to pack

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: BSL

Date: 12/4/17

Sample ID: BSL - MIP - 20 (0-0.5)

Time: 0750

Grid #: 1, 1

Sampler: CV/ST

Depth(s): 0 - 0.5

Associated MiHPT or DP Location: BSL - MIP - 20

Lithology Log: YES / No

Field Measurements: 0 ppb

Comments:

Photos: Field Direct

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 1

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: BSL

Date: 12/4/17

Sample ID: BSL-MIP-20 (12-13)

Time: 0805

Grid #: 1.1

Sampler: CV

Depth(s): 12-13

Associated MiHPT or DP Location: BSL-MIP 20

Lithology Log: (YES) / No

Field Measurements: 0 ppb

Comments:

Photos: FD

Analysis (circle): (VOCs (2 oz jar)) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 3

Analysis notes:

Duplicate collected? (Yes)/no Duplicate Sample ID: MS / MSD

Surface Soil (0-2 feet bgs) or (Subsurface Soil (greater than 2 feet bgs))? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: BSL

Date: 12/14/17

Sample ID: BSL-MIP-20(14-15)

Time: 0815

Grid #: 1,1

Sampler: CV

Depth(s): 14-15

Associated MiHPT or DP Location: BSL-MIP-20

Lithology Log: YES / No

Field Measurements: 167 ppm

Comments: Dark sand clay layer lens with gray stained sands above + below. Strong Odor.

Photos: F.D.

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 5

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: REX Cleaners

Date: 12/21/17

Sample ID: REX-MIP-08

Time: 0825

Grid #: ~

Sampler: JJ

Depth(s): 0-0.5

Associated MiHPT or DP Location: REX-MIP-08

Lithology Log: (YES) / No

Field Measurements: 27 ppb @ 0.5 fbg

Comments:

Photos: Field Direct

VOC's & Vph only

Analysis (circle): VOCs (2 oz jar) x2 | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 6

Analysis notes:

Duplicate collected? Yes/(no) Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: REX Cleaners

Date: 12/21/17

Sample ID: REX-MIP-08

Time: 0830

Grid #: —

Sampler: JS

Depth(s): 1-2

Associated MiHPT or DP Location: REX-MIP-08

Lithology Log: YES / No

Field Measurements:

Comments:

Photos: Field Direct

VOCs, VPH, EPH only

Analysis (circle): VOCs (2 oz jar) x2 | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 6

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: REX Cleaners

Date: 12/21/17

Sample ID: REX-MIP-08

Time: 1330

Grid #: ~

Sampler: JS

Depth(s): 5-5.5

Associated MiHPT or DP Location: REX-MIP-08

Lithology Log: YES / No

Field Measurements: N/A

Comments:

Photos: Field Direct

VOCs, VPH, SVOCs, Metals

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 6

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: REX Cleaners

Date: 12/21/17

Sample ID: REX-MIP-08

Time: 1345

Grid #: –

Sampler: JS

Depth(s): 9.5-10

Associated MiHPT or DP Location: REX-MIP-08

Lithology Log: (YES) / No

Field Measurements:

Comments:

Photos: Field Direct

VOCs, VPH, SVOCs, metals

Analysis (circle): (VOCs (2 oz jar)) | (EPH+PAH (two 4 oz jars, must collect together)) | (VPH (2 oz jar))

FOC (4 oz jar) | (SVOCs+Metals (one 4 oz jar for both)) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 6

Analysis notes:

Duplicate collected? Yes/(no) Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or (Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: REX Cleaners

Date: 12/21/17

Sample ID: REX-MIP-08

Time: 1400

Grid #: —

Sampler: JS

Depth(s): 17-17.5

Associated MiHPT or DP Location: REX-MIP

Lithology Log: (YES) / No

Field Measurements: 170 ppm @ 18.5 Fbg

Comments:

Photos: Field Direct

(VOCs, VPH, SVOC's, metals)

Analysis (circle): (VOCs (2 oz jar)) | (EPH+PAH (two 4 oz jars, must collect together)) | (VPH (2 oz jar))

FOC (4 oz jar) | (SVOCs+Metals (one 4 oz jar for both)) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 6

Analysis notes:

Duplicate collected? Yes (no) Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or (Subsurface Soil (greater than 2 feet bgs))? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: REX-Clearcrs

Date: 12/21/17

Sample ID: REX-MIP-08

Time: 1425

Grid #: ~

Sampler: JS

Depth(s): 23 - 23.5

Associated MiHPT or DP Location: REX-MIP-08

Lithology Log: (YES) / No

Field Measurements:

Comments:

Photos: Field Direct

VOCs, VPH

Analysis (circle): (VOCs (2 oz jar)) | (EPH+PAH (two 4 oz jars, must collect together)) | (VPH (2 oz jar))

FOC (4 oz jar) | (SVOCs+Metals (one 4 oz jar for both)) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 6

Analysis notes:

Duplicate collected? Yes / (no) Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or (Subsurface Soil (greater than 2 feet bgs))? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: REX – Cleaners

Date: 12/21/2017

Sample ID: 20171221-A

Time: 0800

Grid #:

Sampler: JR

Depth(s): –

Associated MiHPT or DP Location: REX-MIP-08

Lithology Log: YES / No

Field Measurements:

Comments: Field Blank

Photos:

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 11

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GW FACILITY, BILLINGS, MT
CLIENT: MT DEQ

General Location: REX - Cleaners

Date: 12/21/2017

Sample ID: 20171221-B

Time:

Grid #:

Sampler: JR

Depth(s):

Associated MiHPT or DP Location: REX-MIP-08

Lithology Log: YES / No

Field Measurements:

Comments: Equipment Blank - distilled water through an unused soil recovery liner.

Photos:

Analysis (circle): VOCs (2 oz jar) | EPH+PAH (two 4 oz jars, must collect together) | VPH (2 oz jar)

FOC (4 oz jar) | SVOCs+Metals (one 4 oz jar for both) | VOC SPLP Analysis (4 oz jar) | Other (list below)

Bulk Density (4 oz jar) | Particle size analysis (8 oz bag)

Number of Jars: 11

Analysis notes:

Duplicate collected? Yes/no Duplicate Sample ID: _____

Surface Soil (0-2 feet bgs) or Subsurface Soil (greater than 2 feet bgs)? (Circle)

SAMPLE LOG, BILLINGS PCE GROUNDWATER
MDEQ, BILLINGS, MT

General Location: Billings PCE

Date: 6/12/15

Sample ID: CC-1

Time: 1250/1255 [illegible]

Grid #:

Sampler: LD

Depth: 0-0.5

Field Measurements: NA

Comments: water lower than normal

Photos: YES

Analysis (circle):

SAMPLE LOG, BILLINGS PCE GROUNDWATER
MDEQ, BILLINGS, MT

General Location: Billings PCE

Date: 6/12/15

Sample ID: CC-2

Time: 1215 water only

Grid #:

Sampler:

Depth:

Field Measurements: NA

Comments: used peri pump to sample water through manhole cover

no sediment sample collected

Photos: YES

Analysis (circle):

SAMPLE LOG, BILLINGS PCE GROUNDWATER
MDEQ, BILLINGS, MT

General Location: Billings PCE

Date: 6/15/15

Sample ID: CC-3

Time: 0930 water / 0940 sediment

Grid #:

Sampler: LS

Depth: 0-0.5

Field Measurements: NA pH 7.80 temp 17.9°C

Comments: Outlet of City/County Drain

Photos: YES

Analysis (circle):

SAMPLE LOG, BILLINGS PCE GROUNDWATER
MDEQ, BILLINGS, MT

General Location: Billings PCE

Date: 6/12/16

Sample ID: SD-1

Time: 1140 W / 1145 Seal

Grid #:

Sampler: LD

Depth: (0-0.5)

Field Measurements: NA pH 7.59 temp 18.1

Comments: 20180612-03 Blind Duplicate
anticipated time 0900

flowing ~~west~~ east to inlet at Morton Ave

Photos: YES

Analysis (circle):

SAMPLE LOG, BILLINGS PCE GROUNDWATER
MDEQ, BILLINGS, MT

General Location: Billings PCE

Date: 6/12/18

Sample ID: SD-2

Time: 1100 W / 1110 Sed

Grid #:

Sampler: LD

Depth: 0 - 0.5

Field Measurements: NA pH 8.09 temp 19.1 °C

Comments: Glowing North

Field Blank 20180612-A

Photos: YES

Analysis (circle):

SAMPLE LOG, BILLINGS PCE GROUNDWATER
MDEQ, BILLINGS, MT

General Location: Billings PCE

Date: 6/12/18

Sample ID: SD-3

Time: 1000 W / 1005 S

Grid #:

Sampler: LD

Depth: 0-0.5

Field Measurements: NA pH 7.97 temp 16.4°C

Comments: Water flowing North

Photos: YES

Analysis (circle):

APPENDIX E-5

VAPOR INTRUSION SAMPLING FIELD FORMS AND PHOTOS

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Rainbow Property Management

Physical Address of property under investigation: 37th St W. Billings MT

Mailing Address:

Phone (optional): 406-794-7408

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
3/1/18	AIR	20180301-37TH STW-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15, APH
3/1/18	AIR	20180301-37TH STW-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15, APH
3/1/18	AIR	20180301-37TH STW-03	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15, APH
3/2/18	AIR	20180302-37THSTW-01	TO-15, APH, FIXED, CH4

*OTHER (specify analysis)

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☒ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.
- ☒ NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☒ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

Signature

Syris Trahan
Printed Name

Telephone #: 307-745-7474

Date: 3/6/18

Property owner/operator copy = white DEQ copy = yellow

*24.9 highest HE reading

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	3 7th St. West		
Project Name:	MDEQ Billings PCE	PID (model/serial #):	ppbRAE 3000 / PGM7340
Sample location:	Boiler Room	Helium Detector (model/serial #):	QRAE / 25561
Date:	03/02/2018	Weather:	Mostly Cloudy, N @ 7 mph
Field Personnel:	Joel Riebli	Air Temp:	33°F
Recorded by:	Joel Riebli	Atmospheric Pressure:	29.97 in

Slab Data

Surface/slab Type:	Concrete
Surface/slab Thickness (inches):	Unknown, EPA installed previously
Slab/subsurface substrate comments:	Unknown
Depth of hole through the slab:	Unknown.
Length of sampling train (feet):	4.0

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 120 ml

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
03/02/18	11:15	100 ml	22.6	23.3				
03/02/18	1116	200 ml	21.5	22.6				
03/02/18	1117	300 ml	20.7	21.5				
03/02/18	1119	400 ml	22.9	~~20.7~~ 23.3				
03/02/18	1120	500 ml	22.4	22.9	1200 ppm	24 ppb		

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train 1,200 ppm / 233,000 ppm = 0.51 %

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
03/02/18	1127	1203	~~20180301-37STW-01~~ 20180302-37STW-01*	3374	FC1556		-25.5	-4.5

*Changed by SJS on 4/9/19 due to error in field sheet

Comments:

			Initial	Final
2 min shut-in test	#3374	FC1556	-25.5	-26.5

4 gas readings → CO, H2S, OXY, LEL = 15ppm, 0ppm, 20.9%, 7% (respo

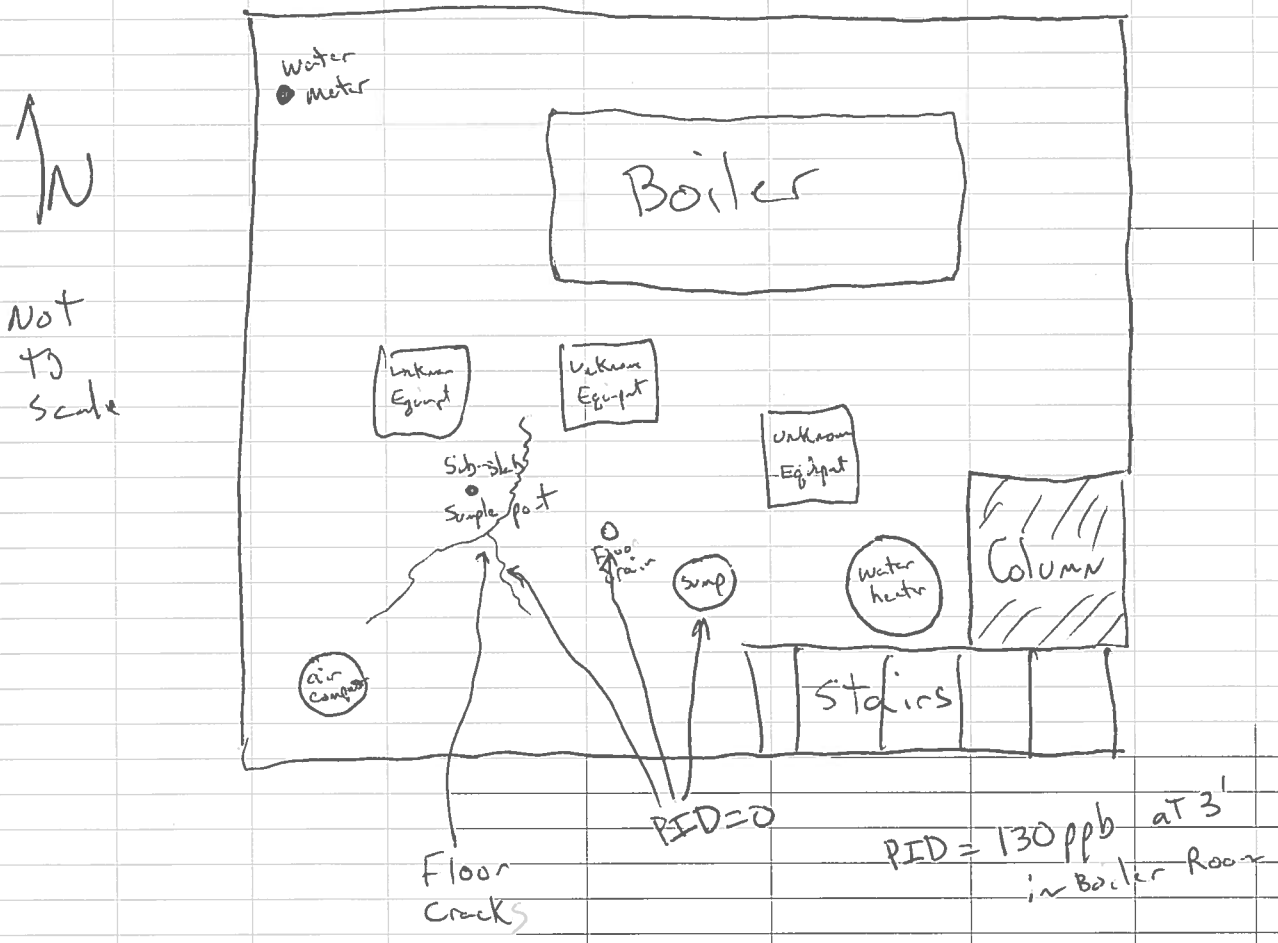
Sub-Slab Soil Vapor Sampling Field Data Sheet

Project Name: MDEQ Billings PCE | Sample Location/ ID: 3 7th St. W.

Date:

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

Location Sketch:



191 / 13th St West Rambow

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	3 7th st W.	Start Weather:	Mostly Cloudy, WSW 2mph
		Start Outdoor Air Temp:	27°F
Project Name:	MDEQ Billings PCE	Start Atmospheric Pressure:	30.05 in
Sample Location:	Boiler Room, 100 level, 200 level		
Date:	03/01/2018 → 03/02/2018	End Weather:	Mostly Cloudy, N @ 7mph
Field Personnel:	Joel Riebl	End Outdoor Air Temp:	33°F
Recorded by:	Joel Riebl	End Atmospheric Pressure:	29.97 in

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
03/01/18	1045	03/02/18	1045	20180301-375TW-01	3458	FCØ878	—	-28.0	-2.0	~75°F	~80°F
03/01/18	1047	03/02/18	1047	20180301-375TW-02	3461	FCØØ65	—	-27.8	-2.5	~70°F	~70°F
03/01/18	1049	03/02/18	1049	20180301-375TW-03	0844	FCØ151	—	-28.1	-3.5	~68°F	~68°F

Comments:

2 min Leak test

		Initial	Final	
#3458	FCØ878	-28.0 in	-28.0	Pass
#3461	FCØØ65	-27.6 in	-27.5	Pass
#0844	FCØ151	-27.9 in	-28.1	Pass

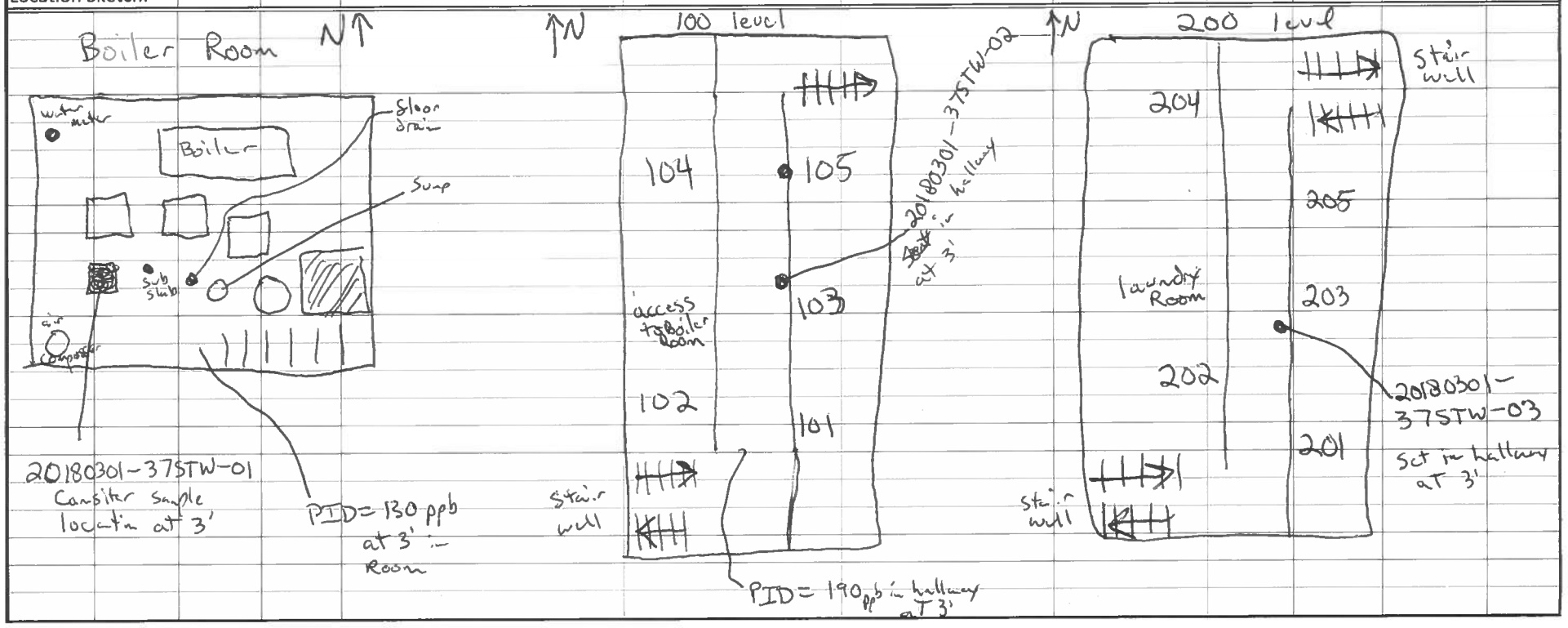
* Apartment complex with Boiler room and three levels above the boiler room with apartments. Not sampling the 300 level.

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

- 20180301_375TW-01 set in Boiler room (lowest level), set near sub-slab sample point set ~3' above the concrete floor. There is a sump and floor drain near the sample location
- 20180301-375TW-02 set in hallway (near mid point) of lowest livable level near the door to apartment 103. Set canister at ~3' off the floor
- 20180301-375TW-03 set in hallway (near mid-point) of second livable level (200 level) near apartment 203 and near laundry room.

Location Sketch:



Completed by S. Trahan after sampling via phone.

OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 3/6/18

1. Name: Rainbow Property Management

   Address: 3 7th St. West Billings, MT

   Home Phone: 406-248-9028 Work Phone: _____

2. What is the best time to call to speak with you? 8-5 At: Work ☑ or Home ☐ ?

3. Are you the Owner ☐, Renter ☐, Other ☒ (please specify) Property Manager of this Home/Structure? If you are not the owner, please provide owner contact information:

   MFM Capital LLC
   23141 Cobblefield
   Mission Viejo, CA 92692

4. Total number of occupants/persons at this location? 720
   Number of Children Unk. Ages Various

5. How long have you lived at this location? Various

General Home Description

6. Type of Home/Structure (check only one): Single Family Home ☐, Duplex ☐, Apartment ☒, Townhouse ☐ Other _____

7. Home/Structure Description:
   Number of floors: 3
   Basement ☒
   Crawlspace ☐
   Partial Crawlspace/Basement ☐ % of each _____
   Slab On Grade ☐
   Other ☐ _____

8. Age of Home/Structure: 68 years, Not Sure/Unknown ☐

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood ☒, Brick ☐, Concrete ☒, Cement block ☒, Other ☐ _____
   Garage: ☐ Attached ☐ Detached ☐ None

10. Foundation Construction (check all that apply):
    Concrete Slab ☒
    Fieldstone ☐
    Concrete Block ☐
    Elevated Above Ground/Grade ☐
    Other ☐ _____

11. Do you have Private Well ☐ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____

12. Do you have a Septic System? Yes ☐ No ☒ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☒

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☒ Unfinished ☐ Partially Finished ☐ Partial Crawlspace ☐?

15. If finished, how many rooms are in the basement? Basement Apts., >10.
What are rooms used for? Bedrooms ☐ Family Room ☐ Storage ☐
Other Various.

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐

17. Is the basement floor (check all that apply) Concrete ☒ Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☒, Cement Block ☒, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☒

Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☒

21. Does the basement have any of the following? Floor Cracks ☒, Wall Cracks ☐, Sump ☐,
Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe_____

22. Are any of the following used or stored in the basement (check all that apply):
- ☐ Paint
- ☐ Solvents (degreasers, paint thinner, etc.)
- ☐ Fuels/Oils (gasoline, diesel, used oil)
- ☒ Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- ☐ Pesticides

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☒ No ☐
If yes, specify what was done, where in the home, and what month:
Individual Apt. remodeling, repainted exterior.

24. Have you installed new carpeting in your home within the last year? Yes ☐ No ☒
If yes, when and where? _____

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
No ☐ Unk.

26. Does anyone in your home use solvents at work?
Yes ☐ If yes, how many persons?
No ☐ If no, go to question 28 Unk.

27. If yes for question 26, are the work clothes washed at home? Yes ☐ No ☐

28. Where is the washer/dryer located?
Basement ☒
Upstairs Utility Room ☐
Kitchen ☐
Garage ☐
Use a Laundromat ☐
Other, please specify ☐ _____

29. If you have a dryer, is it vented to the outdoors? Yes ☒ No ☐

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas ☒, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system:
- Forced Hot Air ☐
- Forced Hot Water ☒
- Steam ☐
- Radiant Floor Heat ☐
- Wood Stove ☐
- Coal Furnace ☐
- Fireplace ☐
- Other ☐ _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? Unk.

How is/was the tank filled?

Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☐ No ☒
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☒ Some units
Other (please specify)

33. Do you use any of the following? Room Fans ☒, Ceiling Fans ☐, Attic Fan ☐

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☒ Unknown ☐
If yes, please specify type of pest controlled
And approximate date of service

36. Water heater type: Gas ☒ Electric ☐, by Furnace ☐,
Other (please describe)

37. Water heater location: Basement ☒, Upstairs Utility Room ☐, Garage ☐,
Other (please specify)

38. What type of cooking appliance do you have? Electric ☒ Gas ☐
Other (please describe)

39. Is there a stove exhaust hood present? Yes ☒ No ☐
Does it vent to the outdoors? Yes ☐ No ☒

40. Smoking in Home:
None ☒, Rare (only guests) ☐, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐

41. If yes to question 40, what is smoked?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☐ No ☐ Unk.

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐, Unk.
Spray Paint ☐, Wood Finishing ☐, Other ☐

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation: No

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

Multi-unit apartment. Many occupants, only Property management company interviewed.

45. Please check weekly household cleaning practices:

Dusting ☐

Dry Sweeping ☐

Vacuuming ☒

Polishing (furniture, etc.) ☐

Washing/Waxing Floors ☐

Other (describe) ☐ _____

46. Other comments:

_____

_____

_____

_____

_____

_____

_____

_____

_____

47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

VI Sample: 3 7th St W_Boiler Room

Indoor air in middle of boiler room - many cracks in concrete foundation.
Subslab port (EPA installed) found east of pictured indoor air location

VI Sample: 3 7th St W_Main

VI Sample: 3 7th St W_2nd Floor

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Billings Central Catholic High School

Physical Address of property under investigation: 3 Broadwater Ave. Billings, MT

Mailing Address: SAME

Phone (optional):

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/22/18	AIR	10-0222-3BROADWATER-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15 APH
2/22/18	AIR	10-0222-3BROADWATER-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15 APH
2/22/18	AIR	10-0222-3BROADWATER-03	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15 APH

*OTHER (specify analysis)

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☒ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.
- ☐ NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☒ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

Signature

Printed Name: Sara Tichar

Telephone #: 307-745-7474

Date: 3/6/18

Property owner/operator copy = white DEQ copy = yellow

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

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Property Owner/Operator Information:

Name: Billings Catholic High School

Physical Address of property under investigation: 3 Broadwater Ave Billings MT

Mailing Address: SAME

Phone (optional):

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
1/22/2018	AIR	20180122-3BROADWATER-04	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-3 APH
2/22/2018	AIR	20180222-3BROADWATER-05	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-3 APH
3/23/2018	AIR	20180223-3BROADWATER-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-3 APH FIXED GASES CH_4

*OTHER (specify analysis)

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☐ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.
- ☒ NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☐ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

Signature

Printed Name: Scott Tabor

Telephone #: 307-745-7471

Date: 3/6/18

Property owner/operator copy = white DEQ copy = yellow

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	3 Broadwater Ave	Start Weather:	Sunny
		Start Outdoor Air Temp:	-1
Project Name:	Billings PCE GW	Start Atmospheric Pressure:	30.29 in
Sample Location:	Billings Central High School		
Date:	2/22/18	End Weather:	Sunny
Field Personnel:	LD	End Outdoor Air Temp:	-3
Recorded by:		End Atmospheric Pressure:	30.34 in

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
2/22	0818	2/23	0820	20180222-3Broadwater-04	1064	1046		-27.5	~~-2.5~~ -2.5	65	65
2/22	0827	2/23	0827	20180222-3Broadwater Ave-05	2318	0862		-28	~~-12.5~~ -2.5	60	60
					2326	0369		-20	Did not use		
2/22	0841	2/23	0754	20180222-3Broadwater-01	2021	1387		-27.5	-1	65	65
2/22	0847	2/23		20180222-3Broadwater-03	2387	0535		-27	-5.5	70	70
2/22	0834	2/23	0757	20180222-3Broadwater-02	2140	1370		-27	-2	65	65

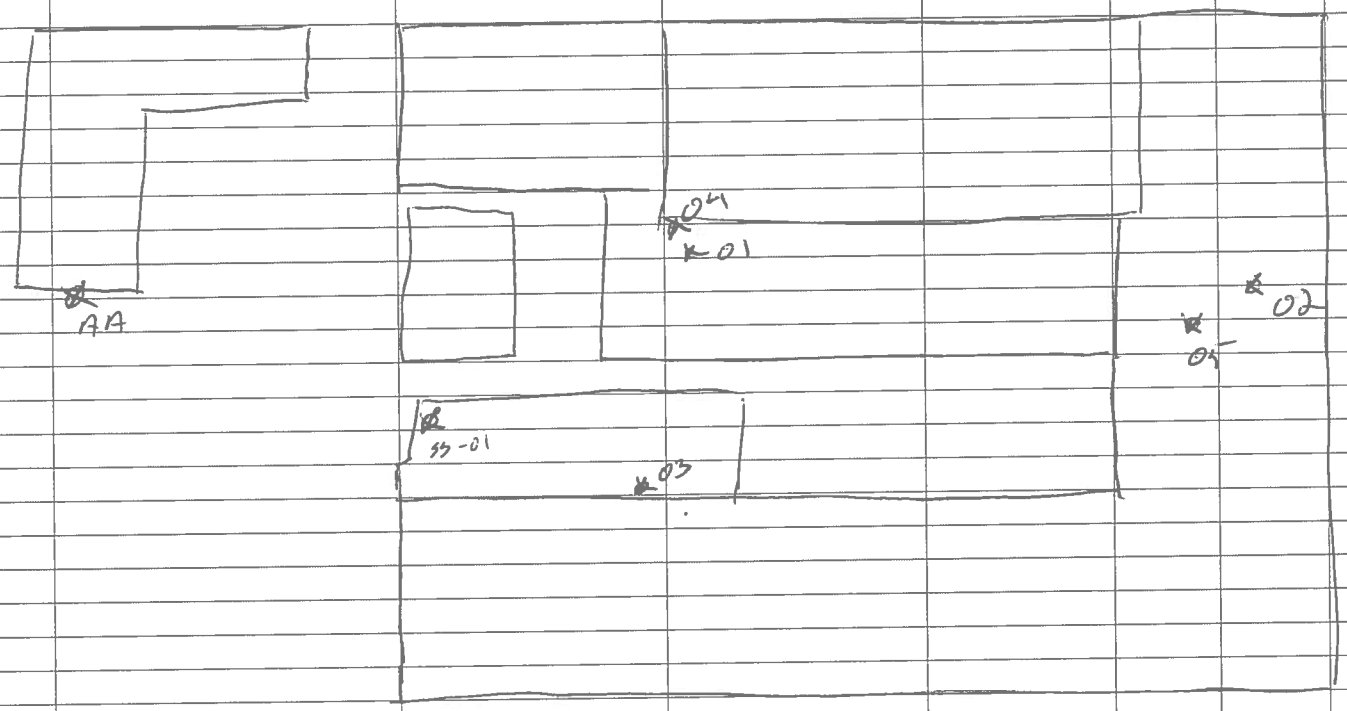
Comments:

1064	20180222-3Broadwater-04	Crawlspace/Tunnel ~~under main hall~~ Boiler room
2318	20180222-3Broadwater Ave-05	~~Boiler room crawlspace/tunnel~~ Crawlspace/Main Hall
~~2326~~		
2021	20180222-3Broadwater-01	Gym Hall
2387	20180222-3Broadwater-03	Band Room
2140	20180222-3Broadwater-02	Main Hall

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

Location Sketch:



Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID: Broadwater Ave

Project Name: Billings PCE GW
PID (model/serial #):
Sample location: Billings Central High School
Helium Detector (model/serial #): MGD-2002 / R11159
Date: 2/23
Weather: Sunny
Field Personnel: LD
Air Temp: 6
Recorded by:
Atmospheric Pressure:

Slab Data

Surface/slab Type:
Surface/slab Thickness (inches):
Slab/subsurface substrate comments:
Depth of hole through the slab:
Length of sampling train (feet):

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft =

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
2/23	1120	500	24.6	27.6	2450 ppm		18.1	22.9

Conversion: 1.0% = 10,000 ppm
At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
2/23	1125	1158		2116	08540		-26.5	-5

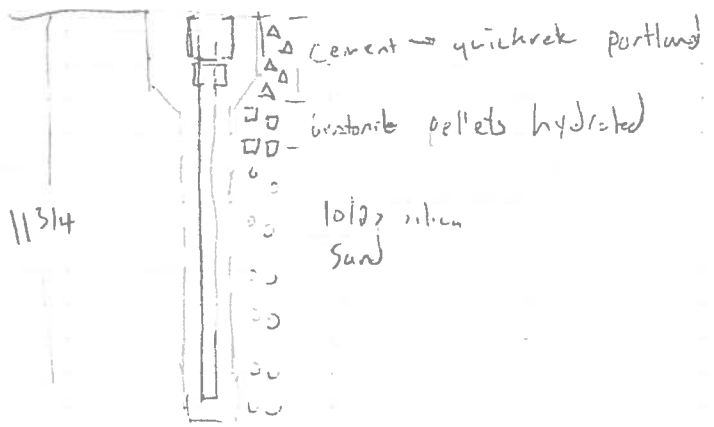
Comments:
20150223-3 Broadwater-01

Sub-Slab Soil Vapor Sampling Field Data Sheet

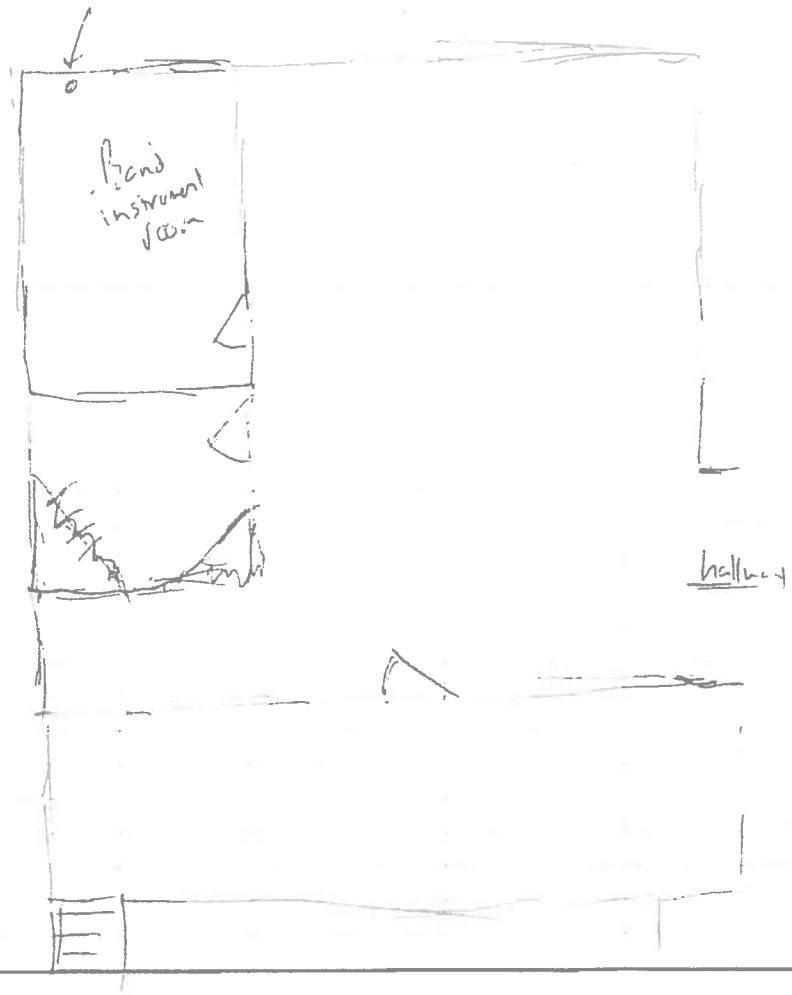
Project Name: Billings PCE
Date: 2/10/18

Sample Location/ ID: Catholic High School Band instrument room

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

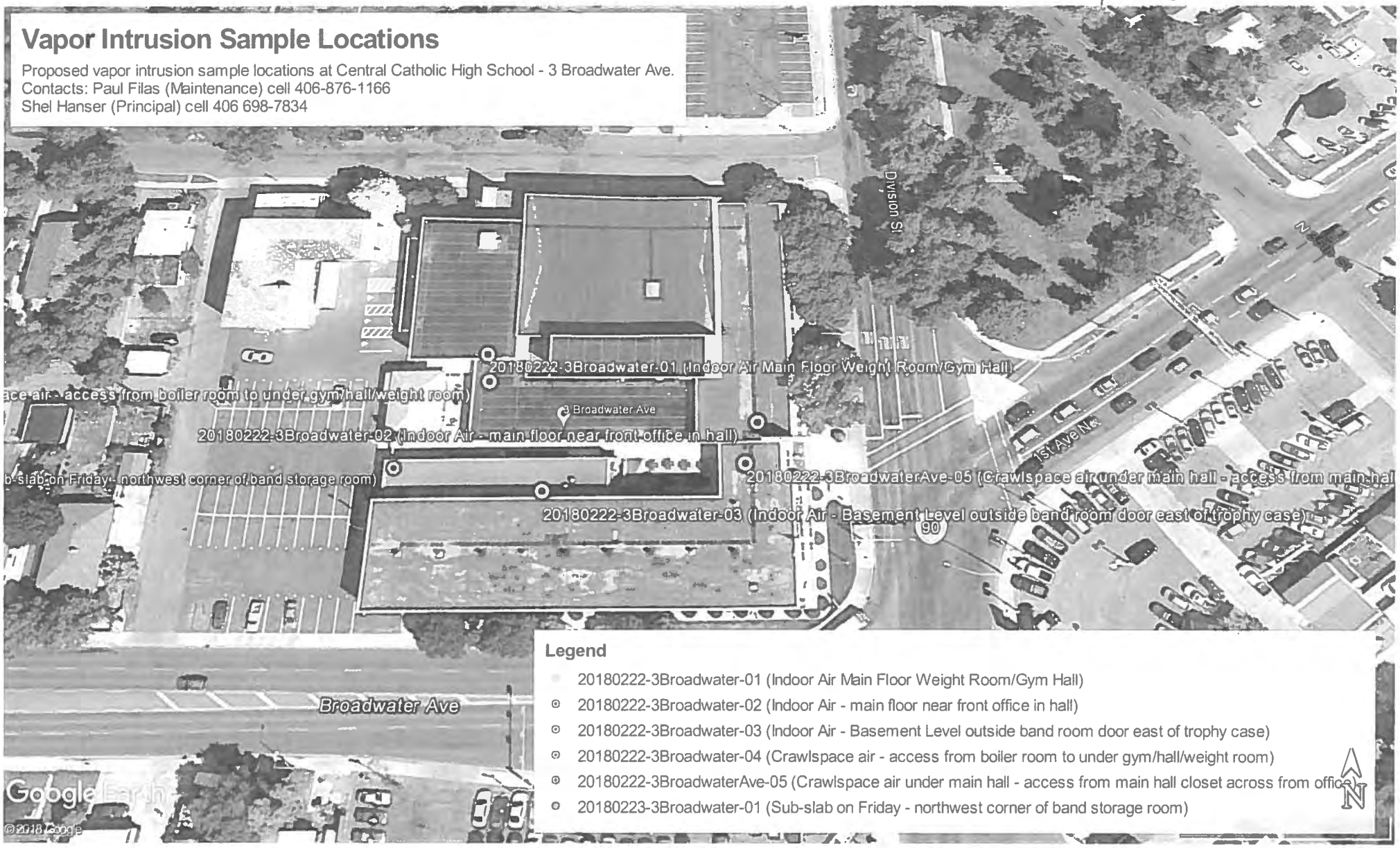


Location Sketch:



Vapor Intrusion Sample Locations

Proposed vapor intrusion sample locations at Central Catholic High School - 3 Broadwater Ave.
Contacts: Paul Filas (Maintenance) cell 406-876-1166
Shel Hanser (Principal) cell 406 698-7834



Department of Environmental Quality
Hazardous Waste Site Cleanup Bureau P.O. Box 200901 Helena MT 59620-0901 (406) 841-5000

COMMERCIAL / INDUSTRIAL BUILDING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 2/7-10/18 Survey / questionnaire completed by: S. Seitz

1. Contact Name: _____
   Address: 3 Broadwater Ave City: Billings State: MT Zip: 59101
   Phone 1: _____ Phone 2: _____ Cell Phone: _____

2. What is the best time to call to speak with you? _____

3. Are you the Owner ☐, Renter ☐, Other ☐ (please specify) Admin / Maintenance of this Building/Structure? If you are not the owner, please provide owner contact information
   Owner Name: Catholic Schools
   Address: _____ City: Billings State: MT Zip: _____
   Phone 1: _____ Phone 2: _____ Cell Phone: _____

4. Total number of occupants/persons at this location? School
   Number of Children _____ Ages 13-18 + teachers

5. How long have you occupied this location? _____
   Days per week the building is occupied 5 Hours per day the building is occupied 9
   Describe typical shifts and types of labor (office, light labor, heavy labor, etc.)
   School home for students - longer, teachers

General Building / Structure Description

6. Type of Building/Structure (check only one): Single Business ☐, Multiple Businesses ☐, Other School

7. Building/Structure Description:
   Number of floors: _____ Area /square footage of main or ground floor: _____ square feet
   Basement ☑ Area /square footage of Basement: _____ square feet South wing (1/4 bdlg)
   Crawlspace ☑ Area /square footage of Crawlspace: _____ square feet (tunnels in foundation beneath 3/4 building)
   Partial crawlspace/basement ☐ % of each _____
   Slab on grade ☐ Area /square footage of Slab on grade: _____ square feet
   Other ☐ _____

8. Age of Building/Structure: _____ years, Not sure/Unknown ☐

9. General Above-Ground Building/Structure construction (check all that apply):
   Wood ☐, Brick ☐, Concrete ☐, Cement Block ☐, Other ☐ _____

10. Foundation Construction (check all that apply):
Concrete Slab ☑
Fieldstone ☐
Concrete Block ☐
Elevated Above Ground/Grade ☐
Other ☐ _____

11. Do you have a Private Well ☐ or Cistern ☐?
If yes, please describe location, use, and current condition NO

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? city water city sewer
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your Building? (pond, ditch, etc.) Yes ☐ No ☐

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☑ or Unfinished ☐? Partial Art & Band wing on south

15. If finished, how many rooms are in the basement? 4 +
What are rooms used for? Office ☑, Shop ☐, Storage ☑, School Room ☑
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐ NA

17. Is the basement floor (check all that apply) Concrete ☑, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☑, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐
unknown
Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☑

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☑, Floor Drain ☑, Other Hole/Opening In Floor ☐
Describe possibly cracks.

22. Are any of the following used or stored in the basement (check all that apply):

Paint ☑, Paint Stripper/Remover ☑, Paint Thinner ☐, Metal Degreaser/Cleaner ☐, Gasoline ☐, Diesel Fuel ☐, Solvents ☐, Glue ☑, Laundry Spot Removers ☐, Drain Cleaners ☑, Pesticides ☐,
Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.) ☐, unknown
Other products with/containing Volatile Organic Compounds, describe: _____

23. Has the Building / structure recently (within the last six months) had any painting or remodeling?
Yes ☑ No ☐ Routine painting/repairs - no major changes
If yes, specify what was done, where in the Building, and what month:

24. Has new carpeting been installed in the Building / Structure within the last year? Yes ☐ No ☐
If yes, when and where? _____

25. Do any occupants / employees regularly conduct or work in the beauty / hair-dressing business?
Yes, work at a beauty / hair-dressing business ☐
Yes, store supplies for beauty / hair-dressing business ☐ Distance to sample point: _____
Yes, building contains beauty / hair-dressing business ☐ Distance to sample point: _____
Yes, building is near beauty / hair-dressing business ☐ Distance to sample point: _____
No ☑

26. Do any occupants / employees / anyone regularly use or work or conduct a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
Yes, building contains or is near dry cleaning service ☐ Distance to sample point: _____
No ☑

27. Do any occupants / employees / anyone in the Building / structure use solvents at work?
Yes ☐ If yes, how many persons?
No ☑ If no, go to question 28 (paint thinner occasionally)

28. If yes for question 26, are the work clothes washed at Building? Yes ☐ No ☐

29. Does Building / Structure contain a washer/dryer? Yes ☐ No ☐
Where are they located?
Basement ☐
Upstairs ☐
Ground floor ☐
Garage ☐
Other, please specify ☐ _____

30. If Building / Structure contains a dryer, is it vented to the outdoors? Yes ☐ No ☐

31. What type(s) of Building heating do you have (check all that apply)
Fuel type: Gas ☑, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ Boiler

Heat conveyance system: Forced Hot Air ☐ Forced Hot Water ☐ Steam ☐
Radiant Floor Heat ☐ Wood Stove ☐ Coal Furnace ☐ Fireplace ☐
Other ☐ _____

32. Does Building / Structure have (or had in the past) a storage tank for storage of Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? _____
_____
How is/was the tank filled? _____
_____
Is there staining near the tank? Yes ☐ No ☐

33. Does Building / Structure have air conditioning? Yes ☐ No ☐
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☐
Other (please specify) _____

34. Does Building / Structure have any: Room Fans ☐, Ceiling Fans ☐, Attic Fan ☐

35. Does Building / Structure ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐

36. Has Building / Structure had termite or other pesticide treatment? Yes ☐ No ☐ Unknown ☐
If yes, please specify type of pest controlled _____
And approximate date of service _____

37. Water heater type: Gas ☐, Electric ☐, by Furnace ☐,
Other (please describe)_____

38. Water heater location: Basement ☐, Upstairs ☐, Ground Floor ☐, Attic ☐,
Other (please specify) _____

39. Does Building / Structure have any cooking appliances? Electric ☐, Gas ☐
Other (please describe) _____

40. Is there a stove exhaust hood present? Yes ☐ No ☐
Does it vent to the outdoors? Yes ☐ No ☐

41. Smoking in Building / Structure:
None ☐, Rare (only guests) ☐, Moderate (occupants, light smokers) ☐,
Heavy (at least one heavy smoker in Building / Structure) ☐

42. If yes to question 41, what do they smoke?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐

43. Does Building / Structure regularly contain/use air fresheners? Yes ☐ No ☐

44. Does anyone in the Building have indoor Building hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____
_____
_____

45. General Building / Structure use of industrial / office / consumer products (circle as appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	**Frequency of Use**				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol Deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window Cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuel	Never	Hardly ever	Occasionally	Regularly	Often

46. Please check weekly Building / Structure maintenance, janitorial, and cleaning practices:

Dusting ☐

Dry Sweeping ☐

Vacuuming ☐

Polishing (furniture, etc.) ☐

Washing/Waxing Floors ☐

Other (describe) ☐ _____

47. Other comments including items / subjects not covered in this questionnaire yet an issue or concern for the Building / Structure:

_____

_____

_____

_____

_____

_____

_____

_____

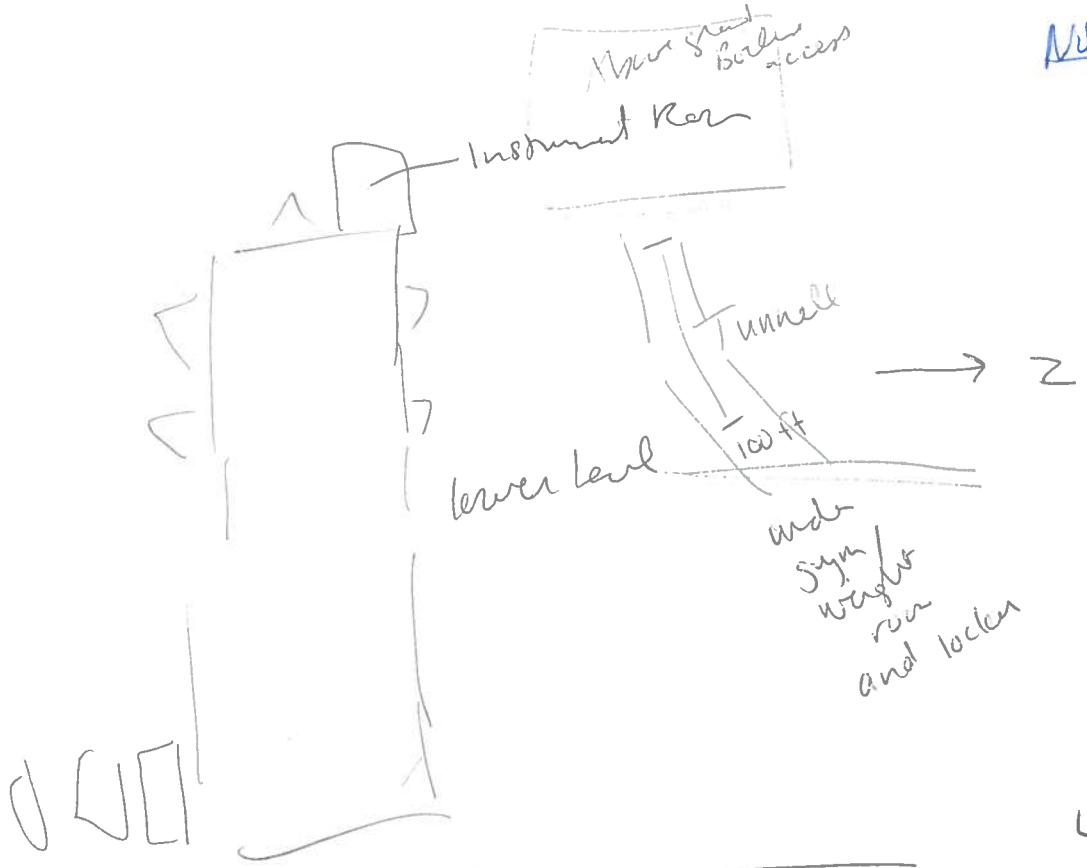
_____

48. **Chemical Inventory/Summary**

Chemical/Chemical Product (consumer name)	Amount present in Building / Structure
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

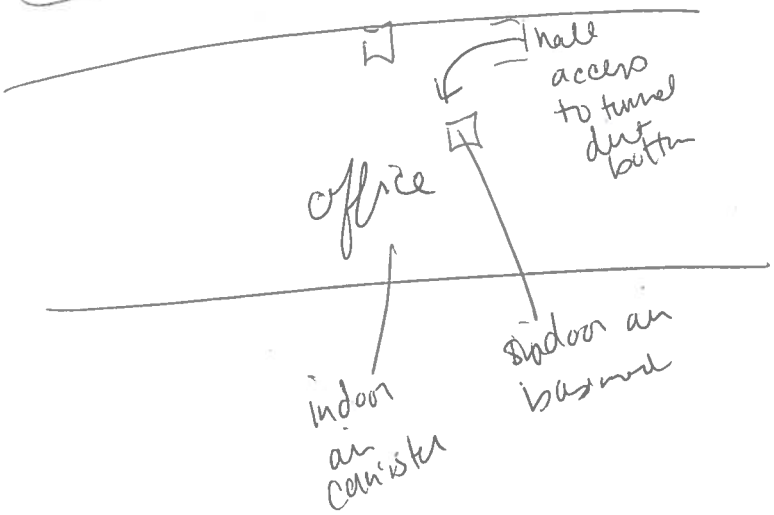
Band / Instrument Room - sub slab

Art / Band Wing - indoor lower level



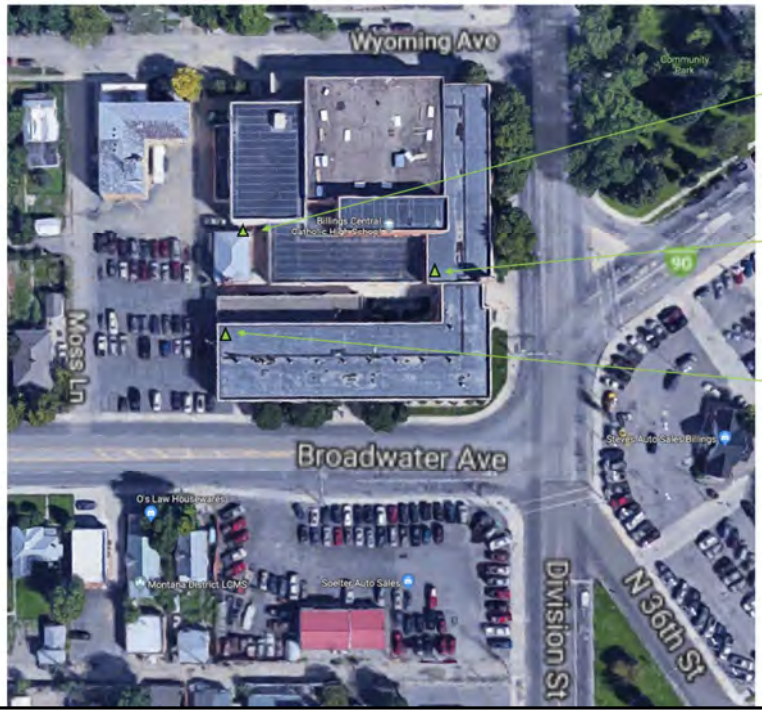
Note

21-22 in
No school



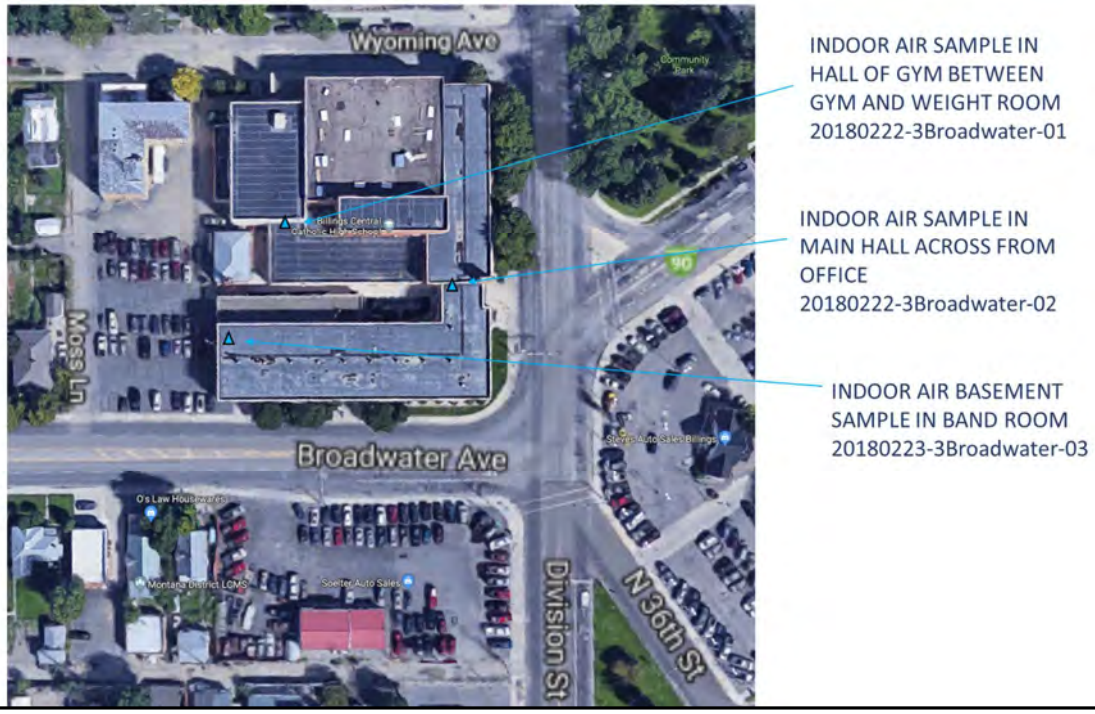
406-876-1166

PFilas@billingscatholicschools.org



ADDRESS: 3 BROADWATER AVENUE

NOTES: SUB-SLAB AND CRAWLSPACE SAMPLE LOCATIONS AT BILLINGS CENTRAL CATHOLIC HIGH SCHOOL



ADDRESS: 3 BROADWATER AVENUE

NOTES: SAMPLE LOCATIONS FOR INDOOR AIR SAMPLE LOCATIONS AT BILLINGS CENTRAL CATHOLIC HIGH SCHOOL

ADDRESS: 3 BROADWATER AVENUE

NOTES: OUTDOOR VIEW OF SCHOOL – LOOKING NORTH ON DIVISION. MAIN DIVISION ST. ENTRANCE IN PICTURE.

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: _____

Physical Address of property under investigation: 11 CUSTER AVE BILLINGS MT

Mailing Address: SAME

Phone (optional): _____

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2017 2/27/2018	AIR	[illegible] CUSTER-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-5 API
2/27/2018	AIR	[illegible] CUSTER-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-5 API
2/27/2018	AIR	[illegible] CUSTER-03	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-5 API
2/28/2018	AIR	[illegible] CUSTER-01	TO-5 API [illegible] GAS CH_4

*OTHER (specify analysis) _____

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☒ Without variation, or
- ☐ With the following variation(s) from the plan:

_____

_____

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.
- ☒ NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☒ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason: _____

DEQ representative:

Signature _____ Printed Name Sris Traham

Telephone #: 307 745 7474 Date: 3/6/18

Property owner/operator copy = white DEQ copy = yellow

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID: 11 CUSTER AVE

Project Name: BPCE
Sample location: Basement
Date: 2/28/18
Field Personnel: ST / BS
Recorded by: ST

PID (model/serial #): RAE PPB 3000 / 12875
Helium Detector (model/serial #): Dielectric / MGD 2002 / 041554
Weather: Sunny, 6 mph SSW
Air Temp: -37°F
Atmospheric Pressure: 30.01"

Slab Data

Surface/slab Type: Finished slab
Surface/slab Thickness (inches): Unk
Slab/subsurface substrate comments: Unk
Depth of hole through the slab: Unk assume ~1 ft.
Length of sampling train (feet): 4 ft train + 1 ft probe = 5 ft.

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 150

Helium Tracer Leak Test Field Data

Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Sample Collection Data: Helium Beneath Shroud (%) min	Sample Collection Data: Helium Beneath Shroud (%) max
2/28/18	1314	50	27.5	27.7				
	1315	100	27.3	27.4				
	1315	150	27.1	27.2				
	1315	200	26.9	27.0				
	1316	250	26.7	26.8				
	1316	300	26.5	26.6	0 ppm			33.3%

Conversion: 1.0% = 10,000 ppm
At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
2/28/18	1319	1358	20180228-11 CUSTER-01	0069	1178		-26.5	-3

Comments:

489 ppb in subslab
0 LEL, H_2S, CO_2 in subslab
17.2% O_2

Sub-Slab Soil Vapor Sampling Field Data Sheet

Project Name:				Sample Location/ ID:				
Date:								

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

Location Sketch:

SEE INDOOR AIR SAMPLING FIELD FORM

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	11 CUSTER AVE	Start Weather:	Sunny, <5 mph
		Start Outdoor Air Temp:	34°F
Project Name:	BPCE	Start Atmospheric Pressure:	29.83 in Hg
Sample Location:	1A / BASEMENT		
Date:	2/27/18	End Weather:	Sunny, SSW 6 mph
Field Personnel:	ST, BS	End Outdoor Air Temp:	37°F
Recorded by:	ST.	End Atmospheric Pressure:	30.01 in Hg

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
2/27/18	1302	2/28/18	1306	20180227 - 11CUSTER-01	3479	6268		-26	-2	70°F	70°F
2/27/18	1305	2/28/18	1304	20180227- 11CUSTER-02	0567	1449		-28	-2	70°F	70°F
2/27/18	1307	2/28/18	1305	2018 0227- 11CUSTER-03	3474	1273		-30	-2.5	70°F	70°F

Comments:

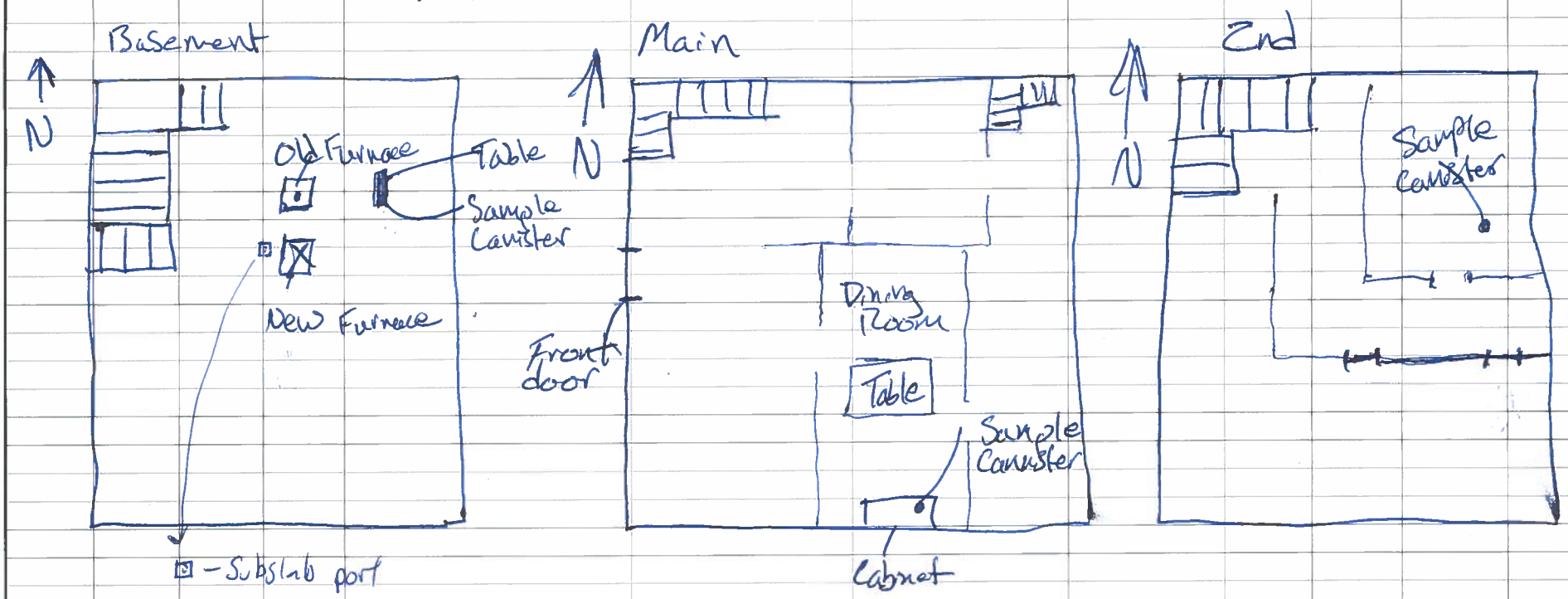
01 - Basement Air.
02 - Mainfloor
03 - 2nd Flr.

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

- 01 - Unfinished basement area used for utilities, storage on end table.
- 02 - placed in dining room on main floor on cabinet top.
- 03 - placed on dresser in upstairs bedroom.

Location Sketch: Basement, Main, Upstairs



OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 2/28/18

1. Name: Pam Merlinger

   Address:
   11 Custer Avenue

   Home Phone: 698-7056 Work Phone: _____

2. What is the best time to call to speak with you? _____ At: Work ☐ or Home ☒?

3. Are you the Owner ☒, Renter ☐, Other ☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

4. Total number of occupants/persons at this location? 2
   Number of Children 0 Ages _____

5. How long have you lived at this location? 23 years

General Home Description

6. Type of Home/Structure (check only one): Single Family Home ☒, Duplex ☐, Apartment ☐, Townhouse ☐ Other _____

7. Home/Structure Description:
   Number of floors: 2
   Basement ☒
   Crawlspace ☐
   Partial Crawlspace/Basement ☐ % of each _____
   Slab On Grade ☐
   Other ☐ _____

8. Age of Home/Structure: 110 years, Not Sure/Unknown ☐

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood ☒, Brick ☐, Concrete ☐, Cement block ☐, Other ☐ _____
   Garage: ☐ Attached ☐ Detached ☐ None

10. Foundation Construction (check all that apply):
    Concrete Slab ☒
    Fieldstone ☐
    Concrete Block ☐
    Elevated Above Ground/Grade ☐
    Other ☐ _____

11. Do you have Private Well ☐ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____

12. Do you have a Septic System? Yes ☐ No ☒ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☒

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☐ Unfinished ☒ Partially Finished ☐ Partial Crawlspace ☐?

15. If finished, how many rooms are in the basement? _____
What are rooms used for? Bedrooms ☐ Family Room ☐ Storage ☐
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐

17. Is the basement floor (check all that apply) Concrete ☒, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☒, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☒

Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☒

21. Does the basement have any of the following? Floor Cracks ☒ Wall Cracks ☐, Sump ☐,
Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe Small cracks in floor.

22. Are any of the following used or stored in the basement (check all that apply):
- [x] Paint
- [ ] Solvents (degreasers, paint thinner, etc.)
- [ ] Fuels/Oils (gasoline, diesel, used oil)
- [ ] Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- [ ] Pesticides

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☐ No ☑
If yes, specify what was done, where in the home, and what month:

24. Have you installed new carpeting in your home within the last year? Yes ☐ No ☑
If yes, when and where? _____

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
No ☑

26. Does anyone in your home use solvents at work?
Yes ☐ If yes, how many persons?
No ☒ If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes ☐ No ☐

28. Where is the washer/dryer located?
Basement ☐
Upstairs Utility Room ☐
Kitchen ☐
Garage ☐
Use a Laundromat ☐
Other, please specify ☒ Main Floor

29. If you have a dryer, is it vented to the outdoors? Yes ☑ No ☐

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas ☒, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system:
- Forced Hot Air ☑
- Forced Hot Water ☐
- Steam ☐
- Radiant Floor Heat ☐
- Wood Stove ☐
- Coal Furnace ☐
- Fireplace ☐
- Other ☐ _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? _____

How is/was the tank filled? _____

Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☐ No ☑
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☐
Other (please specify) _____

33. Do you use any of the following? Room Fans ☐, Ceiling Fans ☐, Attic Fan ☐

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☐ Unknown ☑
If yes, please specify type of pest controlled _____
And approximate date of service _____

36. Water heater type: Gas ☒, Electric ☐, by Furnace ☐,
Other (please describe)_____

37. Water heater location: Basement ☒, Upstairs Utility Room ☐, Garage ☐,
Other (please specify) _____

38. What type of cooking appliance do you have? Electric ☐, Gas ☒
Other (please describe) _____

39. Is there a stove exhaust hood present? Yes ☒ No ☐
Does it vent to the outdoors? Yes ☒ No ☐

40. Smoking in Home:
None ☑, Rare (only guests) ☐, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐

41. If yes to question 40, what is smoked?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☐ No ☒

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation: No

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

45. Please check weekly household cleaning practices:

Dusting ☐

Dry Sweeping ☐

Vacuuming ☐

Polishing (furniture, etc.) ☐

Washing/Waxing Floors ☐

Other (describe) ☐ _____

46. Other comments:

_____

_____

_____

_____

_____

_____

_____

_____

_____

47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

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Property Owner/Operator Information:

Name: Shane Erving

Physical Address of property under investigation: 195 S. Broadway, Billings, MT

Mailing Address: Same

Phone (optional): 406-670-4219

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
3/2/18	AIR	20180302-195 BROADWAY-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15
3/2/18	AIR	20180302-195 BROADWAY-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15 FIXED CH
			Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*

*OTHER (specify analysis) _____

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☒ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.

N/A

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☒ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason: _____

DEQ representative:

Signature: [signature] Printed Name: Syris Trahan

Telephone #: 307 719-7474 Date: 3/4/18

Property owner/operator copy = white DEQ copy = yellow

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	Billings PCE GW Facility	Start Weather:	Cool, cloudy with NW 5 mph
		Start Outdoor Air Temp:	18°F
Project Name:	VI Investigation	Start Atmospheric Pressure:	29.9 in Hg
Sample Location:	19 S Broadway		
Date:	3/2/18	End Weather:	Sunny, 9 mph NNE
Field Personnel:	SS / ST / BS	End Outdoor Air Temp:	33°F
Recorded by:	SS	End Atmospheric Pressure:	29.83

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
3/2/18	0810	3/2/18	1552	20180302 - 19S Broadway -01	3491	0028	—	-26 in Hg	2	64°F	~60°F

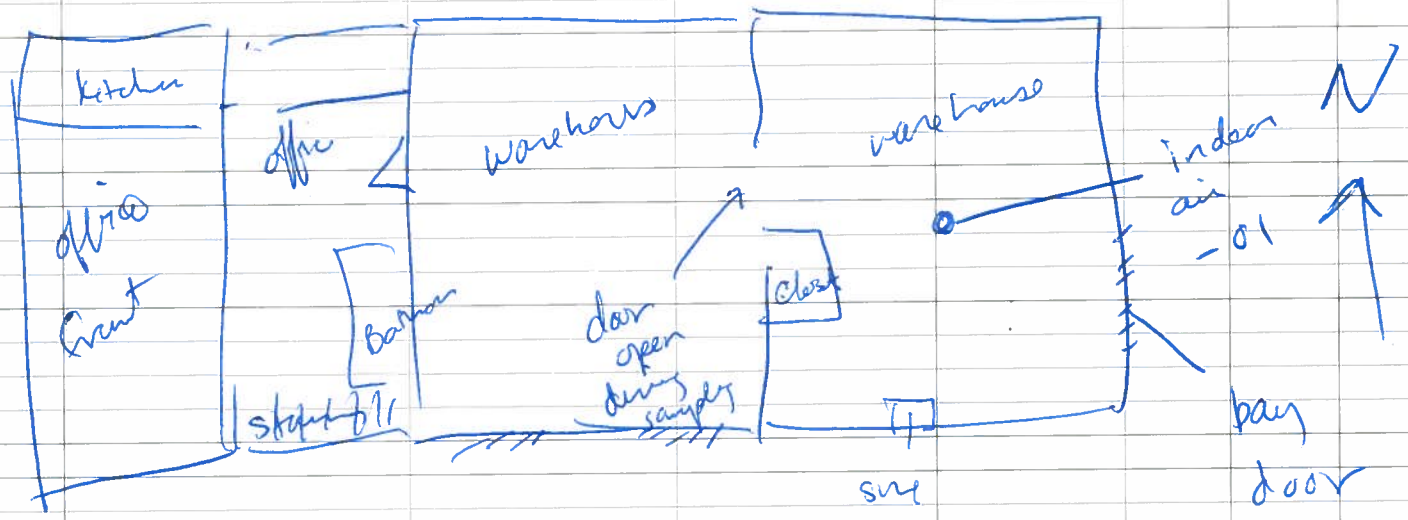
Comments:

-01 Passed shut in ✓ S/S
Located in center of ~~West~~ EAST warehouse area sample, area of building same as sub-slab port set @ ≈ 4' off ground.
S/S

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

Location Sketch:



Testwell
Five point

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	19 S. Broadway		
Project Name:	BPCE	PID (model/serial #):	PPb RAE 3000 / 12875
Sample location:	19 S. Broadway	Helium Detector (model/serial #):	Dielectric / MGD-2002
Date:	3/2/18	Weather:	Sunny, 10 mph NNE
Field Personnel:	BS, ST	Air Temp:	28°F
Recorded by:	BS	Atmospheric Pressure:	29.85

Slab Data

Surface/slab Type:	Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft =
Surface/slab Thickness (inches):	
Slab/subsurface substrate comments:	Transcribed 3/2/18
Depth of hole through the slab:	
Length of sampling train (feet):	

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
3/2/18	1600	50	27.0	27.1			Max 27.5%	
	1601	100	26.7	26.8				
	1601	150	26.3	26.5				
	1601	200	25.9	26.2				
	1602	250	25.6	25.8				
	1602	300	25.0	25.4		0 PPM in Tedlar		

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
3/2/18	1604	1648	20180302-19SBroadway-02	1682	2833		27	25

Comments:

Subslab - 114.5 ppm and climbing slowly after 5 min
LEL - 0%
O_2 - 19.6 %
H_2S - 0
CO - 0

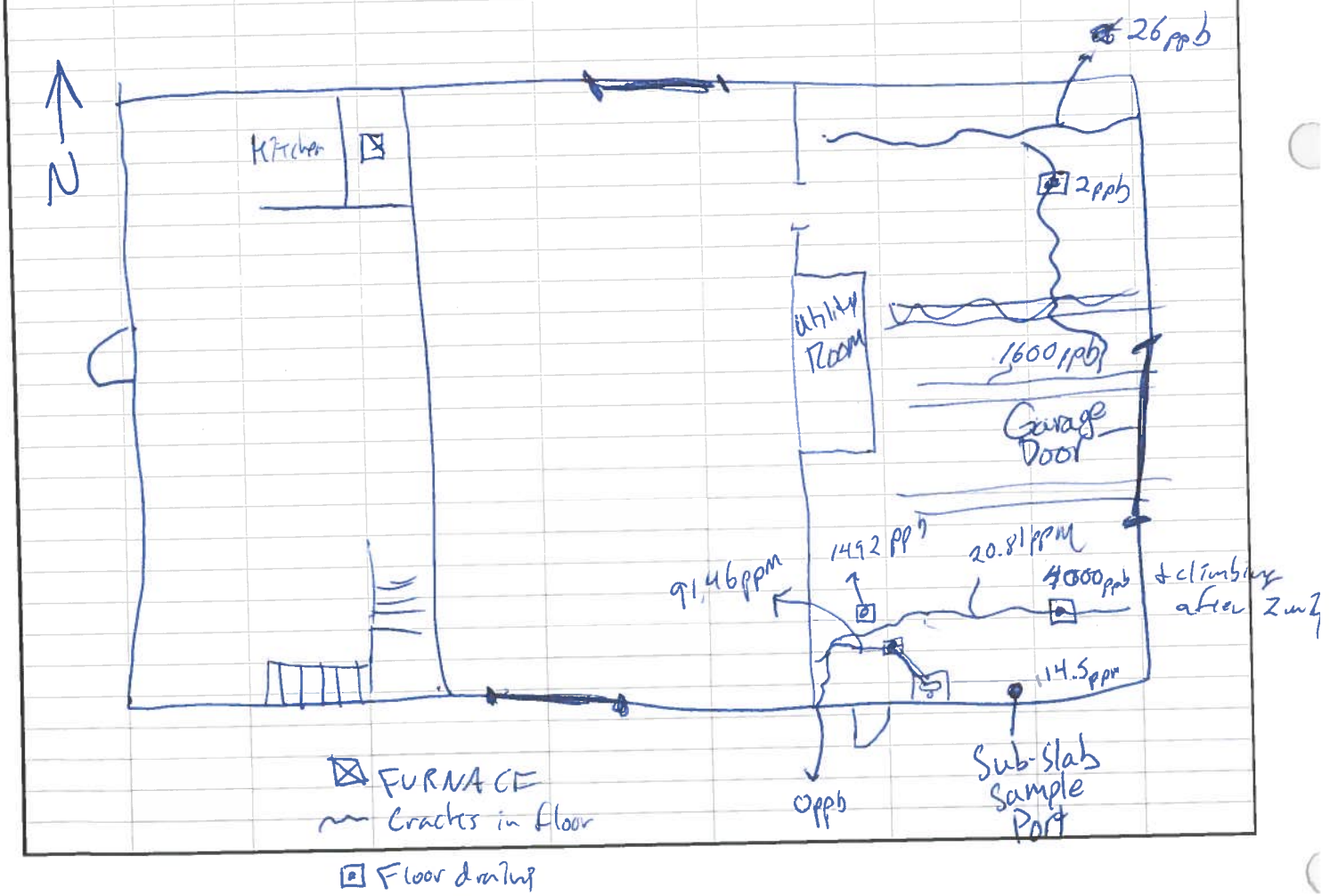
Sub-Slab Soil Vapor Sampling Field Data Sheet

Project Name: ISPCE
Date: 3/2/18

Sample Location/ ID: 19 S. Broadway

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

Location Sketch:



Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	19 S Broadway Ave Billings MT		
Project Name:		PID (model/serial #):	
Sample location:		Helium Detector (model/serial #):	
Date:		Weather:	
Field Personnel:		Air Temp:	
Recorded by:		Atmospheric Pressure:	

Slab Data

Surface/slab Type: Aged concrete	Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft =
Surface/slab Thickness (inches): 5 1/2"	
Slab/subsurface substrate comments: Dark @ subsurface - no odor	
Depth of hole through the slab: ~~9 1/2"~~ 10"	
Length of sampling train (feet):	

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

Canister Information

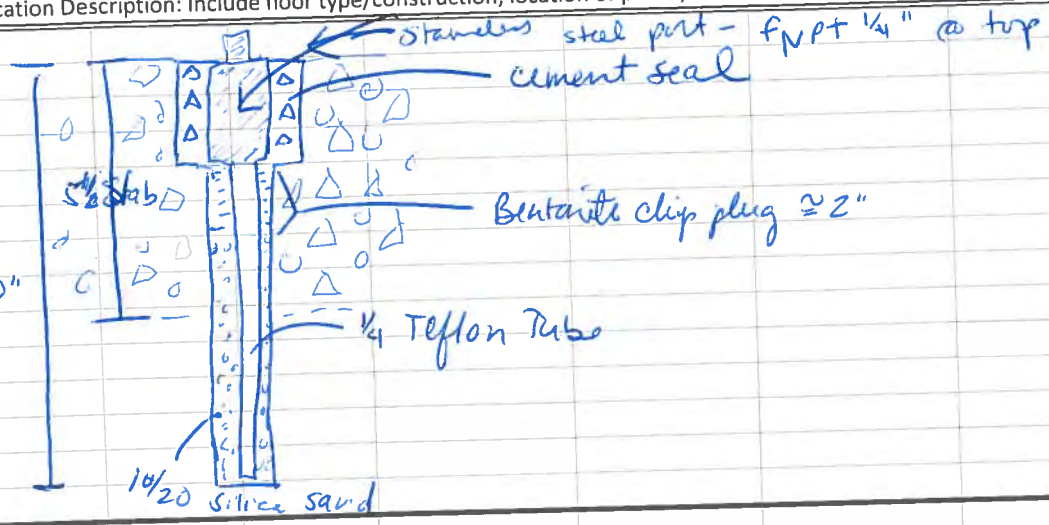
Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum

Comments:

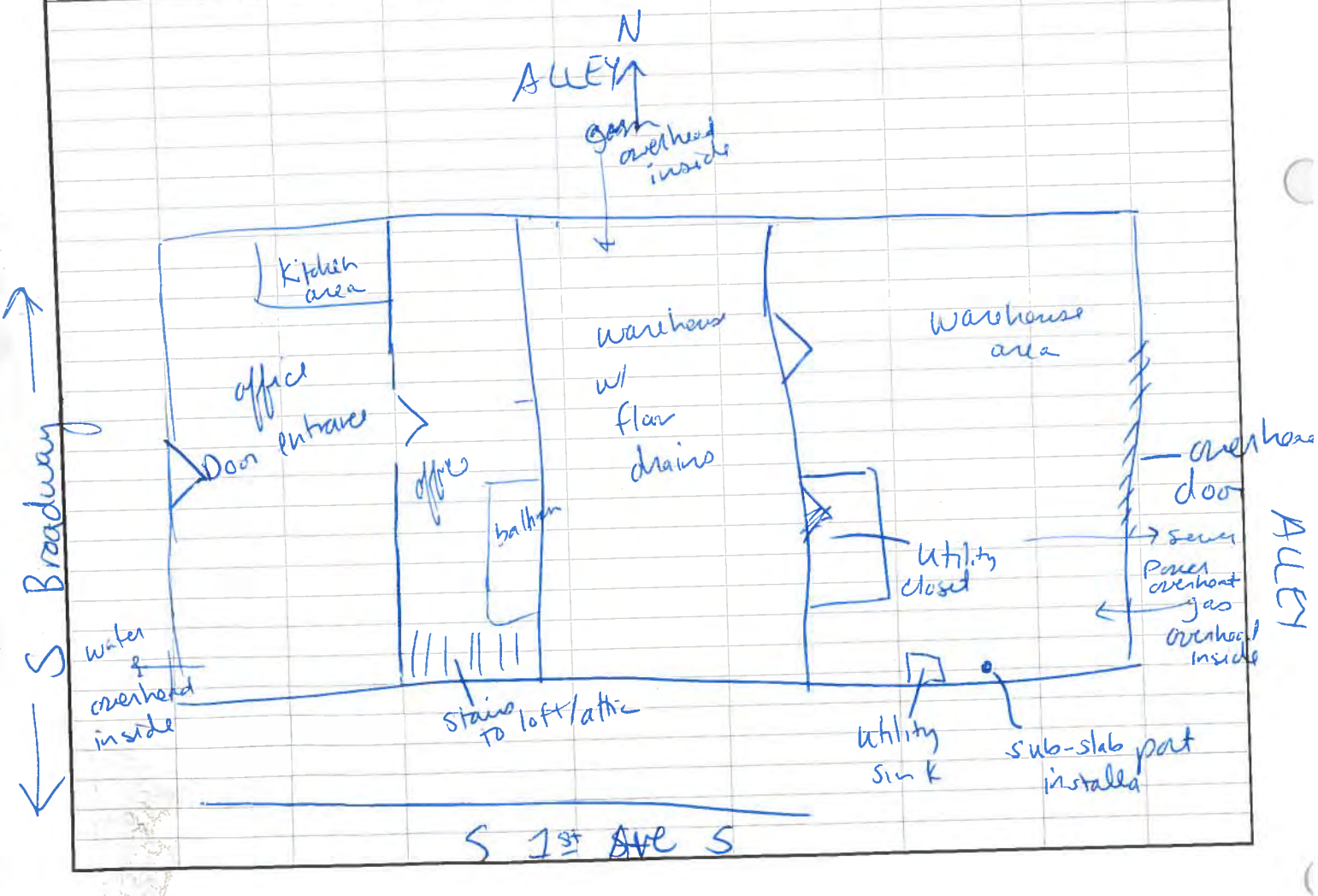
Sub-Slab Soil Vapor Sampling Field Data Sheet

Project Name:	Sample Location/ ID:
Date:	

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.



Location Sketch:



Excavation, Drilling, and Utility-Locating Checklist

19 S Broadway - Former Rex

Task	Date	Initials
A. Excavation-site planning:		
1. The local One Call regulations have been checked for local utility-notification requirements (e.g., 48 hours vs. 72 hours).	2/27	SS
2. Per the local One Call regulations, list the responsible party (generally the excavation/drilling contractor) for requesting and verifying completion of utility locates below: TRIHYDRO	2/27	SS
3. The property owner and/or business owner has been notified of the excavation schedule. Yes - met @ site (Shane Erving)	2/27	SS
4. Each proposed excavation site or "area of interest" has been delineated for utility-line locators using white spray paint and/or wooden stakes/lathes with white flagging.	NA	—
5. Public-utility locates have been requested by calling One Call at least 48 hours (72 hours in some states) before work is scheduled to begin, and the request includes depths, as available.	2/27	SS
6. Each utility company has been notified of the excavation schedule and invited to review the proposed excavation sites. 811 / one call ✓	2/27	SS
7. On-site meetings have been scheduled with the appropriate representatives of critical utility facilities (e.g., gas/oil pipelines, high-voltage cables, fiber-optic lines).	NA	—
8. Private-utility locates—including fuel lines; tanks; and water, sewer, gas, electricity, and other utilities—have been requested.	NA	—
9. The property owner was contacted to determine if he/she knows of privately owned subsurface facilities within 5 feet of the proposed excavation sites. (Review locations with the manager/~~owner.~~) Examples of privately owned facilities that are not commonly marked on private property include: Property owner		
a) Water and sewer laterals ✓	2/27	SS
b) Gas lines ✓ aboveground as enter building	2/27	SS
c) Power lines (including those for landscape/yard lighting, pool and spa lines, and "out building" lines) overhead	NA	—
d) Irrigation lines NA	2/27	SS
e) Communication lines (cable, telephone, Internet) Aboveground	NA	
f) Propane tank lines NA		
10. The proposed excavation sites have been reviewed by the appropriate stakeholders (~~e.g., owner, tenant, driller, excavator) and the Trihydro project~~ manager. Field TRIHYDRO	2/27	SS
11. Proposed excavation sites have been visually inspected, ~~and available plans and aerial photos~~ have been reviewed for evidence of potential utilities. SS no plans/photos	2/27	SS
12. A scaled site plan showing the proposed excavation sites relative to subsurface utilities has been prepared and is available for stakeholder/Management review.	NA	SS
13. The basis for each buried utility line's location and the accuracy of the data defining the utility location are documented on the site plan.	NA	—
14. The proposed excavation sites are at least 5 feet from subsurface utilities shown on the building plans. no plans > 5 ft visual	SS	8/27
15. The proposed excavation sites are at least 5 feet from subsurface utilities shown on public right-of-way / street-improvement plans. [Note: Work with utility companies to determine if they require a representative present during excavation activities.] inside building	NA	—
16. The proposed excavation sites are at least 7 feet from the pad surrounding underground storage tanks (USTs) shown on the building plans.	NO USTS	
17. The utility-locate ticket number is available on site. 180048044 (refresh)	2/27	SS
18. A traffic-control plan has been prepared if appropriate. Note: If the project area encompasses a public street or right of way, the local and/or state authority must approve the traffic-control plan before fieldwork begins.	NA	—
19. Arrangements have been made to contact the appropriate personnel if utility-line repairs are needed. (Who must be contacted if a line is unexpectedly damaged?)	NA	—
20. Contact information is in place and readily available with the driller, excavator, and other project stakeholders. TRIHYDRO WP	2/27	SS
21. The client and other relevant stakeholders (if any) have been notified of the excavation planning/pre-planning steps and results. Work Plan only	2/27	SS
22. A detailed work scope was developed by the project team and reviewed by the Project Director and Contracting Team. Work Plan Addendum	2/27	SS
Project Director (excavation-site planning tasks):	NA	SS

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
B. Utility-line marking:		
1. Electrical circuits are energized during utility-line marking for subsurface power lines (e.g., circuits on timers or light-sensing switches). NOT designed overhead	—	
2. Public-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	2/27	SS
3. Private-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	NA	—
4. Verify that One Call locators marked their facilities in the designated excavation area or provided notification that they do not have any facilities near the proposed excavation sites.	2/27	SS
5. One Call was contacted to request a "refresh" if utility-locate markings are missing, difficult to see, or more than 14 days old (7 days in some states). "Refresh" markings must be performed by the original marking organization.	2/27	SS
Project Director (utility-line marking tasks):	NA	SS
C. Job walk:		
1. Visual verification that each proposed excavation site does not lie on a line connecting two similar-looking manhole covers (e.g., sanitary sewers or storm drains). (Consider having the line snaked to confirm their locations.)	2/27	SS
2. Visual verification that each proposed excavation site does not lie on a line with any water, gas, electrical meters, utility cleanouts, or other utility boxes in the surrounding areas.	2/27	SS
3. Visual verification that the pavement near each proposed excavation site has not subsided or give the appearance it may be covering a previous excavation (e.g., linear cracks or sagging curbs).	NA	—
4. Visual verification that each proposed excavation has adequate overhead clearance for the excavation equipment (e.g., at least 10 feet from overhead-utility lines and/or reasonable distance from canopies).	2/27	SS
5. Fences and fields have been checked for markers, signs, posts, valves, stub outs, etc.	NA	—
6. Surface structures such as tank batteries, wells, valves, phone pedestals, and electrical junction boxes have been checked for evidence of subsurface utilities.	NA	—
7. Observed evidence of subsurface utilities has been photographed, sketched, or otherwise documented.	2/27	SS
8. Proposed excavation sites have been "walked"/reviewed by the excavation contractor, ~~Trihydro project manager, and other stakeholders (e.g., client representative, property owner, tenant).~~ TRIHYDRO Field staff only	2/27	SS
9. Proposed excavation sites are located at least 5 feet from marked utilities (i.e., the "tolerance zone"), or written approval to excavate within the 5-foot tolerance zone has been obtained from the appropriate utility owner. In no case shall a proposed excavation be located closer than 2 feet from the outside edge of a marked utility. (Note: The tolerance zone is measured from the outside edge of a subsurface structure—not its centerline.)	2/27	SS
10. Verify that the excavation contractor (with help from appropriate utility-line locators, if part of the client-approved work scope) has walked each proposed excavation site to verify all expected utility-line markings are present.	2/27	SS
11. Traffic-control devices, safety barricades, caution tape, and other safety-management devices are in place as needed to protect project personnel.	NA	—
Project Director (job-walk tasks):	NA	SS
D. Daylighting / potholing / "soft digging":		
1. The proposed excavation sites located within the "tolerance zone" (and sites located outside the "tolerance zone" when required by the client) have been potholed to a depth below the anticipated utility zone using "minimally intrusive excavation methods" such as vacuum excavation (either air-entrainment or water-jet) and careful hand-tool use.	NA	SS
2. Monitoring and emergency equipment is available on site when hazardous atmospheres are expected to be encountered in the potholing excavations.	↓	↓
3. A list of emergency-contact names/numbers is maintained at the potholing excavation site.	↓	↓
4. The project health and safety plan addresses potential hazards and safety-performance requirements related to utility-clearance operations.	↓	↓
5. The location of and directions to the nearest hospital are known by all members of the project team.	↓	↓
6. Representatives of utility owners that requested to be on site for utility locates are present.	↓	↓

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
7. Pothole excavations have been visually checked with a flashlight by the excavation contractor, Trihydro project manager, or her/his designee.	NA	SJS
8. Utilities adjacent to the excavation or that cross the excavation have been daylighted using "minimally intrusive excavation methods."		
9. The areal extent of the excavation-clearance pothole has been verified to extend at least 120% beyond the outside diameter of the largest-diameter down-hole tool to be used in the borehole, or at least 2 feet on each side of daylighted/exposed lines, whichever is greater.		
10. If vacuum excavation (e.g., air knife, air vac, hydro-vac) is not available to daylight utility lines, verify that the non-conductive probe method was used as follows: Scratch the ground no more than 10 inches deep above the utility and then probe the scratched area. If the utility isn't found in the scratched area, repeat the first step until the utility is located. Once the utility is found, its depth must be continually verified with the probe until 2 feet of soil remain above the utility. Carefully hand dig the remaining overburden to expose the utility.		
11. The soil encountered in the excavation-clearance pothole has been verified to be free of bedding material (e.g., clean gravel, clean sand, aggregate base [gravelly sand with ~10% fines], or other non-native-looking material) that could indicate the presence of a previously installed utility line.		
12. Excavation work within 2 feet of an underground utility was "hand dug."		
13. Once the utility lines were exposed and the excavations were safe to enter, the exposed lines (including their protective coating) was examined for damage.		
14. The condition of each utility line exposed during daylighting was documented, and the documentation was forwarded to the Trihydro project manager to place in the project file.		
15. If a utility line was damaged in any way, it was reported to the utility owner and Trihydro project manager and documented in the project file.		
16. Damage to a utility line was documented and repaired before it was reburied. The utility owner signed off on the repairs.		
17. Employees entering the excavation followed the procedures described in the Trihydro "Trenching and Excavation Program" and used the Trihydro "Daily Excavation/Trench Inspection Report" to document excavation condition.		
18. The location of daylighted utilities was documented and photographed after daylighting was completed and before the pothole excavation was backfilled.		
19. Locations for hand digging within the "tolerance zone" were noted.		
Project Director (daylighting/potholing tasks):		
E. Excavation (including drilling):		
1. The appropriate permits have been obtained for the work (e.g., hot-work permits, entry permits).	NA	—
2. The utility-owner and/or agency representatives that requested to be on site during excavation work are present. (Trihydro Utility Locate Acknowledgement Form) no owners on site	NA	—
3. A safety kickoff meeting was conducted with the excavation contractor to review roles/responsibilities, work activities, anticipated hazards, this checklist, and emergency-response procedures before starting excavation work the site. The safety kickoff meeting was documented in the project file.	2/27	SJS
4. A daily tailgate safety meeting was conducted and documented in the project file. Verify weather conditions, safety hazards, PPE requirements, job duties, communication, hand signals, etc.	2/27	SJS
5. JSAs covering the work to be done are in place and have been reviewed, "marked up" where appropriate, and acknowledged by the excavation project-team members.	2/27	SJS
6. Site workers have been reminded to look for hazardous conditions, processes, and activities, and that they are authorized to stop work if they see an unsafe condition.	2/27	SJS
7. The emergency-response plan has been reviewed by all excavation project-team members (e.g., contact numbers, ~~evacuation muster points~~ SJS, hospital routes).	2/27	SJS
8. The excavation contractor has checked the excavation sites relative to overhead utilities, subsurface-utility locates, and adjacent surface structures.	2/27	SJS
9. The excavation contractor has acknowledged the potential location of each subsurface utility marked in the excavation areas.	2/27	SJS
10. Proper traffic control and exclusion zones have been established.	NA	—
11. The excavation equipment (e.g., drill rig, backhoe) has been inspected for proper operation and condition. (drill)	2/27	SJS
12. Emergency equipment (~~fire extinguisher~~, first aid kit, ~~emergency shut-off switch, etc.~~) has been checked, is readily available, and is in working order.	2/27	SJS
13. Excavation project-team members are wearing appropriate PPE per the Trihydro HASP and client/site-specific requirements.	2/27	SJS
14. Power in the excavation area has been de-energized, if possible. If power cannot be de-energized, the excavation contractor was advised of the hazard. energized	NA	—

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
Project Director (excavation/drilling tasks):	NA	SJS
F. If an unmarked utility line is discovered:		
1. Verify the One Call utility-locate request was made correctly.	NA	SJS
2. Identify the owner/operator of the unmarked utility line and contact One Call (dial "811") to request a "No Response" ticket. If the owner/operator fails to respond again, seek a third-party locating service to mark the utility before: a) excavation work begins, or b) advancing the excavation further.		
3. Contact the owner/operator of non-locatable utilities to request they be taken out of service before excavation begins.		
4. If possible, a representative of the unmarked utility line should be on site when the unmarked utility is daylighted.		
Project Director (unmarked utility line tasks):		

Note:

-- If an item doesn't apply, please insert an "NA" in the "**Date**" column and provide an explanation in the "**Project Notes**" section below.

SJS for A Vann	S. SEITZ, S. TRAHAN, B. SCHICHE	2/27/18
Project Manager	Field Manager / Team Members	Date Reviewed
MT DEQ / 19 S Bradley	TRIHYDRO	NA
Client / Project Name / Location	Excavator/Driller Name	Date Action Items Completed

Project Notes: [Please cross reference to the appropriate checklist-item number[s] when possible.]

Department of Environmental Quality
Hazardous Waste Site Cleanup Bureau P.O. Box 200901 Helena MT 59620-0901 (406) 841-5000

COMMERCIAL / INDUSTRIAL BUILDING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 2/27/18 Survey / questionnaire completed by: S. Seitz

1. Contact Name: Shana Erving (not present - inspected by Mr Lydia
   Address: 19 S Broadway City: Billings State: MT Zip: 59102
   Phone 1: 406-670-4219 Phone 2: _____ Cell Phone: _____

2. What is the best time to call to speak with you? unk.

3. Are you the Owner ☑, Renter ☐, Other ☐ (please specify) _____ of this Building/Structure? If you are not the owner, please provide owner contact information
   Owner Name: _____
   Address: _____ City: _____ State: _____ Zip: _____
   Phone 1: _____ Phone 2: _____ Cell Phone: _____

4. Total number of occupants/persons at this location? none - vacant @ time
   Number of Children NA Ages commercial business

5. How long have you occupied this location? _____
   Days per week the building is occupied NA Hours per day the building is occupied _____
   Describe typical shifts and types of labor (office, light labor, heavy labor, etc.) _____
   8 hr sampling

General Building / Structure Description

6. Type of Building/Structure (check only one): Single Business ☑, Multiple Businesses ☐, Other former car sales, prior Rex Cleaners (pre 1966)

7. Building/Structure Description:
   Number of floors: 1 Area /square footage of main or ground floor: 3500 square feet
   Basement ☐ Area /square footage of Basement: 0 square feet
   Crawlspace ☐ Area /square footage of Crawlspace: 0 square feet
   Partial crawlspace/basement ☐ % of each 0
   Slab on grade ☑ Area /square footage of Slab on grade: 3500 square feet
   Other ☑ loft off office to attic area

8. Age of Building/Structure: 1920's years, Not sure/Unknown ☑

9. General Above-Ground Building/Structure construction (check all that apply):
   Wood ☐, Brick ☑, Concrete ☐, Cement Block ☐, Other ☑ sheet / stucco cover

10. Foundation Construction (check all that apply):
Concrete Slab ☐
Fieldstone ☐
Concrete Block ☐
Elevated Above Ground/Grade ☐
Other ☐ _____

11. Do you have a Private Well ☐ or Cistern ☐?
If yes, please describe location, use, and current condition _____
NO

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____ city water | city sewer
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your Building? (pond, ditch, etc.) Yes ☐ No ☐

Basement Description (please check all boxes that apply): NO basement

14. Is the basement Finished ☐ or Unfinished ☐?

15. If finished, how many rooms are in the basement? _____
What are rooms used for? Office ☐, Shop ☐, Storage ☐,
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐

17. Is the basement floor (check all that apply) Concrete ☐, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☐, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

concrete slabs have cracks in oldest (rear) area bay and floor drains in both work bays

21. Does the basement have any of the following? Floor Cracks ☑, Wall Cracks ☐, Sump ☑, Floor Drain ☑, Other Hole/Opening In Floor ☐
Describe basement NA, but

22. Are any of the following used or stored in the basement (check all that apply):
Paint ☐, Paint Stripper/Remover ☐, Paint Thinner ☐, Metal Degreaser/Cleaner ☐, NA
Gasoline ☐, Diesel Fuel ☐, Solvents ☐, Glue ☐, Laundry Spot Removers ☐,
Drain Cleaners ☐, Pesticides ☐,
Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.) ☐,
Other products with/containing Volatile Organic Compounds, describe: _____

23. Has the Building / structure recently (within the last six months) had any painting or remodeling?
Yes ☐ No ☑
If yes, specify what was done, where in the Building, and what month:

24. Has new carpeting been installed in the Building / Structure within the last year? Yes ☐ No ☑
If yes, when and where? _____

25. Do any occupants / employees regularly conduct or work in the beauty / hair-dressing business?
Yes, work at a beauty / hair-dressing business ☐
Yes, store supplies for beauty / hair-dressing business ☐ Distance to sample point: _____
Yes, building contains beauty / hair-dressing business ☐ Distance to sample point: _____
Yes, building is near beauty / hair-dressing business ☐ Distance to sample point: _____
No ☑

26. Do any occupants / employees / anyone regularly use or work or conduct a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
Yes, building contains or is near dry cleaning service ☐ Distance to sample point: _____
No ☑ Former Dry cleaner before 1966 – Rex Cleaners

27. Do any occupants / employees / anyone in the Building / structure use solvents at work?
Yes ☐ If yes, how many persons?
No ☑ If no, go to question 28 not occupied

28. If yes for question 26, are the work clothes washed at Building? Yes ☐ No ☑

29. Does Building / Structure contain a washer/dryer? Yes ☐ No ☑
Where are they located?
Basement ☐
Upstairs ☐
Ground floor ☐
Garage ☐
Other, please specify ☐ _____

30. If Building / Structure contains a dryer, is it vented to the outdoors? Yes ☐ No ☑

31. What type(s) of Building heating do you have (check all that apply)
Fuel type: Gas ☑, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system: Forced Hot Air ☑ Forced Hot Water ☐ Steam ☐
Radiant Floor Heat ☐ Wood Stove ☐ Coal Furnace ☐ Fireplace ☐
Other ☐ _____

32. Does Building / Structure have (or had in the past) a storage tank for storage of Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? unknown – possible based on Phase 2 from DSR
How is/was the tank filled?
Is there staining near the tank? Yes ☐ No ☐

33. Does Building / Structure have air conditioning? Yes ☐ No ☐
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☐ unknown
Other (please specify)

34. Does Building / Structure have any: Room Fans ☐, Ceiling Fans ☐, Attic Fan ☐ unknown

35. Does Building / Structure ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐ unknown

36. Has Building / Structure had termite or other pesticide treatment? Yes ☐ No ☐ Unknown ☒
If yes, please specify type of pest controlled
And approximate date of service

37. Water heater type: Gas ☒, Electric ☐, by Furnace ☐,
Other (please describe)

38. Water heater location: Basement ☐, Upstairs ☒, Ground Floor ☐, Attic ☒,
Other (please specify)

39. Does Building / Structure have any cooking appliances? Electric ☐, Gas ☐
Other (please describe)

40. Is there a stove exhaust hood present? Yes ☐ No ☐
Does it vent to the outdoors? Yes ☐ No ☐

41. Smoking in Building / Structure:
None ☒, Rare (only guests) ☐, Moderate (occupants, light smokers) ☐,
Heavy (at least one heavy smoker in Building / Structure) ☐
not currently occupied

42. If yes to question 41, what do they smoke?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐

43. Does Building / Structure regularly contain/use air fresheners? Yes ☐ No ☐

44. Does anyone in the Building have indoor Building hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐
used to be for car work @ times
used to be drycleaner in 1900s and before

45. General Building / Structure use of industrial / office / consumer products (circle as appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol Deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window Cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuel	Never	Hardly ever	Occasionally	Regularly	Often

unknown

46. Please check weekly Building / Structure maintenance, janitorial, and cleaning practices:

Dusting ☐
Dry Sweeping ☐
Vacuuming ☐
Polishing (furniture, etc.) ☐
Washing/Waxing Floors ☐
Other (describe) ☐ _____

unknown - unoccupied @ time of sampling

47. Other comments including items / subjects not covered in this questionnaire yet an issue or concern for the Building / Structure:

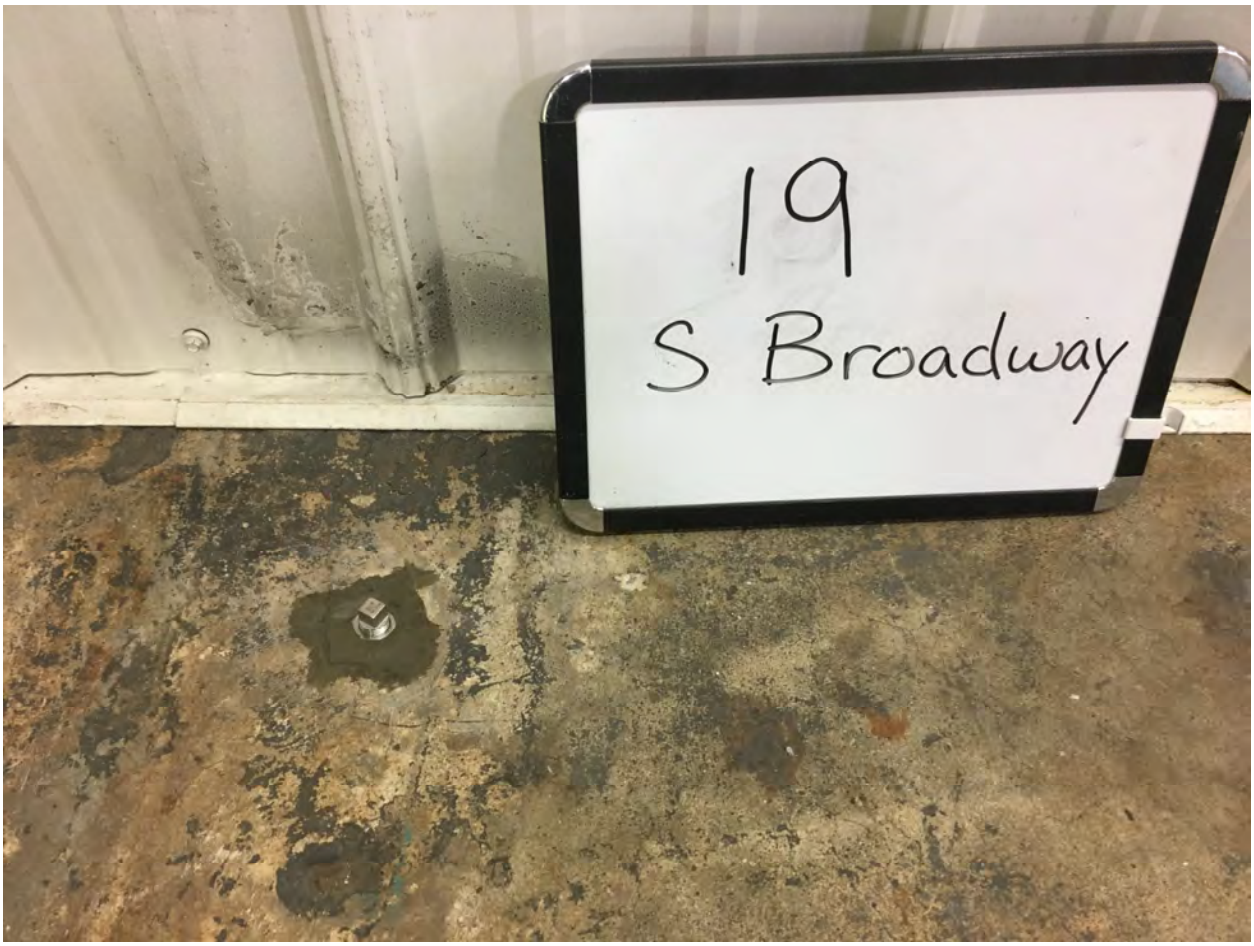
Owner Shane Ervin met Trihydro to give access. Did not stay for interview. Info from Trihydro walk-through and past reports

48. **Chemical Inventory/Summary**

Chemical/Chemical Product (consumer name)	Amount present in Building / Structure
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

VI Sample: 19 S Broadway_Subslab

VI Sample: 19 S Broadway_Subslab



ADDRESS: 19 S BROADWAY

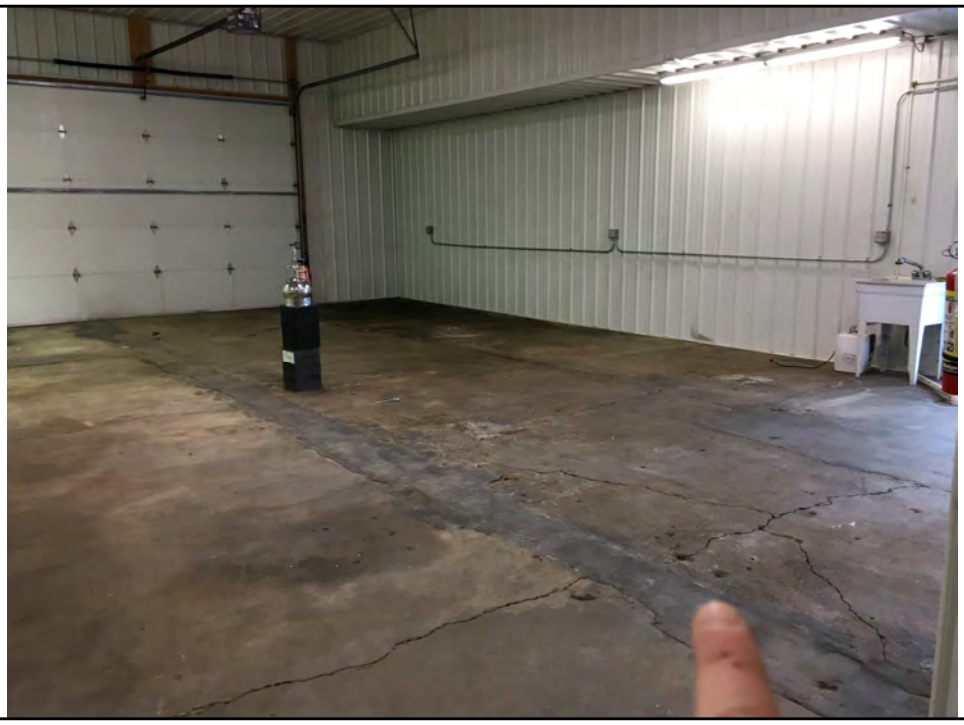
NOTES:
INDDOR AIR IN EAST WAREHOUSE BAY (LOOKING WEST)

ADDRESS: 19 S BROADWAY

NOTES:
INDDOR AIR IN EAST WAREHOUSE BAY (LOOKING SOUTHEAST)

ADDRESS: 19 S BROADWAY

NOTES:
INDDOR AIR IN EAST WAREHOUSE BAY (LOOKING EAST)

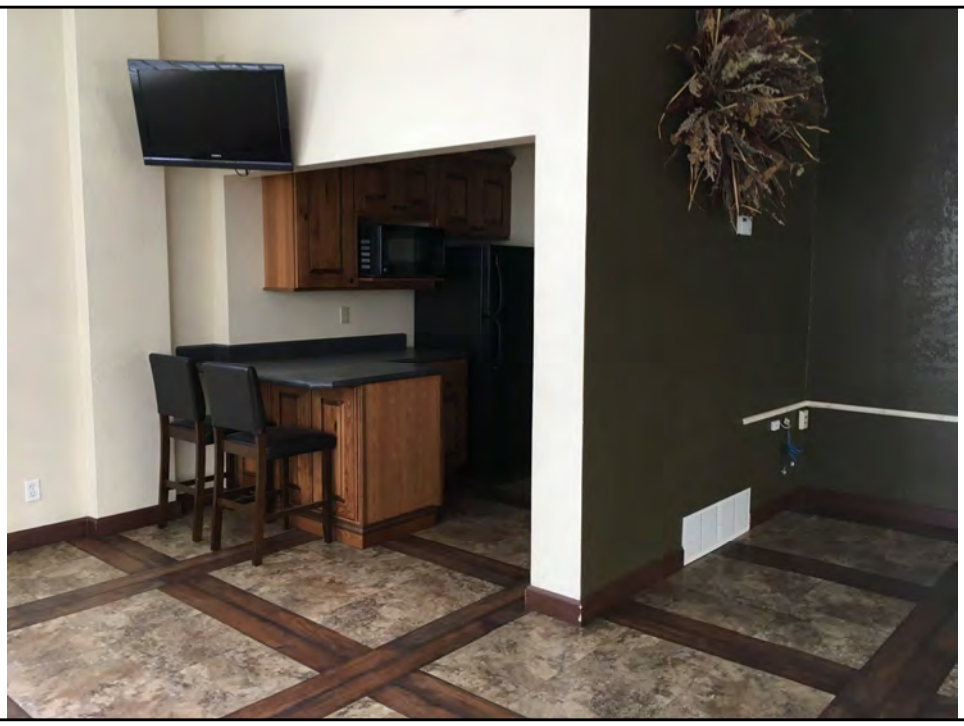


ADDRESS: 19 S BROADWAY

NOTES:
INDDOR AIR IN EAST WAREHOUSE BAY (LOOKING SOUTHEAST) – FLOOR HAS CRACKS AND VISIBLE STAINING

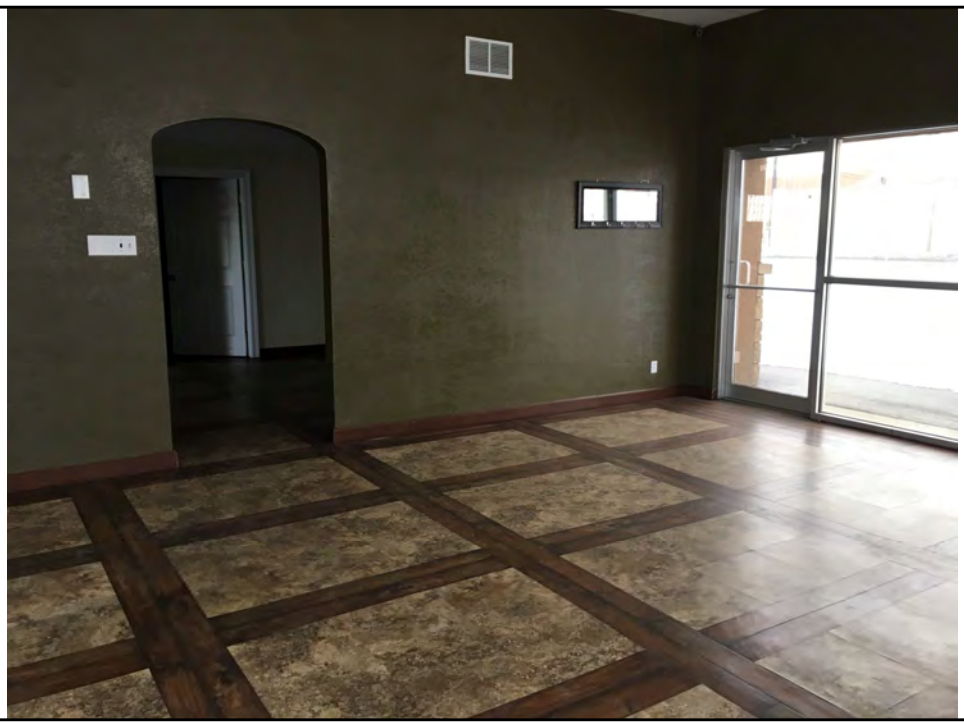
ADDRESS: 19 S BROADWAY

NOTES:
INDOOR AIR IN CENTRAL WAREHOUSE BAY (LOOKING EAST)



ADDRESS: 19 S BROADWAY

NOTES:
INDOOR OFFICE AREA IN WEST OF BUILDING – NOT OCCUPIED AT THE TIME AND NOT SAMPLED



ADDRESS: 19 S BROADWAY

NOTES:
INDOOR OFFICE AREA IN WEST OF BUILDING – NOT OCCUPIED AT THE TIME AND NOT SAMPLED

ADDRESS: 19 S BROADWAY

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NOTES:
INDOOR OFFICE AREA IN WEST OF BUILDING – NOT OCCUPIED AT THE TIME AND NOT SAMPLED

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Star Service

Physical Address of property under investigation: 26 S. 24th S. Billings, MT

Mailing Address: Same

Phone (optional):

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/28/18	AIR	20180228-265 2455-0	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/28/18	AIR	20180228-265 2455-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
			Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*

*OTHER (specify analysis)

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☐ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.
- ☒ NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☐ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

Signature

Printed Name: Syris Trahan

Telephone #: 307 715-7474

Date: 3/6/18

Property owner/operator copy = white DEQ copy = yellow

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID: 26 S. 24th J-4

Project Name: BPCE
Sample location: NE Corner S.Slab
Date: 2/28/18
Field Personnel: ST/BS/LD
Recorded by: ST

PID (model/serial #): ppb RAE 3000/12875
Helium Detector (model/serial #):
Weather: Sunny, SSW 6mph
Air Temp: 35°F
Atmospheric Pressure: 30.01in Hg.

Slab Data

Surface/slab Type: Concrete slab.
Surface/slab Thickness (inches): 2" slab
Slab/subsurface substrate comments: Competent concrete w/ aggregate below
Depth of hole through the slab: 5"
Length of sampling train (feet): ~5ft.

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 150ml

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
2/28/18	1512	50	33.9	34.1				
	1512	100	33.8	33.9				
	1513	150	32.6	33.2				
	1513	200	31.8	32.1				
	1514	250	31.3	31.6				
	1514	300	30.8	31.6	375ppm			34.1

Conversion: 1.0% = 10,000 ppm
At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
2/28/18	1517	1555	20180228-265245T-02	3478	0728		-28	-4

Comments:

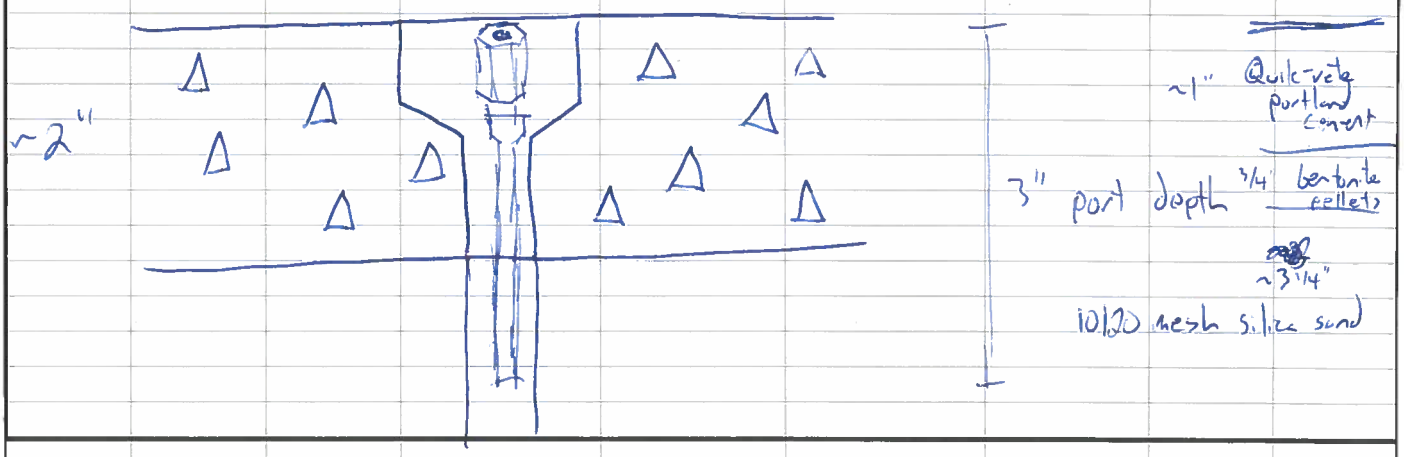
Indoor Air
PID - 1607ppb Max
H2S - Ø ppm
LEL - 0%
O2 - 20.9
CO - 17ppm

Subslab
PID - 890ppb Max
CO - 0
H2S - 0.0
OXY - 20.9%
LEL - 0%

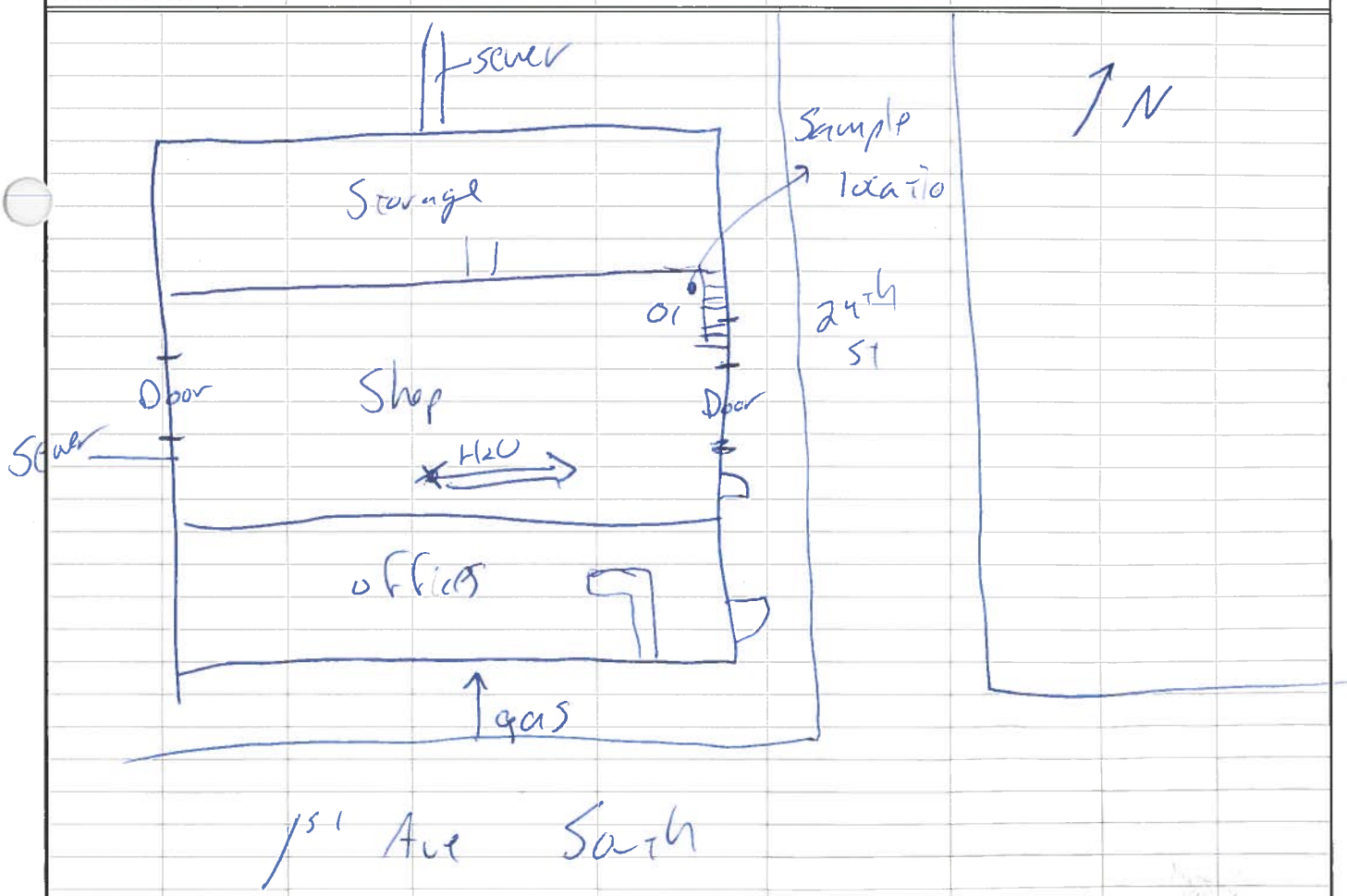
Sub-Slab Soil Vapor Sampling Field Data Sheet

Project Name:	Sample Location/ ID:
Date:	

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.



Location Sketch:



Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	26 S. 24th Street	Start Weather:	Mostly Sunny, Winds SW 17mph
		Start Outdoor Air Temp:	16°F
Project Name:	MDEQ Billings PCE	Start Atmospheric Pressure:	30.10 in
Sample Location:	Wearhouse		
Date:	02/28/2018	End Weather:	Sunny SSW 6mph
Field Personnel:	Jock Riebli	End Outdoor Air Temp:	35°F
Recorded by:	Jock Riebli	End Atmospheric Pressure:	30.01 inHg

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
2/28/18	0705	2/28/18	1504	20180228-26S 24ST-01	2191	FC 0330	—	-28.5	-5.5	~75°F	~70°
2/28/18	0705	2/28/18	1504	20180228-A	0557	FC0227	—	-29.5	-3	~75°F	~70°

Comments:

Canister Tests: (2 minute)

#2191	FC 0330	-28.5	-28.5	(Pass)
#0557	FC 0227	-29.5	-29.5	(Pass)

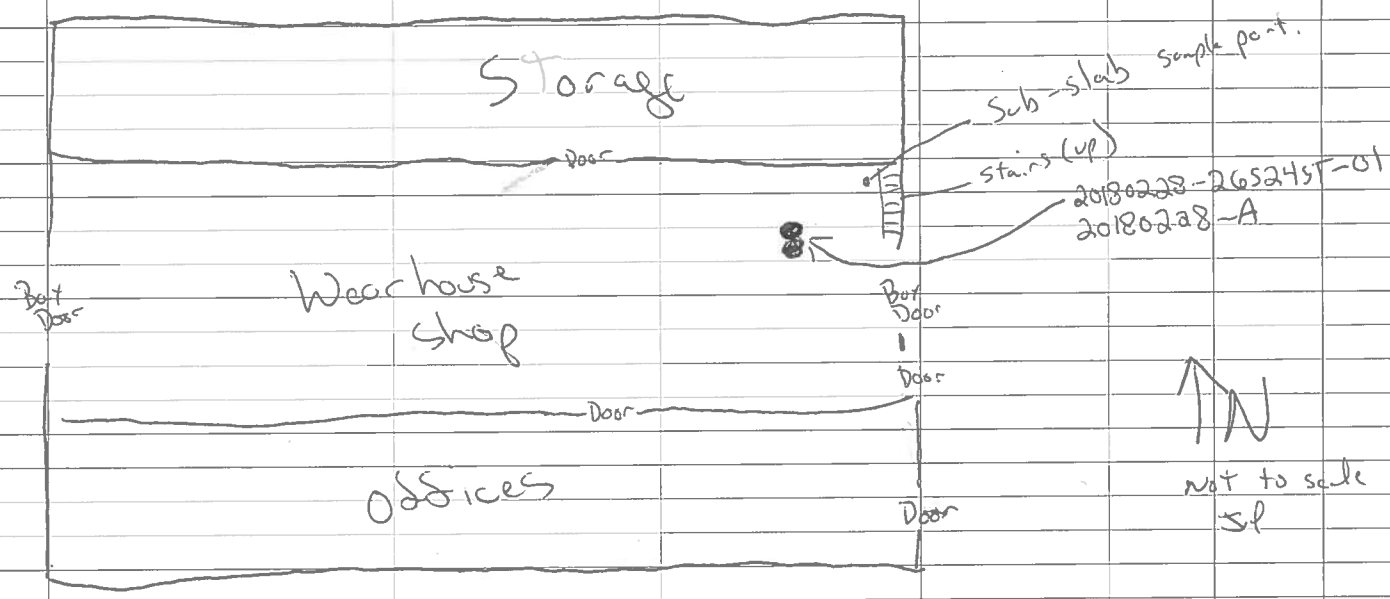
Forklift running on propane active in shop. Smoking in shop.

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s): MDEQ Billings PCE 26 S. 24th Street

Place an 8-hr canister & Duplicate in the warehouse/shop area. The sample zone is set approximately 4' bgs in the area of the sub-slab sample area near the stairs.

Location Sketch:



Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
A. Excavation-site planning:		
1. The local One Call regulations have been checked for local utility-notification requirements (e.g., 48 hours vs. 72 hours).	2/12/18	ST
2. Per the local One Call regulations, list the responsible party (generally the excavation/drilling contractor) for requesting and verifying completion of utility locates below: TH	2/12	ST
3. The property owner and/or business owner has been notified of the excavation schedule.	2/12	ST
4. Each proposed excavation site or "area of interest" has been delineated for utility-line locators using white spray paint and/or wooden stakes/lathes with white flagging.	NA	
5. Public-utility locates have been requested by calling One Call at least 48 hours (72 hours in some states) before work is scheduled to begin, and the request includes depths, as available.	2/12	ST
6. Each utility company has been notified of the excavation schedule and invited to review the proposed excavation sites.	NA	
7. On-site meetings have been scheduled with the appropriate representatives of critical utility facilities (e.g., gas/oil pipelines, high-voltage cables, fiber-optic lines).	NA	
8. Private-utility locates—including fuel lines; tanks; and water, sewer, gas, electricity, and other utilities—have been requested.	NA	
9. The property owner was contacted to determine if he/she knows of privately owned subsurface facilities within 5 feet of the proposed excavation sites. (Review locations with the manager/owner.) Examples of privately owned facilities that are not commonly marked on private property include:	2/12	ST
a) Water and sewer laterals	2/12	ST
b) Gas lines	2/12	ST
c) Power lines (including those for landscape/yard lighting, pool and spa lines, and "out building" lines)	2/12	ST
d) Irrigation lines	NA	ST
e) Communication lines (cable, telephone, Internet)	2/12	ST
f) Propane tank lines	NA	ST
10. The proposed excavation sites have been reviewed by the appropriate stakeholders (e.g., owner, tenant, driller, excavator) and the Trihydro project manager.	2/12	ST
11. Proposed excavation sites have been visually inspected, and available plans and aerial photos have been reviewed for evidence of potential utilities.	NA	
12. A scaled site plan showing the proposed excavation sites relative to subsurface utilities has been prepared and is available for stakeholder/Management review.	NA	
13. The basis for each buried utility line's location and the accuracy of the data defining the utility location are documented on the site plan.	NA	
14. The proposed excavation sites are at least 5 feet from subsurface utilities shown on the building plans.	NA	
15. The proposed excavation sites are at least 5 feet from subsurface utilities shown on public right-of-way / street-improvement plans. [Note: Work with utility companies to determine if they require a representative present during excavation activities.]	2/12	ST
16. The proposed excavation sites are at least 7 feet from the pad surrounding underground storage tanks (USTs) shown on the building plans.	NA	
17. The utility-locate ticket number is available on site. 180038411	2/12	ST
18. A traffic-control plan has been prepared if appropriate. Note: If the project area encompasses a public street or right of way, the local and/or state authority must approve the traffic-control plan before fieldwork begins.	NA	
19. Arrangements have been made to contact the appropriate personnel if utility-line repairs are needed. (Who must be contacted if a line is unexpectedly damaged?)	2/12	ST
20. Contact information is in place and readily available with the driller, excavator, and other project stakeholders.	2/12	ST
21. The client and other relevant stakeholders (if any) have been notified of the excavation planning/pre-planning steps and results.	NA	
22. A detailed work scope was developed by the project team and reviewed by the Project Director and Contracting Team.		
Project Director (excavation-site planning tasks):		

Star Services 26 S. 24th St

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
B. Utility-line marking:		
1. Electrical circuits are energized during utility-line marking for subsurface power lines (e.g., circuits on timers or light-sensing switches).	NA	
2. Public-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	2/12	ST
3. Private-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	NA	
4. Verify that One Call locators marked their facilities in the designated excavation area or provided notification that they do not have any facilities near the proposed excavation sites.	2/12	ST
5. One Call was contacted to request a "refresh" if utility-locate markings are missing, difficult to see, or more than 14 days old (7 days in some states). "Refresh" markings must be performed by the original marking organization.	NA	
Project Director (utility-line marking tasks):		
C. Job walk:		
1. Visual verification that each proposed excavation site does not lie on a line connecting two similar-looking manhole covers (e.g., sanitary sewers or storm drains). (Consider having the line snaked to confirm their locations.)	2/12	ST
2. Visual verification that each proposed excavation site does not lie on a line with any water, gas, electrical meters, utility cleanouts, or other utility boxes in the surrounding areas.	2/12	ST
3. Visual verification that the pavement near each proposed excavation site has not subsided or give the appearance it may be covering a previous excavation (e.g., linear cracks or sagging curbs).	2/12	ST
4. Visual verification that each proposed excavation has adequate overhead clearance for the excavation equipment (e.g., at least 10 feet from overhead-utility lines and/or reasonable distance from canopies).	NA	
5. Fences and fields have been checked for markers, signs, posts, valves, stub outs, etc.	NA	
6. Surface structures such as tank batteries, wells, valves, phone pedestals, and electrical junction boxes have been checked for evidence of subsurface utilities.	NA	
7. Observed evidence of subsurface utilities has been photographed, sketched, or otherwise documented.	NA	
8. Proposed excavation sites have been "walked"/reviewed by the excavation contractor, Trihydro project manager, and other stakeholders (e.g., client representative, property owner, tenant).	2/12	
9. Proposed excavation sites are located at least 5 feet from marked utilities (i.e., the "tolerance zone"), or written approval to excavate within the 5-foot tolerance zone has been obtained from the appropriate utility owner. In no case shall a proposed excavation be located closer than 2 feet from the outside edge of a marked utility. (Note: The tolerance zone is measured from the outside edge of a subsurface structure—not its centerline.)	2/12	ST
10. Verify that the excavation contractor (with help from appropriate utility-line locators, if part of the client-approved work scope) has walked each proposed excavation site to verify all expected utility-line markings are present.	2/12	ST
11. Traffic-control devices, safety barricades, caution tape, and other safety-management devices are in place as needed to protect project personnel.	NA	
Project Director (job-walk tasks):		
D. Daylighting / potholing / "soft digging":		
1. The proposed excavation sites located within the "tolerance zone" (and sites located outside the "tolerance zone" when required by the client) have been potholed to a depth below the anticipated utility zone using "minimally intrusive excavation methods" such as vacuum excavation (either air-entrainment or water-jet) and careful hand-tool use.		
2. Monitoring and emergency equipment is available on site when hazardous atmospheres are expected to be encountered in the potholing excavations.		
3. A list of emergency-contact names/numbers is maintained at the potholing excavation site.		
4. The project health and safety plan addresses potential hazards and safety-performance requirements related to utility-clearance operations.		
5. The location of and directions to the nearest hospital are known by all members of the project team.		
6. Representatives of utility owners that requested to be on site for utility locates are present.		

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
7. Pothole excavations have been visually checked with a flashlight by the excavation contractor, Trihydro project manager, or her/his designee.		
8. Utilities adjacent to the excavation or that cross the excavation have been daylighted using "minimally intrusive excavation methods."		
9. The areal extent of the excavation-clearance pothole has been verified to extend at least 120% beyond the outside diameter of the largest-diameter down-hole tool to be used in the borehole, or at least 2 feet on each side of daylighted/exposed lines, whichever is greater.		
10. If vacuum excavation (e.g., air knife, air vac, hydro-vac) is not available to daylight utility lines, verify that the non-conductive probe method was used as follows: Scratch the ground no more than 10 inches deep above the utility and then probe the scratched area. If the utility isn't found in the scratched area, repeat the first step until the utility is located. Once the utility is found, its depth must be continually verified with the probe until 2 feet of soil remain above the utility. Carefully hand dig the remaining overburden to expose the utility.		
11. The soil encountered in the excavation-clearance pothole has been verified to be free of bedding material (e.g., clean gravel, clean sand, aggregate base [gravelly sand with ~10% fines], or other non-native-looking material) that could indicate the presence of a previously installed utility line.		
12. Excavation work within 2 feet of an underground utility was "hand dug."		
13. Once the utility lines were exposed and the excavations were safe to enter, the exposed lines (including their protective coating) was examined for damage.		
14. The condition of each utility line exposed during daylighting was documented, and the documentation was forwarded to the Trihydro project manager to place in the project file.		
15. If a utility line was damaged in any way, it was reported to the utility owner and Trihydro project manager and documented in the project file.		
16. Damage to a utility line was documented and repaired before it was reburied. The utility owner signed off on the repairs.		
17. Employees entering the excavation followed the procedures described in the Trihydro "Trenching and Excavation Program" and used the Trihydro "Daily Excavation/Trench Inspection Report" to document excavation condition.		
18. The location of daylighted utilities was documented and photographed after daylighting was completed and before the pothole excavation was backfilled.		
19. Locations for hand digging within the "tolerance zone" were noted.		
Project Director (daylighting/potholing tasks):		
E. Excavation (including drilling):		
1. The appropriate permits have been obtained for the work (e.g., hot-work permits, entry permits).	NA	
2. The utility-owner and/or agency representatives that requested to be on site during excavation work are present. (Trihydro Utility Locate Acknowledgement Form)	NA	
3. A safety kickoff meeting was conducted with the excavation contractor to review roles/responsibilities, work activities, anticipated hazards, this checklist, and emergency-response procedures before starting excavation work the site. The safety kickoff meeting was documented in the project file.	NA	
4. A daily tailgate safety meeting was conducted and documented in the project file. Verify weather conditions, safety hazards, PPE requirements, job duties, communication, hand signals, etc.	2/12	ST
5. JSAs covering the work to be done are in place and have been reviewed, "marked up" where appropriate, and acknowledged by the excavation project-team members.	2/12	ST
6. Site workers have been reminded to look for hazardous conditions, processes, and activities, and that they are authorized to stop work if they see an unsafe condition.	2/12	ST
7. The emergency-response plan has been reviewed by all excavation project-team members (e.g., contact numbers, evacuation muster points, hospital routes).	2/12	ST
8. The excavation contractor has checked the excavation sites relative to overhead utilities, subsurface-utility locates, and adjacent surface structures.	NA	
9. The excavation contractor has acknowledged the potential location of each subsurface utility marked in the excavation areas.	NA	
10. Proper traffic control and exclusion zones have been established.	NA	
11. The excavation equipment (e.g., drill rig, backhoe) has been inspected for proper operation and condition.	NA	
12. Emergency equipment (fire extinguisher, first aid kit, emergency shut-off switch, etc.) has been checked, is readily available, and is in working order.	2/12	ST
13. Excavation project-team members are wearing appropriate PPE per the Trihydro HASP and client/site-specific requirements.	2/12	ST
14. Power in the excavation area has been de-energized, if possible. If power cannot be de-energized, the excavation contractor was advised of the hazard.	2/12	ST

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
Project Director (excavation/drilling tasks):		
F. If an unmarked utility line is discovered:		
1. Verify the One Call utility-locate request was made correctly.		
2. Identify the owner/operator of the unmarked utility line and contact One Call (dial "811") to request a "No Response" ticket. If the owner/operator fails to respond again, seek a third-party locating service to mark the utility before: a) excavation work begins, or b) advancing the excavation further.		
3. Contact the owner/operator of non-locatable utilities to request they be taken out of service before excavation begins.		
4. If possible, a representative of the unmarked utility line should be on site when the unmarked utility is daylighted.		
Project Director (unmarked utility line tasks):		

Note:

-- If an item doesn't apply, please insert an "NA" in the "**Date**" column and provide an explanation in the "**Project Notes**" section below.

		2/12/18
Project Manager	Field Manager / Team Members	Date Reviewed
Client / Project Name / Location	Excavator/Driller Name	Date Action Items Completed

Project Notes: [Please cross reference to the appropriate checklist-item number[s] when possible.]

VI Sample: 26 S 24th St_Subslab

VI Sample: 26 S 24th St_Subslab

VI Sample: 26 S 24th St_Shop

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

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Property Owner/Operator Information:

Name: Crystal Sorenson

Physical Address of property under investigation: 28 7th St. W, Billings MT

Mailing Address: Same

Phone (optional): —

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/7/18	Indoor Air - Main *	20180208 - 297TH STW-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/7/18	Indoor Air Basement	20180207 - 297TH STW-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/8/18	Subslab Vapor	20180208 - 297TH STW-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/7/18 *	Indoor Air - Duplicate	20180207 - B	VOCs, Other

*OTHER (specify analysis) INDOOR AIR - VOCs, PETROLEUM
SUBSLAB - VOCs, PETROLEUM, FIXED GASES, HELIUM

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample. NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

[signature] on behalf DEQ — Signature

S. SEITZ (TRINYDRO) — Printed Name

Telephone #: 406-558-4850

Date: 2/11/18

Property owner/operator copy = white DEQ copy = yellow

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	28 7th STW		
Project Name:	Billings PCC	PID (model/serial #):	
Sample location:	Sub slab Basement northeast room	Helium Detector (model/serial #):	MGD-2002 / R11189
Date:	2/8/11	Weather:	Snow
Field Personnel:	JR / MD	Air Temp:	9
Recorded by:	MD	Atmospheric Pressure:	30.4

Slab Data

Surface/slab Type:	Carpet on Concrete
Surface/slab Thickness (inches):	unknown
Slab/subsurface substrate comments:	semi-finished inhabited room
Depth of hole through the slab:	?
Length of sampling train (feet):	6 ft (assumed 1 ft underground) ~180ml min (600act)

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 180

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
2/8/18	1844	100	20.2	21.0				
	1845	200	1.0	20.2				
	1846	300	21.4	22.5				
	1847	400	20.0	21.4				
	1848	500	20.7	22.3	0	>100ppm		

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
02/08/2018	18:50	19:26	~~20180208-287th-01~~ 20180208-287THSTW-01	0301	FC1641		-26.8	-4.9

Comments: PID >100 ppm after ~3 min.
gas meter O2 16.4 %
S 0
CO
LEL ↓

~~2/8/2018~~ 7.3

Sub-Slab Soil Vapor Sampling Field Data Sheet

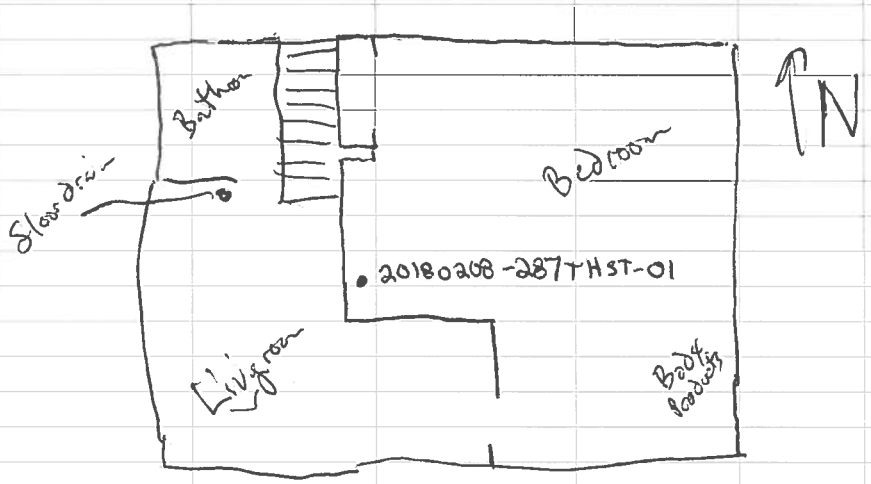
Project Name: MT DEQ Billings PCE | Sample Location/ ID: 28 7th Street / 20180208-287THST-01

Date: 02/08/2018

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

Concrete slab with glued down carpet, sub-slab was installed approximately 8-years ago.

Location Sketch:



Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	28 7th St	Start Weather:	Overcast
		Start Outdoor Air Temp:	34°F
Project Name:	Billings PCE	Start Atmospheric Pressure:	30.7
Sample Location:	indoor 4 basement		
Date:	2/7/18	End Weather:	9° F, Snowy, snow ~~was~~ falling. cold
Field Personnel:	SS/MO	End Outdoor Air Temp:	9°F
Recorded by:	MO	End Atmospheric Pressure:	30.4 in Hg

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
2/7/18	1814	2/8/18	1814	20180207-287THSTW-01	0273	0228		-25.0	-0.5		
2/7/18	1814	2/8/18	–	20180207-287THSTW-B	2673	1050		-26.5	-2.5		
2/7/18	1822	2/8/18	1822	20180207-287THSTW-02	0673	0204		-30.0	-3.5		

Comments:

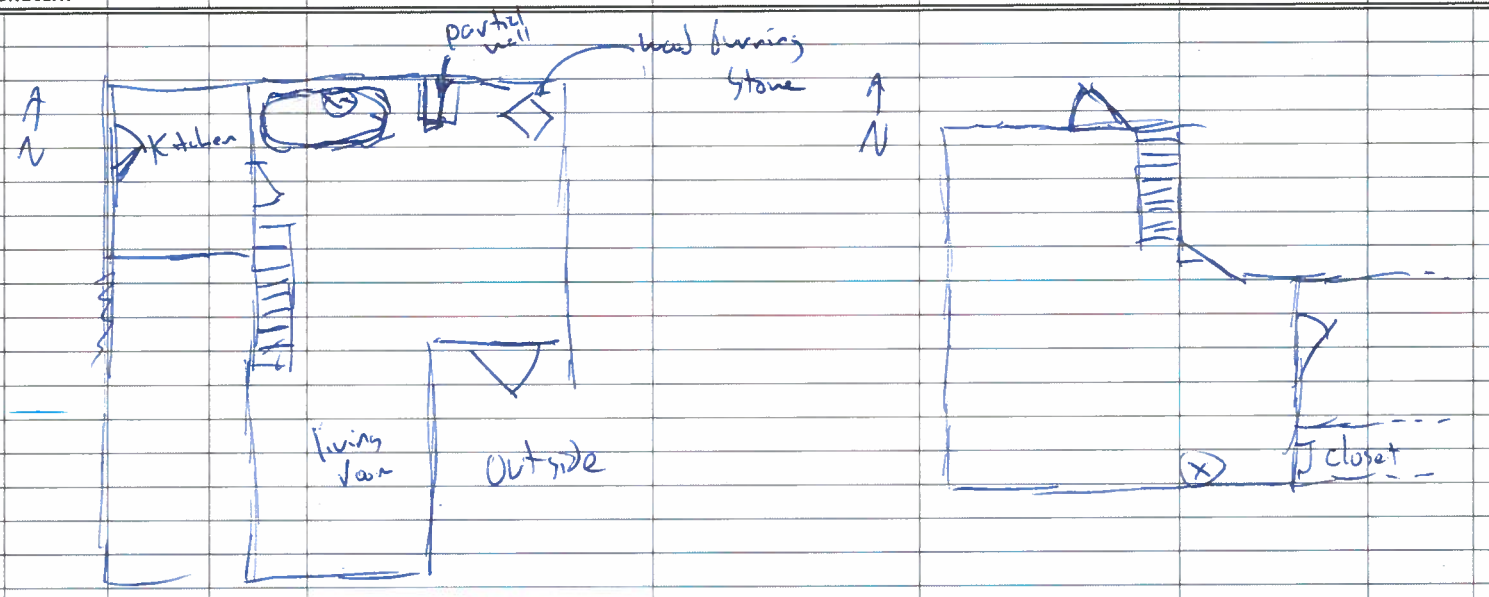
20180207-287THSTW-B is a duplicate of indoor air in upstairs living room for 20180207-287THSTW-01

~~2018~~ -01 is from living room upstairs
-02 is from basement bedroom @ bottom of stairs

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

Location Sketch:



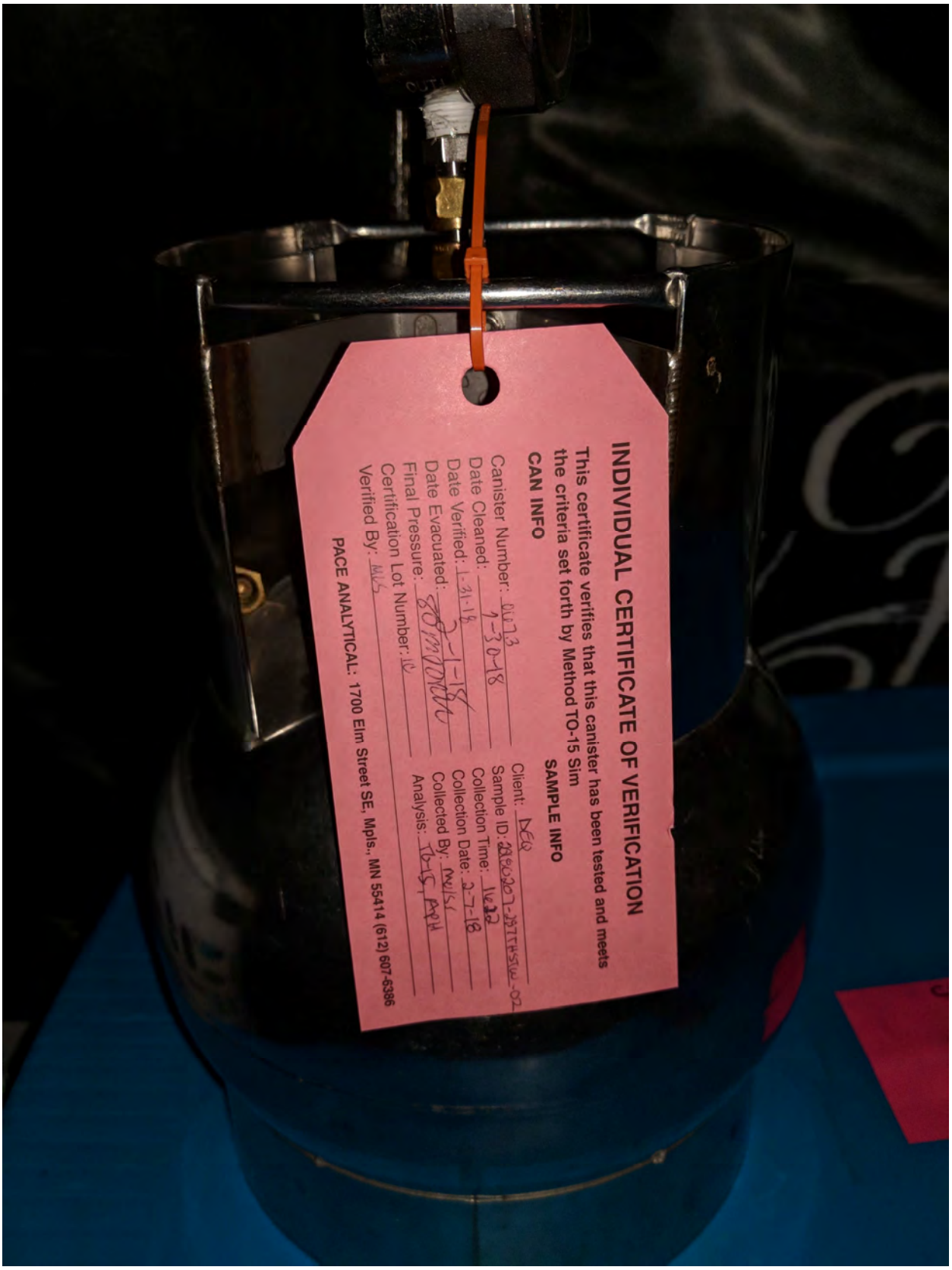
28 7th Street W utlity locate

28 7th Street W_Subslab

28 7th Street W_Main

28 7th Street W_Basement

28 7th Street W_Basement



28 7th Street W utility locate

28 7th Street W utlity locate

28 7th Street W utility locate

VI subslab sample taken in 28 7th Street W_Basement

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Hazel Junkert

Physical Address of property under investigation: 44 6th St. W

Mailing Address: same

Phone (optional):

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
02/05/18	Indoor Air	20180205-44 6th St W -01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
02/05/18	Indoor Air	20180205-44 6th St W -02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
02/06/18	Sub slab Vapor	20180206-44 6th St W -01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*

*OTHER (specify analysis) Indoor Air - VOCs, Petroleum ; Sub-slab - VOCs Pet., Fixed Gases, t

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample. NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

S/Seitz for DEQ — Signature

S. SEITZ @ TRIHYDRO — Printed Name

Telephone #: 406-558-4850

Date: 02/06/18

Property owner/operator copy = white DEQ copy = yellow

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	44 6th St W		
Project Name:	Billings PCE	**PID (model/serial #):**	ppbRAE 3000 / 12875
Sample location:	Sub slab	**Helium Detector (model/serial #):**	MGD-2002 / R11189
Date:	2/6/18	**Weather:**	Overcast / snow
Field Personnel:	ST/SS/MO/CB	Indoor **Air Temp:**	68 °F
Recorded by:	MO	**Atmospheric Pressure:**	

Slab Data

Surface/slab Type:	Concrete	Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft =
Surface/slab Thickness (inches):	no data	
Slab/subsurface substrate comments:	water on floor by furnace // dried w/ paper towels	
Depth of hole through the slab:		
Length of sampling train (feet):	5 ⇒ 150 mL	purged 300 mL

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	**Time**	**Cumulative volume purged (ml)**	**Helium Beneath Shroud (%) min**	**Helium Beneath Shroud (%) max**	**Helium in Probe (ppm or %)**	**PID reading in probe (ppb)**	**Helium Beneath Shroud (%) min**	**Helium Beneath Shroud (%) max**
2/6/18	1217	50	~~21.8~~	21.0				
	1217	100	21.8	21.8				
	1219	150	21.3	21.8				
	1220	200	21.0	21.3				
	1220	250	20.7	21.0				
Conversion: 1% = 10,000 ppm			20.4	20.7	650 ppm			

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
2/6/2018	12:25	1303	20180206-44 6TH ST W -01	0796	FC 1594		27.0	5.0

Comments:

max PID 517 ppb
O_2 18.7 %
Other ⇒ none

Shut-in test
#0796 26.8 / 26.8 → pass

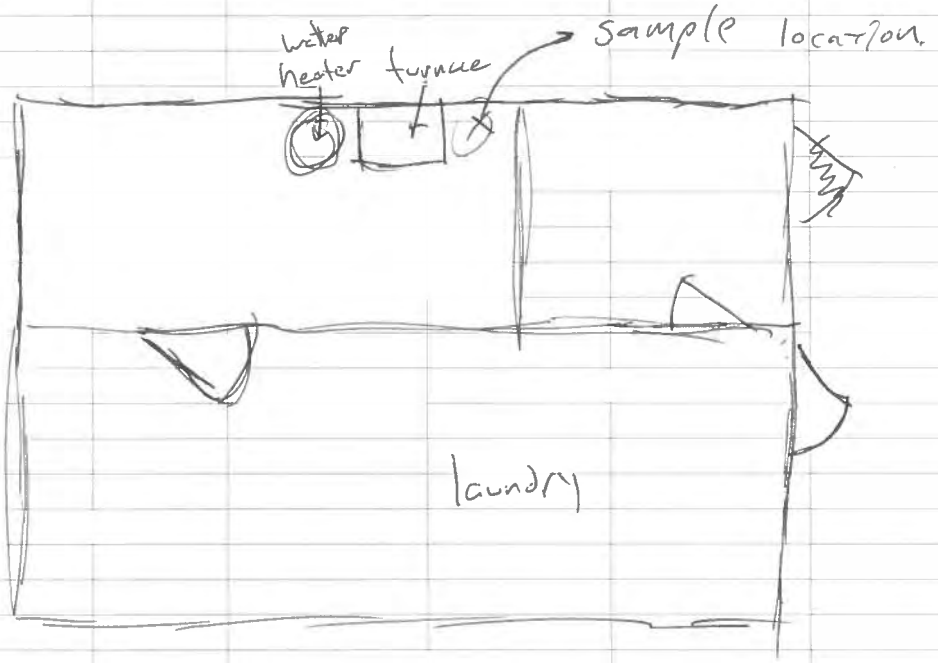
Sub-Slab Soil Vapor Sampling Field Data Sheet

Project Name:	Sample Location/ ID:
Date:	

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

Furnace Room North of Laundry Room

Location Sketch:



Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	414 6th Street	Start Weather:	Snowy 12°F
		Start Outdoor Air Temp:	12°F
Project Name:	Billings PCE Groundwater	Start Atmospheric Pressure:	30.3 in Hg
Sample Location:	Basement / Laundry Room + Apt #4		
Date:	2/5/18	End Weather:	Sno Overcast
Field Personnel:	ST + S.S.	End Outdoor Air Temp:	22°F
Recorded by:	S.T	End Atmospheric Pressure:	30.0

Canister and Sample Information

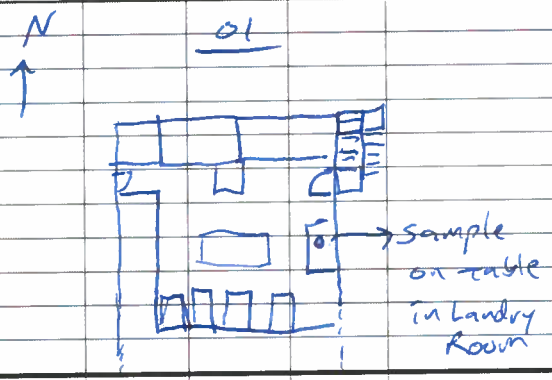
Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
2/5/18	1025	2/6/18	0916	20180205-414 6th STW-01	0066	1261		-28.1	-2"	68°F	68°F
2/5/18	1030	2/6/18	0913	20180205-414 6th STW-02	0975	1456		-26.8	-2.5"	68°F	68°F

Comments:

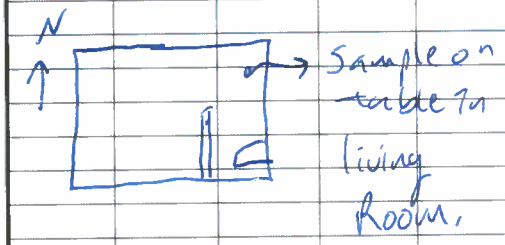
01- Basement / Laundry Room
02- Hazel's Apt. - PID 34 ppb.

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):



Location Sketch:



OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

✓ Filled out by S. Seitz after walking property & conversation w/owner 2017-20

Date: ~~2/8/18~~ Feb. 2008

1. Name: Hazel Lambert (owner)

   Address:
   ~~[illegible] Billings, MT 59102~~
   44 6th St. W, Billings MT 59101

   Home Phone: _____ Work Phone: _____

2. What is the best time to call to speak with you? _____ At: Work☐ or Home☐ ?

3. Are you the Owner☑, Renter☐, Other☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:
   owner of apartment building and occupant of middle main floor apt #4

4. Total number of occupants/persons at this location? Various
   Number of Children potential Ages _____

5. How long have you lived at this location? decades

General Home Description

6. Type of Home/Structure (check only one): Single Family Home☐, Duplex☐, Apartment☑, Townhouse ☐ Other _____

7. Home/Structure Description:
   Number of floors: 4 floors including partial walk-out basement and 3 floors above
   Basement☑
   Crawlspace ☐
   Partial Crawlspace/Basement ☐ % of each _____
   Slab On Grade ☐
   Other ☐ _____

8. Age of Home/Structure: _____ years, Not Sure/Unknown☑

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood☑, Brick☐, Concrete☐, Cement block☐, Other☐ _____
   Garage: ☐Attached ☐Detached ☐None

10. Foundation Construction (check all that apply):
    Concrete Slab☑
    Fieldstone☐
    Concrete Block☐
    Elevated Above Ground/Grade☐
    Other☐ _____

11. Do you have Private Well ☐ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____
unknown - not used if has

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____ city water city sewer
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☐ unknown

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☒ Unfinished ☐ Partially Finished ☐ Partial Crawlspace ☐?

15. If finished, how many rooms are in the basement? apartments & laundry
What are rooms used for? Bedrooms ☒ Family Room ☒ Storage ☐
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☒ N/A

17. Is the basement floor (check all that apply) Concrete ☒, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☒, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐
unknown

Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐
unknown

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐,
Floor Drain ☒, Other Hole/Opening In Floor ☐
Describe _____
in laundry room on north corner

22. Are any of the following used or stored in the basement (check all that apply):
- ☐ Paint
- ☐ Solvents (degreasers, paint thinner, etc.)
- ☐ Fuels/Oils (gasoline, diesel, used oil)
- ☐ Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- ☐ Pesticides

unknown

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☒ No ☐
If yes, specify what was done, where in the home, and what month:

Routine apartment maintenance

24. Have you installed new carpeting in your home within the last year? Yes ☐ No ☒
If yes, when and where? _____

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
No ☒

26. Does anyone in your home use solvents at work?
Yes ☐ If yes, how many persons?
No ☒ If no, go to question 28

unknown - not @ #4

27. If yes for question 26, are the work clothes washed at home? Yes ☐ No ☐

laundry on-site in building

28. Where is the washer/dryer located?
Basement ☒
Upstairs Utility Room ☐
Kitchen ☐
Garage ☐
Use a Laundromat ☐
Other, please specify ☐ _____

29. If you have a dryer, is it vented to the outdoors? Yes ☒ No ☐

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas ☒, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

unknown

Heat conveyance system:
- Forced Hot Air ☒
- Forced Hot Water ☐
- Steam ☐
- Radiant Floor Heat ☐
- Wood Stove ☐
- Coal Furnace ☐
- Fireplace ☐
- Other ☐ _____

saw gas forced air during sampling

SB

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? unknown
How is/was the tank filled?
Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☐ No ☐
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☒
Other (please specify)

33. Do you use any of the following? Room Fans ☐, Ceiling Fans ☐, Attic Fan ☐ unknown

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐ unknown

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☐ Unknown ☐
If yes, please specify type of pest controlled
And approximate date of service unknown

36. Water heater type: Gas ☒, Electric ☐, by Furnace ☐,
Other (please describe)

37. Water heater location: Basement ☒, Upstairs Utility Room ☐, Garage ☐,
Other (please specify) other - various locations

38. What type of cooking appliance do you have? Electric ☒, Gas ☐
Other (please describe) must have

39. Is there a stove exhaust hood present? Yes ☒ No ☐
Does it vent to the outdoors? Yes ☐ No ☒ in #4

40. Smoking in Home:
None ☒, Rare (only guests) ☐, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐ in #4, but unknown w/ others

41. If yes to question 40, what is smoked?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐ NA

42. Do you regularly use air fresheners? Yes ☐ No ☐

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐
Spray Paint ☐, Wood Finishing ☐, Other ☐
unknown for whole apt. not in #4

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation:
no

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

45. Please check weekly household cleaning practices:

- Dusting ☐
- Dry Sweeping ☐
- Vacuuming ☐
- Polishing (furniture, etc.) ☐
- Washing/Waxing Floors ☐
- Other (describe) ☐ _____

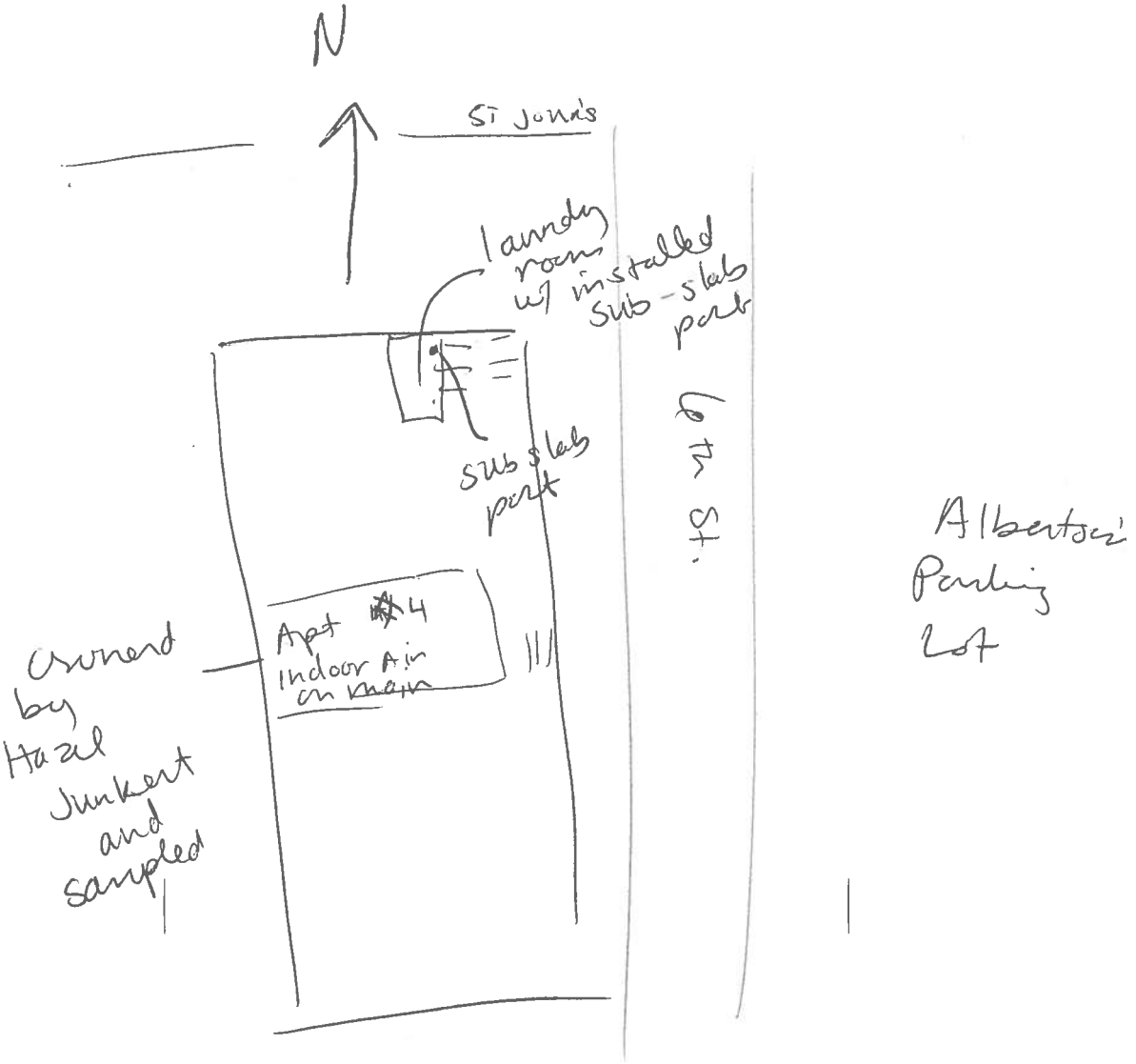
} Depends on unit answers for #4

46. Other comments:

_____
_____
_____
_____
_____
_____
_____
_____

47. Chemical Inventory/Summary

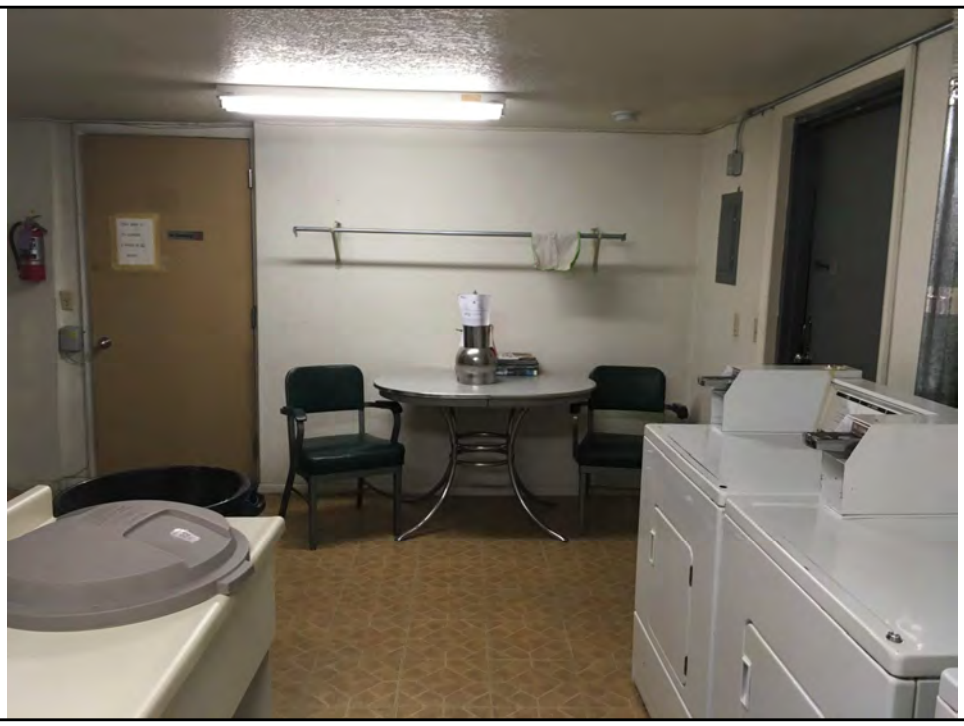
Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	



VI Sample: 44 6th Street W_Subslab

VI Sample: 44 6th Street W_Subslab

VI Sample: 44 6th Street W_Subslab



ADDRESS: 44 6TH ST WEST

NOTES:
INDOOR AIR BASEMENT SAMPLE LOCATION

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Ernst (Scott) Sheets

Physical Address of property under investigation: 104 Custer Ave., Billings MT

Mailing Address: Same

Phone (optional): —

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/8/18	20180208-104CUSTER-01	Indoor Air - Basement	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/8/18	20180208-104CUSTER-02	Indoor Air Main	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/9/18	20180209-104CUSTER-01	Sub slab vapor	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*

*OTHER (specify analysis) Indoor Air - VOCs, APH ; Sub slab - VOCs, APH, Fixed Gases,

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample. NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

Signature: [illegible] behalf DEQ

Printed Name: SARAH SEITZ (TRIHYDRO)

Telephone #: 406-558-4850

Date: 2/11/18

Property owner/operator copy = white DEQ copy = yellow

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	104 Custer Ave, Billings MT	Start Weather:	Mostly cloudy with freezing rain
		Start Outdoor Air Temp:	14°F
Project Name:	MT DEQ Billings PCE	Start Atmospheric Pressure:	30.07 in Hg
Sample Location:	Basement/crawlspace = Ø1 First floor Kitchen = 02		
Date:	02/08/2018	End Weather:	Mostly cloudy with snow
Field Personnel:	Joel Riebli & Cameron Brown	End Outdoor Air Temp:	1°F
Recorded by:	Joel Riebli	End Atmospheric Pressure:	30.50 in Hg

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
02/08/18	0807	02/09/18	0807	20180208-104 Custer-01	# 2156	FC 0131		-24.0	-9.1	70°F	70°F
02/08/18	0810	02/09/18	0810	20180208-104 Custer-02	# 1051	FC 0880		-25.0	-3.6	60°F	60°F

Comments: Leak Test: #2156 (FC 0131) start -24.0 after 2 mins = -24.0
#1051 (FC 0880) start -25.0 after 2 mins = -25.0

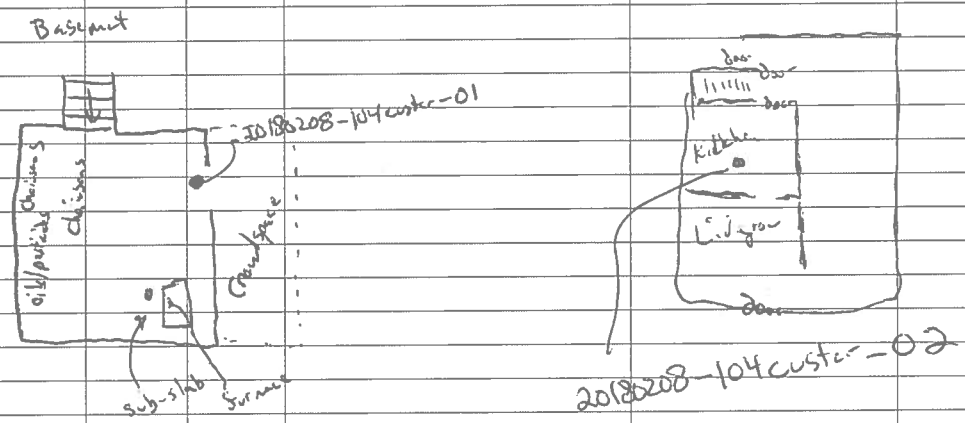
* Gas motor (chain saws), pesticides, oils in basement. Crawlspace is open to basement, set basement/crawlspace sample (20180208-104 Custer-01) next to the opening

* Set top floor sample (20180208-104Custer-02) on the kitchen table.

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

Location Sketch:



Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID: 104 Custer Ave, Billings MT

Project Name: DEQ Billings PCE
Sample location: Subslab basement
Date: 02/09/2018
Field Personnel: Joel Richl & Cameron Sarch
Recorded by: Joel Richl

PID (model/serial #): ppbRAE 3000 (594-06778 12875)
Helium Detector (model/serial #): MGD-2002 R11189
Weather: Snowing
Air Temp: 1°F
Atmospheric Pressure: 30.50 Hg

Slab Data

Surface/slab Type: Concrete Slab with open soil northeast
Surface/slab Thickness (inches): 2.5"
Slab/subsurface substrate comments: Cracks present within 3 feet of sample point
Depth of hole through the slab: 5.5"
Length of sampling train (feet): 5.5'

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 165 mL

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
02/09/18	0828	100	21.9	26.0				
	0829	200	19.6	21.9				
	0830	300	28.5	32.3				
	0830	400	26.2	28.5				
	0831	500	24.6	26.2	4950 ppm*	>100ppm		

Conversion: 1.0% = 10,000 ppm
At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

* Air inside basement read @ 1950 ppm, upstairs >1400 ppm, outside 150ppm

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
02/09/18	0838	0915	20180209-104 Custer-01	0701	FC1160		-27.8	-4.9

Comments: Leak test passed 2 minute shut down test.

Highest He reading 32.3%

CO = 0 ppm H_2S = 0.0 ppm OXY = 20.9% LEL = 0%

Sub-Slab Soil Vapor Sampling Field Data Sheet

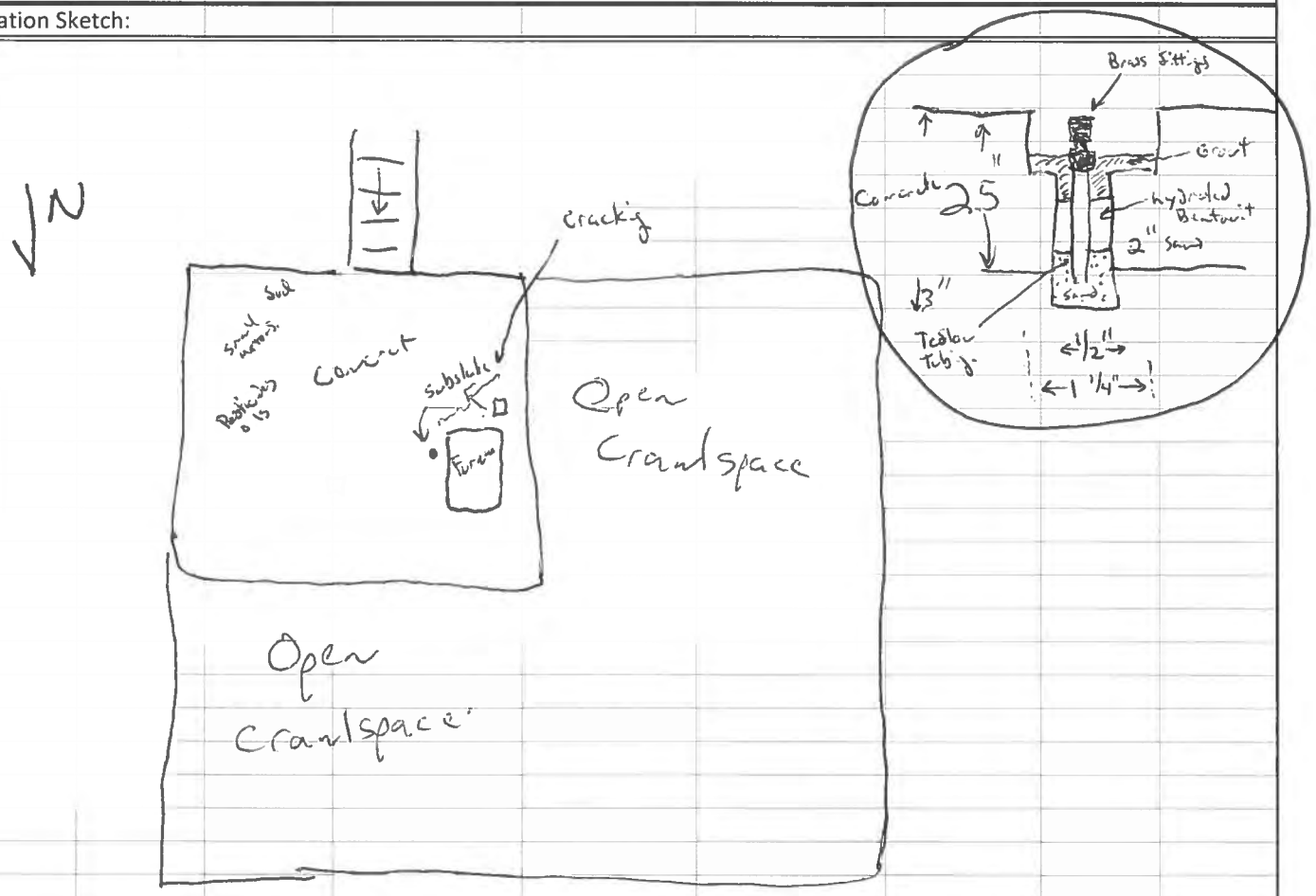
Project Name: 104 Custer Ave, Billings MT Sample Location/ ID: Subslab 20180209-104Custr-01
Date: 02/09/2018

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

Concrete (cracked) floor covered by carpet. Crawlspace open to the basement north and west. Drilled into floor next to the furnace (east side). Concrete is 2 1/2" thick. Drilled down 3". Place sand, then thin layer of hydrated Bentonite, then grout. Open end of teflon tubing set ~2 3/4" bgs.

Pesticides, gasoline, oils stored in basement. Small motors (chainsaws and blower) also stored in basement.

Location Sketch:



Excavation, Drilling, and Utility-Locating Checklist

104 [illegible] Ave

Task	Date	Initials
A. Excavation-site planning:		
1. The local One Call regulations have been checked for local utility-notification requirements (e.g., 48 hours vs. 72 hours).	02/07/18	JR
2. Per the local One Call regulations, list the responsible party (generally the excavation/drilling contractor) for requesting and verifying completion of utility locates below: Trihydro	02/07/18	JR
3. The property owner and/or business owner has been notified of the excavation schedule.	02/07/18	JR
4. Each proposed excavation site or "area of interest" has been delineated for utility-line locators using white spray paint and/or wooden stakes/lathes with white flagging. (pink)	02/18	JR
5. Public-utility locates have been requested by calling One Call at least 48 hours (72 hours in some states) before work is scheduled to begin, and the request includes depths, as available.	02/04/18	JR
6. Each utility company has been notified of the excavation schedule and invited to review the proposed excavation sites.	02/04/18	JR
7. On-site meetings have been scheduled with the appropriate representatives of critical utility facilities (e.g., gas/oil pipelines, high-voltage cables, fiber-optic lines).	—	—
8. Private-utility locates—including fuel lines; tanks; and water, sewer, gas, electricity, and other utilities—have been requested.	—	—
9. The property owner was contacted to determine if he/she knows of privately owned subsurface facilities within 5 feet of the proposed excavation sites. (Review locations with the manager/owner.) Examples of privately owned facilities that are not commonly marked on private property include:	02/02/18	JR
a) Water and sewer laterals	✓	JR
b) Gas lines	✓	JR
c) Power lines (including those for landscape/yard lighting, pool and spa lines, and "out building" lines)	✓	JR
d) Irrigation lines	—	—
e) Communication lines (cable, telephone, Internet)	✓	JR
f) Propane tank lines	—	—
10. The proposed excavation sites have been reviewed by the appropriate stakeholders (e.g., owner, tenant, driller, excavator) and the Trihydro project manager.	02/07/18	JR
11. Proposed excavation sites have been visually inspected, and available plans and aerial photos have been reviewed for evidence of potential utilities.	02/07/18	JR
12. A scaled site plan showing the proposed excavation sites relative to subsurface utilities has been prepared and is available for stakeholder/Management review.	—	—
13. The basis for each buried utility line's location and the accuracy of the data defining the utility location are documented on the site plan.	—	—
14. The proposed excavation sites are at least 5 feet from subsurface utilities shown on the building plans.	—	—
15. The proposed excavation sites are at least 5 feet from subsurface utilities shown on public right-of-way / street-improvement plans. [Note: Work with utility companies to determine if they require a representative present during excavation activities.]	—	—
16. The proposed excavation sites are at least 7 feet from the pad surrounding underground storage tanks (USTs) shown on the building plans.	—	—
17. The utility-locate ticket number is available on site.	02/07/18	JR
18. A traffic-control plan has been prepared if appropriate. Note: If the project area encompasses a public street or right of way, the local and/or state authority must approve the traffic-control plan before fieldwork begins.	—	—
19. Arrangements have been made to contact the appropriate personnel if utility-line repairs are needed. (Who must be contacted if a line is unexpectedly damaged?)	02/07/18	JR
20. Contact information is in place and readily available with the driller, excavator, and other project stakeholders.	02/07/18	JR
21. The client and other relevant stakeholders (if any) have been notified of the excavation planning/pre-planning steps and results.	02/07/18	JR
22. A detailed work scope was developed by the project team and reviewed by the Project Director and Contracting Team.	—	—
Project Director (excavation-site planning tasks):		

104 Custer Ave.

Excavation, Drilling, and Utility-Locating Checklist

104 Custer Ave

Task	Date	Initials
B. Utility-line marking:		
1. Electrical circuits are energized during utility-line marking for subsurface power lines (e.g., circuits on timers or light-sensing switches).	02/05/18	JR
2. Public-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	02/07/18	JR
3. Private-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	—	—
4. Verify that One Call locators marked their facilities in the designated excavation area or provided notification that they do not have any facilities near the proposed excavation sites.	02/07/18	JR
5. One Call was contacted to request a "refresh" if utility-locate markings are missing, difficult to see, or more than 14 days old (7 days in some states). "Refresh" markings must be performed by the original marking organization.	—	—
Project Director (utility-line marking tasks):		
C. Job walk:		
1. Visual verification that each proposed excavation site does not lie on a line connecting two similar-looking manhole covers (e.g., sanitary sewers or storm drains). (Consider having the line snaked to confirm their locations.)	02/07/18	JR
2. Visual verification that each proposed excavation site does not lie on a line with any water, gas, electrical meters, utility cleanouts, or other utility boxes in the surrounding areas.	02/07/18	JR
3. Visual verification that the pavement near each proposed excavation site has not subsided or give the appearance it may be covering a previous excavation (e.g., linear cracks or sagging curbs).	02/07/18	JR
4. Visual verification that each proposed excavation has adequate overhead clearance for the excavation equipment (e.g., at least 10 feet from overhead-utility lines and/or reasonable distance from canopies).	02/07/18	JR
5. Fences and fields have been checked for markers, signs, posts, valves, stub outs, etc.	02/07/18	JR
6. Surface structures such as tank batteries, wells, valves, phone pedestals, and electrical junction boxes have been checked for evidence of subsurface utilities.	02/07/18	JR
7. Observed evidence of subsurface utilities has been photographed, sketched, or otherwise documented.	02/07/18	JR
8. Proposed excavation sites have been "walked"/reviewed by the excavation contractor, Trihydro project manager, and other stakeholders (e.g., client representative, property owner, tenant).	02/07/18	JR
9. Proposed excavation sites are located at least 5 feet from marked utilities (i.e., the "tolerance zone"), or written approval to excavate within the 5-foot tolerance zone has been obtained from the appropriate utility owner. In no case shall a proposed excavation be located closer than 2 feet from the outside edge of a marked utility. (Note: The tolerance zone is measured from the outside edge of a subsurface structure—not its centerline.)	02/07/18	JR
10. Verify that the excavation contractor (with help from appropriate utility-line locators, if part of the client-approved work scope) has walked each proposed excavation site to verify all expected utility-line markings are present.	02/07/18	JR
11. Traffic-control devices, safety barricades, caution tape, and other safety-management devices are in place as needed to protect project personnel.	—	—
Project Director (job-walk tasks):		
D. Daylighting / potholing / "soft digging":		
1. The proposed excavation sites located within the "tolerance zone" (and sites located outside the "tolerance zone" when required by the client) have been potholed to a depth below the anticipated utility zone using "minimally intrusive excavation methods" such as vacuum excavation (either air-entrainment or water-jet) and careful hand-tool use.		
2. Monitoring and emergency equipment is available on site when hazardous atmospheres are expected to be encountered in the potholing excavations.		
3. A list of emergency-contact names/numbers is maintained at the potholing excavation site.		
4. The project health and safety plan addresses potential hazards and safety-performance requirements related to utility-clearance operations.		
5. The location of and directions to the nearest hospital are known by all members of the project team.		
6. Representatives of utility owners that requested to be on site for utility locates are present.		

104 Fer Ave

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
7. Pothole excavations have been visually checked with a flashlight by the excavation contractor, Trihydro project manager, or her/his designee.		
8. Utilities adjacent to the excavation or that cross the excavation have been daylighted using "minimally intrusive excavation methods."		
9. The areal extent of the excavation-clearance pothole has been verified to extend at least 120% beyond the outside diameter of the largest-diameter down-hole tool to be used in the borehole, or at least 2 feet on each side of daylighted/exposed lines, whichever is greater.		
10. If vacuum excavation (e.g., air knife, air vac, hydro-vac) is not available to daylight utility lines, verify that the non-conductive probe method was used as follows: Scratch the ground no more than 10 inches deep above the utility and then probe the scratched area. If the utility isn't found in the scratched area, repeat the first step until the utility is located. Once the utility is found, its depth must be continually verified with the probe until 2 feet of soil remain above the utility. Carefully hand dig the remaining overburden to expose the utility.		
11. The soil encountered in the excavation-clearance pothole has been verified to be free of bedding material (e.g., clean gravel, clean sand, aggregate base [gravelly sand with ~10% fines], or other non-native-looking material) that could indicate the presence of a previously installed utility line.		
12. Excavation work within 2 feet of an underground utility was "hand dug."		
13. Once the utility lines were exposed and the excavations were safe to enter, the exposed lines (including their protective coating) was examined for damage.		
14. The condition of each utility line exposed during daylighting was documented, and the documentation was forwarded to the Trihydro project manager to place in the project file.		
15. If a utility line was damaged in any way, it was reported to the utility owner and Trihydro project manager and documented in the project file.		
16. Damage to a utility line was documented and repaired before it was reburied. The utility owner signed off on the repairs.		
17. Employees entering the excavation followed the procedures described in the Trihydro "Trenching and Excavation Program" and used the Trihydro "Daily Excavation/Trench Inspection Report" to document excavation condition.		
18. The location of daylighted utilities was documented and photographed after daylighting was completed and before the pothole excavation was backfilled.		
19. Locations for hand digging within the "tolerance zone" were noted.		
Project Director (daylighting/potholing tasks):		
E. Excavation (including drilling):		
1. The appropriate permits have been obtained for the work (e.g., hot-work permits, entry permits).	—	—
2. The utility-owner and/or agency representatives that requested to be on site during excavation work are present. (Trihydro Utility Locate Acknowledgement Form)	02/07/18	JR
3. A safety kickoff meeting was conducted with the excavation contractor to review roles/responsibilities, work activities, anticipated hazards, this checklist, and emergency-response procedures before starting excavation work the site. The safety kickoff meeting was documented in the project file.	02/07/18	JR
4. A daily tailgate safety meeting was conducted and documented in the project file. Verify weather conditions, safety hazards, PPE requirements, job duties, communication, hand signals, etc.	02/07/18	JR
5. JSAs covering the work to be done are in place and have been reviewed, "marked up" where appropriate, and acknowledged by the excavation project-team members.	02/07/18	JR
6. Site workers have been reminded to look for hazardous conditions, processes, and activities, and that they are authorized to stop work if they see an unsafe condition.	02/07/18	JR
7. The emergency-response plan has been reviewed by all excavation project-team members (e.g., contact numbers, evacuation muster points, hospital routes).	02/07/18	JR
8. The excavation contractor has checked the excavation sites relative to overhead utilities, subsurface-utility locates, and adjacent surface structures.	02/07/18	JR
9. The excavation contractor has acknowledged the potential location of each subsurface utility marked in the excavation areas.	02/07/18	JR
10. Proper traffic control and exclusion zones have been established.	—	—
11. The excavation equipment (e.g., drill rig, backhoe) has been inspected for proper operation and condition.	02/07/18	JR
12. Emergency equipment (fire extinguisher, first aid kit, emergency shut-off switch, etc.) has been checked, is readily available, and is in working order.	02/07/18	JR
13. Excavation project-team members are wearing appropriate PPE per the Trihydro HASP and client/site-specific requirements.	02/07/18	JR
14. Power in the excavation area has been de-energized, if possible. If power cannot be de-energized, the excavation contractor was advised of the hazard.	—	—

Excavation, Drilling, and Utility-Locating Checklist

104 Custer Ave

Task	Date	Initials
Project Director (excavation/drilling tasks):		
F. If an unmarked utility line is discovered:		
1. Verify the One Call utility-locate request was made correctly.	02/07/18	JR
2. Identify the owner/operator of the unmarked utility line and contact One Call (dial "811") to request a "No Response" ticket. If the owner/operator fails to respond again, seek a third-party locating service to mark the utility before: a) excavation work begins, or b) advancing the excavation further.	—	—
3. Contact the owner/operator of non-locatable utilities to request they be taken out of service before excavation begins.	—	—
4. If possible, a representative of the unmarked utility line should be on site when the unmarked utility is daylighted.	—	—
Project Director (unmarked utility line tasks):		

Note:

-- If an item doesn't apply, please insert an "NA" in the "**Date**" column and provide an explanation in the "**Project Notes**" section below.

Andrew Aranda	Syris / Joel / Comaroon	02/07/2018
Project Manager	Field Manager / Team Members	Date Reviewed
MTDEQ / Billings PCE / 104 Custer Ave	Tri-hydro	
Client / Project Name / Location	Excavator/Driller Name	Date Action Items Completed

Project Notes: [Please cross reference to the appropriate checklist-item number[s] when possible.]

OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: Feb 13, 2018*

* Filled out by S. Seitz after conversations and sampling @ hom

1. Name: Ernest (Scott) Sheets

   Address: 104 Custer Ave, Billings MT

   Home Phone: — Work Phone: _____

2. What is the best time to call to speak with you? _____ At: Work ☐ or Home ☐ ?

3. Are you the Owner ☑, Renter ☐, Other ☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

4. Total number of occupants/persons at this location? 1 adult
   Number of Children _____ Ages _____

5. How long have you lived at this location? decades

General Home Description

6. Type of Home/Structure (check only one): Single Family Home ☑, Duplex ☐, Apartment ☐, Townhouse ☐ Other _____

7. Home/Structure Description:
   Number of floors: 1 main
   Basement ☑ storage
   Crawlspace ☑ partial
   Partial Crawlspace/Basement ☐ % of each _____
   Slab On Grade ☐
   Other ☐ _____

8. Age of Home/Structure: _____ years, Not Sure/Unknown ☑

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood ☑, Brick ☐, Concrete ☐, Cement block ☐, Other ☐ _____
   Garage: ☐ Attached ☐ Detached ☐ None

10. Foundation Construction (check all that apply):
    Concrete Slab ☑
    Fieldstone ☐
    Concrete Block ☐
    Elevated Above Ground/Grade ☐
    Other ☐ _____

11. Do you have Private Well ☒ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition Scott installed private well in Fall 2017 in front yard. Used for irrigation! Well is about 23 ft bgs according to Scott.

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____ city water / city sewer
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☒

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☐ Unfinished ☒ Partially Finished ☐ Partial Crawlspace ☐?

15. If finished, how many rooms are in the basement? no, just storage
What are rooms used for? Bedrooms ☐ Family Room ☒ Storage ☐
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☒

17. Is the basement floor (check all that apply) Concrete ☒, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☒, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☒

Describe the moisture problem _____

20. Does the basement ever flood?

Yes, frequently (3 or more times/year) ☐

Yes, occasionally (1-2 times/year) ☐

Yes, rarely (less that 1 time/year) ☐

No ☒

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐,
Floor Drain ☒, Other Hole/Opening In Floor ☒
Describe _____

opening to crawlspace w/ dirt floor

22. Are any of the following used or stored in the basement (check all that apply):
- [x] Paint
- [x] Solvents (degreasers, paint thinner, etc.)
- [x] Fuels/Oils (gasoline, diesel, used oil) – weed wackers
- [x] Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- [x] Pesticides

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☐ No ☒
If yes, specify what was done, where in the home, and what month:

24. Have you installed new carpeting in your home within the last year? Yes ☐ No ☒
If yes, when and where? _____

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
No ☒

26. Does anyone in your home use solvents at work?
Yes ☒ If yes, how many persons? as needed with maintenance work @ apartments he manages
No ☐ If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes ☒ No ☐

28. Where is the washer/dryer located?
Basement ☐
Upstairs Utility Room ☒
Kitchen ☐
Garage ☐
Use a Laundromat ☐
Other, please specify ☐ _____

29. If you have a dryer, is it vented to the outdoors? Yes ☐ No ☐ unknown

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas ☒, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system:
- Forced Hot Air ☒
- Forced Hot Water ☐
- Steam ☐
- Radiant Floor Heat ☐
- Wood Stove ☐
- Coal Furnace ☐
- Fireplace ☐
- Other ☐ _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? _____
_____
How is/was the tank filled? Not known by Ernst (Scott)
_____
Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☐ No ☐
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☐
Other (please specify) unknown

33. Do you use any of the following? Room Fans ☐, Ceiling Fans ☐, Attic Fan ☐

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☐ Unknown ☐ V. little ☒
If yes, please specify type of pest controlled _____
And approximate date of service Some spot as needed

36. Water heater type: Gas ☒, Electric ☐, by Furnace ☐,
Other (please describe) _____

37. Water heater location: Basement ☒, Upstairs Utility Room ☐, Garage ☐,
Other (please specify) _____

38. What type of cooking appliance do you have? Electric ☒, Gas ☐
Other (please describe) _____

39. Is there a stove exhaust hood present? Yes ☐ No ☐
Does it vent to the outdoors? Yes ☐ No ☐ unknown

40. Smoking in Home:
None ☐, Rare (only guests) ☐, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐ unknown

41. If yes to question 40, what is smoked?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☐ No ☒

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____
_____
unknown

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation: _____
_____
NO
_____

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

45. Please check weekly household cleaning practices:

Dusting ☐

Dry Sweeping ☐

Vacuuming ☐

Polishing (furniture, etc.) ☐

Washing/Waxing Floors ☐

Other (describe) ☐ _____

46. Other comments:

_____

_____

_____

_____

_____

_____

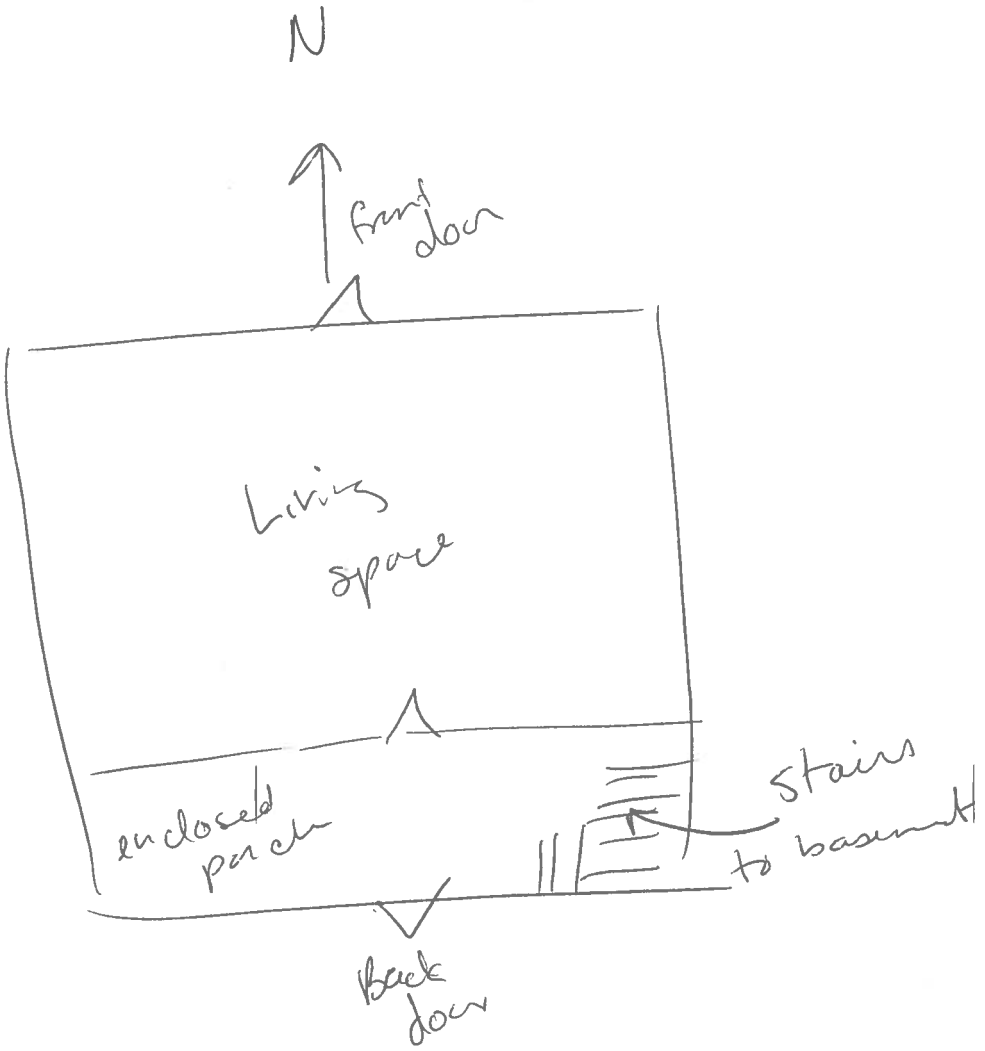
_____

_____

_____

47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	



VI Sample: 104 Custer Ave_Basement

VI Sample: 104 Custer Ave_Basement

VI Sample: 104 Custer Ave_Main

VI Sample: 104 Custer Ave_Basement

VI Sample: 104 Custer Ave_Subslab

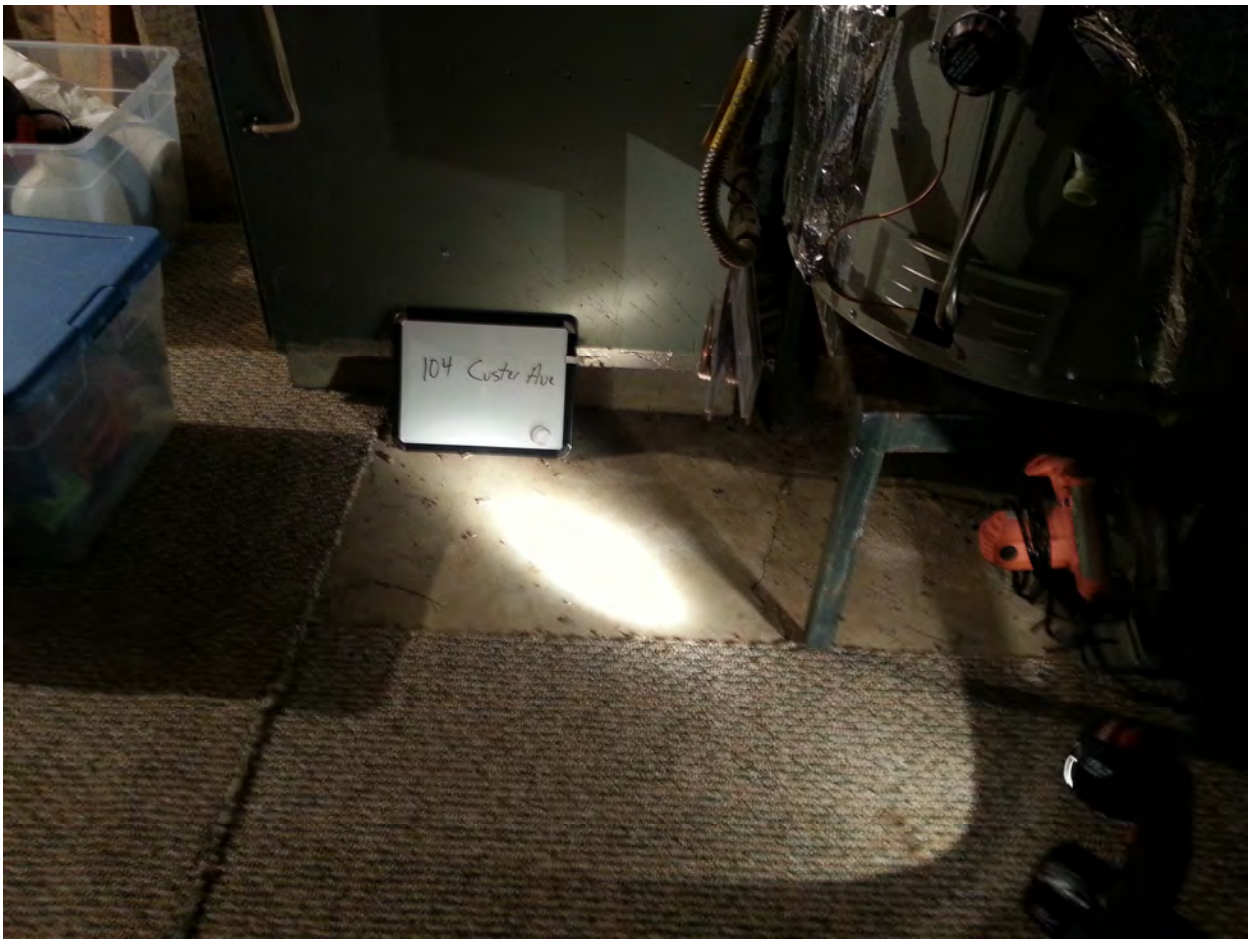
VI Sample: 104 Custer Ave_Subslab

VI Sample: 104 Custer Ave_Basement

VI Sample: 104 Custer Ave_Subslab

VI Sample: 104 Custer Ave_Subslab

VI Sample: 104 Custer Ave_Subslab



VI Sample: 104 Custer Ave_Subslab

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Benjamin Munoz

Physical Address of property under investigation: 109 S 38th St [illegible] MT 59102

Mailing Address: Same

Phone (optional):

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
3/2/18	AIR	20180302-[illegible] 538[illegible] 57-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15
3/2/18	AIR	20180302-A (Duplicate Sample)	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15
3/2/18	AIR	20180302-1095387[illegible] 57-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15
3/3/18	AIR	20180303-1095387[illegible] 57-01	TO-15, Fixed gases CH4

*OTHER (specify analysis)

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☒ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.

NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☒ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

Signature

Syd Tuohan
Printed Name

Telephone #: 307-745-7474

Date: 3/9/18

Property owner/operator copy = white DEQ copy = yellow

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	109 S 38th St.	Start Weather:	OVERCAST, 9 mph NNE
		Start Outdoor Air Temp:	28°F
Project Name:	BPCE	Start Atmospheric Pressure:	29.83
Sample Location:	Indoor Air - Main & Basement		
Date:	3/2/18	End Weather:	Snowy, Cloudy NE 6MPH
Field Personnel:	ST/BS	End Outdoor Air Temp:	28°F
Recorded by:	ST	End Atmospheric Pressure:	29.94 mmHg

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
3/2/18	1541	3/3/18	1539	20180302-109S 38THST-01	2355	0135		27	3	70	70
3/2/18	1541	3/3/18	1539	20180302-A	2174	0407		28	16	70	70
3/2/18	1542	3/3/18	1538	20180302-109S 38THST-02	2038	0538		28	1.5	65°F	65°F

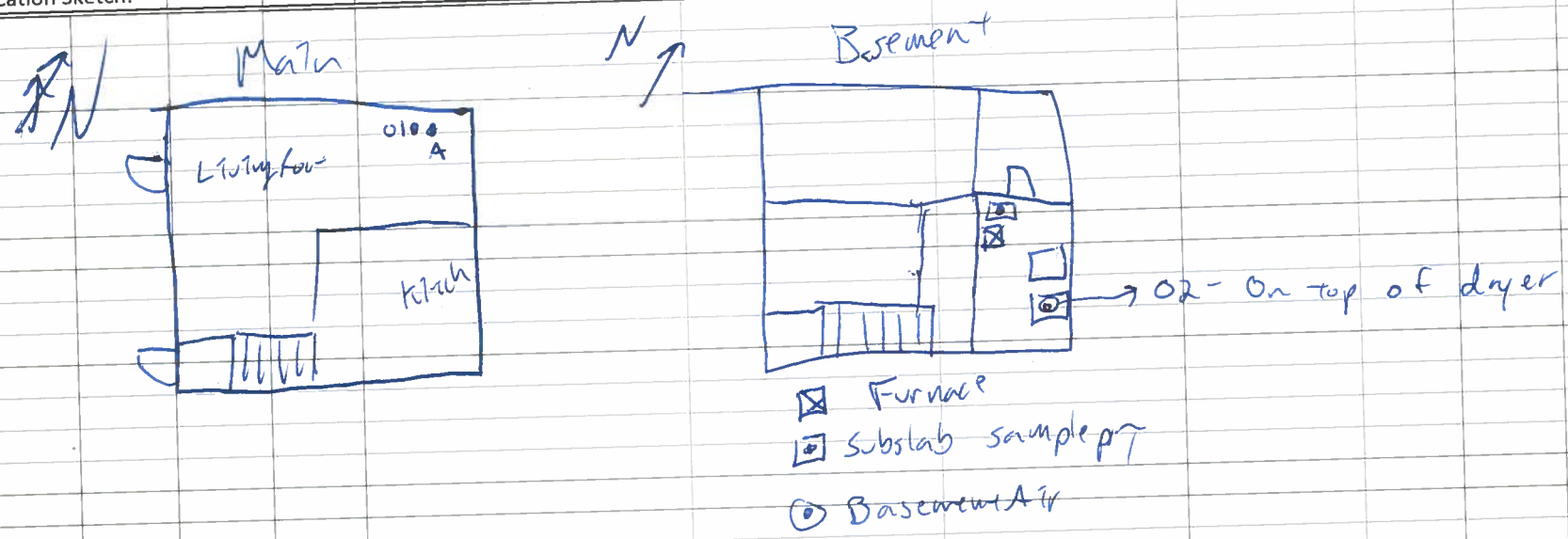
Comments:

01 - Main floor - on Kitchen table.
02 - Basement - Laundry Room
A - Duplicate of 01.

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

Location Sketch:



Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	109 S. 38th Street		
Project Name:	MDEQ Billings PCE	PID (model/serial #):	ppb RAE3000 / 12875
Sample location:	Basement Sub-slab	Helium Detector (model/serial #):	Dielectric / R11189
Date:	3/3/18	Weather:	Snowy, overcast NE 6mph
Field Personnel:	ST / DS	Air Temp:	28°F
Recorded by:	ST	Atmospheric Pressure:	29.94 inHg

Slab Data

Surface/slab Type:	Concrete	Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 120
Surface/slab Thickness (inches):	3"	
Slab/subsurface substrate comments:	Unknown substrate below concrete slab	
Depth of hole through the slab:	4"	
Length of sampling train (feet):	3 1/2" bgs	4' x 10 - 3 = 120ml

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
3/3/18	1543	50	27.8	28.7				
	1543	100	25.7	27.0				31.2
	1544	150	24.0	25.2				
	1544	200	22.7	23.5				
	1545	250	21.5	22.3				
	1545	300	20.7	21.3	0 ppm			

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
3/3/18	1547	1632	20180303-109538THST-01	3373	1518		26	3

ambient PID = 0 ppm

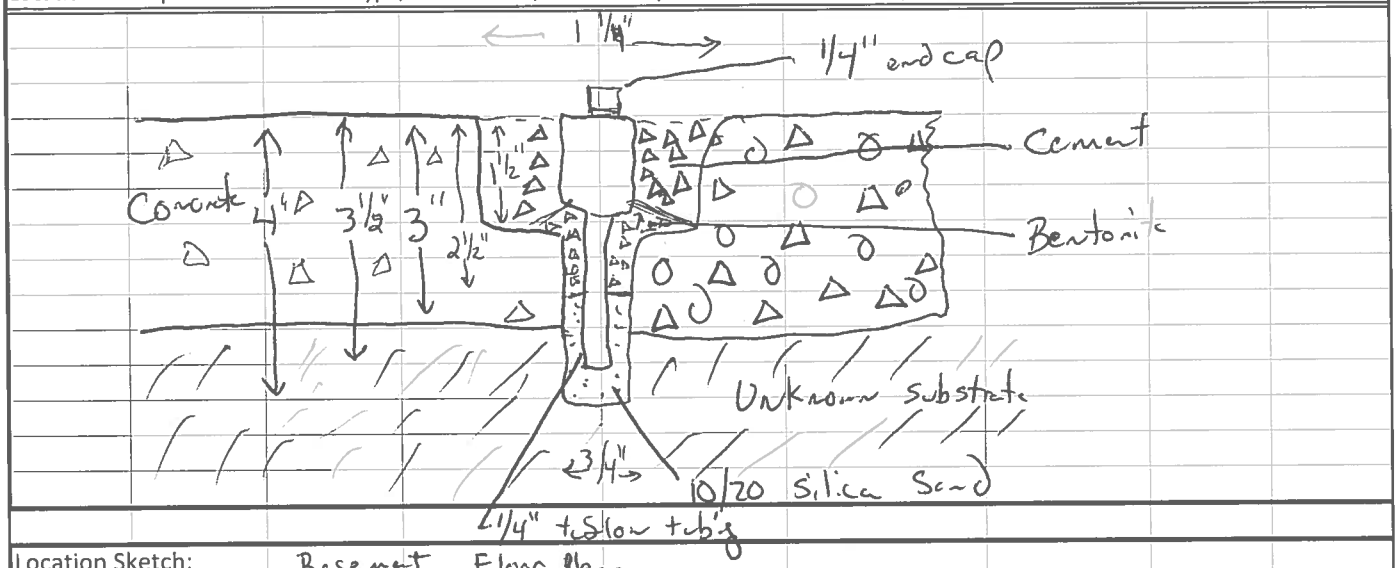
Comments: PID: 108ppb
CO: 0
H_2S: 0
LEL: 0
O_2: 19.6

Sub-Slab Soil Vapor Sampling Field Data Sheet

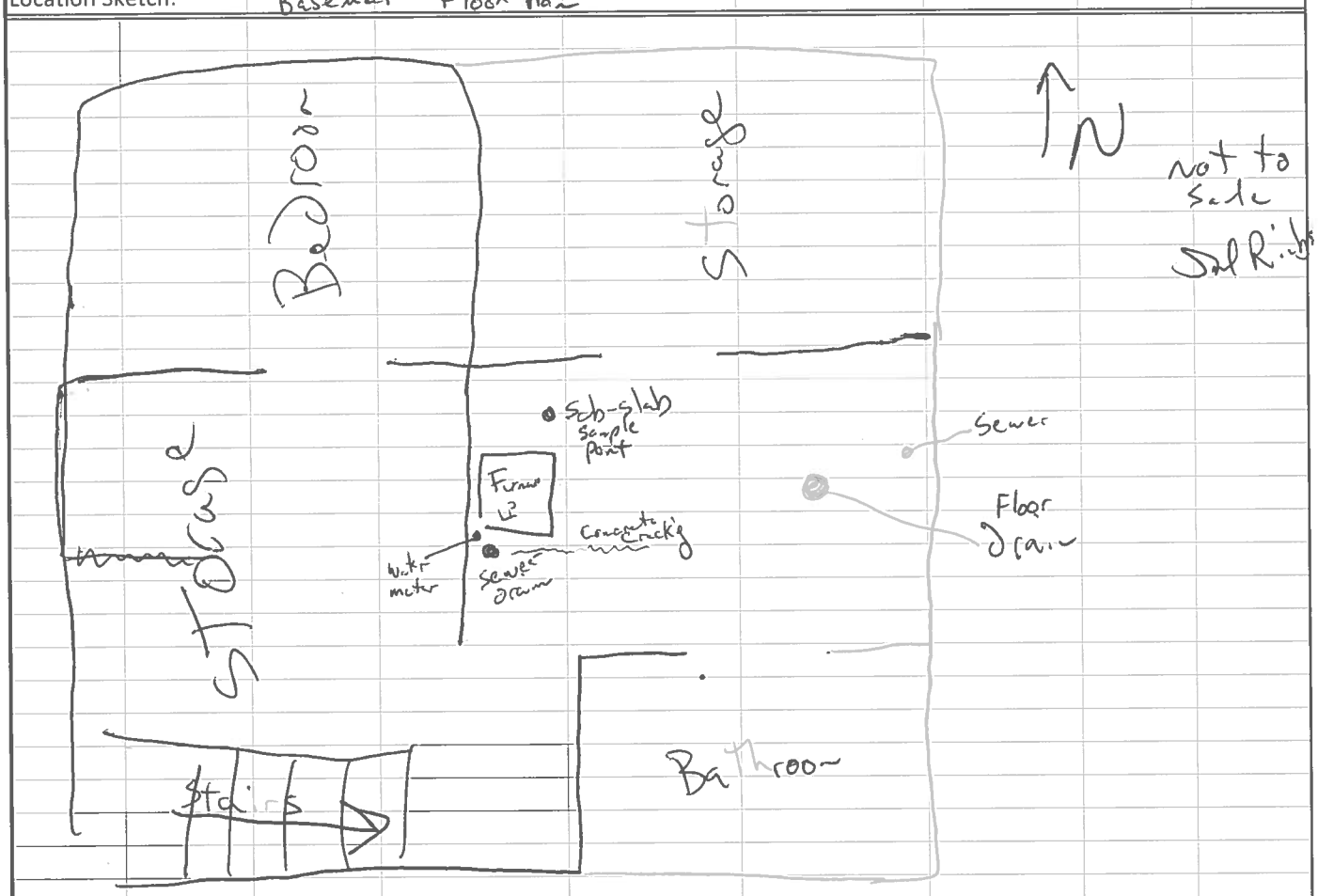
Project Name: MDEQ Billing PCE | Sample Location/ ID: 109 S. 38th street

Date:

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.



Location Sketch: Basement Floor Plan



Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
A. Excavation-site planning:		
1. The local One Call regulations have been checked for local utility-notification requirements (e.g., 48 hours vs. 72 hours).	2/27	JR
2. Per the local One Call regulations, list the responsible party (generally the excavation/drilling contractor) for requesting and verifying completion of utility locates below: Trihydro	2/27	JR
3. The property owner and/or business owner has been notified of the excavation schedule.	2/27	JR
4. Each proposed excavation site or "area of interest" has been delineated for utility-line locators using white spray paint and/or wooden stakes/lathes with white flagging.	NA	JR
5. Public-utility locates have been requested by calling One Call at least 48 hours (72 hours in some states) before work is scheduled to begin, and the request includes depths, as available.	2/27	JR
6. Each utility company has been notified of the excavation schedule and invited to review the proposed excavation sites.	2/27	JR
7. On-site meetings have been scheduled with the appropriate representatives of critical utility facilities (e.g., gas/oil pipelines, high-voltage cables, fiber-optic lines).	NA	JR
8. Private-utility locates—including fuel lines; tanks; and water, sewer, gas, electricity, and other utilities—have been requested.	NA	JR
9. The property owner was contacted to determine if he/she knows of privately owned subsurface facilities within 5 feet of the proposed excavation sites. (Review locations with the manager/owner.) Examples of privately owned facilities that are not commonly marked on private property include:	2/27	JR
a) Water and sewer laterals — water front yard south side; sewer alley way south side	2/27	JR
b) Gas lines — alley way south side	2/27	JR
c) Power lines (including those for landscape/yard lighting, pool and spa lines, and "out building" lines) — alley way	2/27	JR
d) Irrigation lines	NA	JR
e) Communication lines (cable, telephone, Internet) — alley way	2/27	JR
f) Propane tank lines	NA	JR
10. The proposed excavation sites have been reviewed by the appropriate stakeholders (e.g., owner, tenant, driller, excavator) and the Trihydro project manager.	NA	JR
11. Proposed excavation sites have been visually inspected, and available plans and aerial photos have been reviewed for evidence of potential utilities.	NA	JR
12. A scaled site plan showing the proposed excavation sites relative to subsurface utilities has been prepared and is available for stakeholder/Management review.	NA	JR
13. The basis for each buried utility line's location and the accuracy of the data defining the utility location are documented on the site plan.	NA	JR
14. The proposed excavation sites are at least 5 feet from subsurface utilities shown on the building plans.	NA	JR
15. The proposed excavation sites are at least 5 feet from subsurface utilities shown on public right-of-way / street-improvement plans. [Note: Work with utility companies to determine if they require a representative present during excavation activities.]	NA	JR
16. The proposed excavation sites are at least 7 feet from the pad surrounding underground storage tanks (USTs) shown on the building plans.	NA	JR
17. The utility-locate ticket number is available on site. 8005067	2/27	JR
18. A traffic-control plan has been prepared if appropriate. Note: If the project area encompasses a public street or right of way, the local and/or state authority must approve the traffic-control plan before fieldwork begins.	NA	JR
19. Arrangements have been made to contact the appropriate personnel if utility-line repairs are needed. (Who must be contacted if a line is unexpectedly damaged?)	NA	JR
20. Contact information is in place and readily available with the driller, excavator, and other project stakeholders.	2/27	JR
21. The client and other relevant stakeholders (if any) have been notified of the excavation planning/pre-planning steps and results.	NA	JR
22. A detailed work scope was developed by the project team and reviewed by the Project Director and Contracting Team.	NA	JR
Project Director (excavation-site planning tasks):		

109 S. 38th Street

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
B. Utility-line marking:		
1. Electrical circuits are energized during utility-line marking for subsurface power lines (e.g., circuits on timers or light-sensing switches).	2/27	JR
2. Public-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	2/27	JR
3. Private-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	NA	JR
4. Verify that One Call locators marked their facilities in the designated excavation area or provided notification that they do not have any facilities near the proposed excavation sites.	2/27	JR
5. One Call was contacted to request a "refresh" if utility-locate markings are missing, difficult to see, or more than 14 days old (7 days in some states). "Refresh" markings must be performed by the original marking organization.	NA	JR
Project Director (utility-line marking tasks):		
C. Job walk:		
1. Visual verification that each proposed excavation site does not lie on a line connecting two similar-looking manhole covers (e.g., sanitary sewers or storm drains). (Consider having the line snaked to confirm their locations.)	2/27	JR
2. Visual verification that each proposed excavation site does not lie on a line with any water, gas, electrical meters, utility cleanouts, or other utility boxes in the surrounding areas.	2/27	JR
3. Visual verification that the pavement near each proposed excavation site has not subsided or give the appearance it may be covering a previous excavation (e.g., linear cracks or sagging curbs).	2/27	JR
4. Visual verification that each proposed excavation has adequate overhead clearance for the excavation equipment (e.g., at least 10 feet from overhead-utility lines and/or reasonable distance from canopies).	2/27	JR
5. Fences and fields have been checked for markers, signs, posts, valves, stub outs, etc.	NA	JR
6. Surface structures such as tank batteries, wells, valves, phone pedestals, and electrical junction boxes have been checked for evidence of subsurface utilities.	NA	JR
7. Observed evidence of subsurface utilities has been photographed, sketched, or otherwise documented.	2/27	JR
8. Proposed excavation sites have been "walked"/reviewed by the excavation contractor, Trihydro project manager, and other stakeholders (e.g., client representative, property owner, tenant).	2/27	JR
9. Proposed excavation sites are located at least 5 feet from marked utilities (i.e., the "tolerance zone"), or written approval to excavate within the 5-foot tolerance zone has been obtained from the appropriate utility owner. In no case shall a proposed excavation be located closer than 2 feet from the outside edge of a marked utility. (Note: The tolerance zone is measured from the outside edge of a subsurface structure—not its centerline.)	2/27	JR
10. Verify that the excavation contractor (with help from appropriate utility-line locators, if part of the client-approved work scope) has walked each proposed excavation site to verify all expected utility-line markings are present.	2/27	JR
11. Traffic-control devices, safety barricades, caution tape, and other safety-management devices are in place as needed to protect project personnel.	NA	JR
Project Director (job-walk tasks):		
D. Daylighting / potholing / "soft digging":		
1. The proposed excavation sites located within the "tolerance zone" (and sites located outside the "tolerance zone" when required by the client) have been potholed to a depth below the anticipated utility zone using "minimally intrusive excavation methods" such as vacuum excavation (either air-entrainment or water-jet) and careful hand-tool use.	NA	JR
2. Monitoring and emergency equipment is available on site when hazardous atmospheres are expected to be encountered in the potholing excavations.	↓	↓
3. A list of emergency-contact names/numbers is maintained at the potholing excavation site.		
4. The project health and safety plan addresses potential hazards and safety-performance requirements related to utility-clearance operations.		
5. The location of and directions to the nearest hospital are known by all members of the project team.		
6. Representatives of utility owners that requested to be on site for utility locates are present.		

109 S. 38th Street

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
7. Pothole excavations have been visually checked with a flashlight by the excavation contractor, Trihydro project manager, or her/his designee.	NA	JR
8. Utilities adjacent to the excavation or that cross the excavation have been daylighted using "minimally intrusive excavation methods."		
9. The areal extent of the excavation-clearance pothole has been verified to extend at least 120% beyond the outside diameter of the largest-diameter down-hole tool to be used in the borehole, or at least 2 feet on each side of daylighted/exposed lines, whichever is greater.		
10. If vacuum excavation (e.g., air knife, air vac, hydro-vac) is not available to daylight utility lines, verify that the non-conductive probe method was used as follows: Scratch the ground no more than 10 inches deep above the utility and then probe the scratched area. If the utility isn't found in the scratched area, repeat the first step until the utility is located. Once the utility is found, its depth must be continually verified with the probe until 2 feet of soil remain above the utility. Carefully hand dig the remaining overburden to expose the utility.		
11. The soil encountered in the excavation-clearance pothole has been verified to be free of bedding material (e.g., clean gravel, clean sand, aggregate base [gravelly sand with ~10% fines], or other non-native-looking material) that could indicate the presence of a previously installed utility line.		
12. Excavation work within 2 feet of an underground utility was "hand dug."		
13. Once the utility lines were exposed and the excavations were safe to enter, the exposed lines (including their protective coating) was examined for damage.		
14. The condition of each utility line exposed during daylighting was documented, and the documentation was forwarded to the Trihydro project manager to place in the project file.		
15. If a utility line was damaged in any way, it was reported to the utility owner and Trihydro project manager and documented in the project file.		
16. Damage to a utility line was documented and repaired before it was reburied. The utility owner signed off on the repairs.		
17. Employees entering the excavation followed the procedures described in the Trihydro "Trenching and Excavation Program" and used the Trihydro "Daily Excavation/Trench Inspection Report" to document excavation condition.		
18. The location of daylighted utilities was documented and photographed after daylighting was completed and before the pothole excavation was backfilled.		
19. Locations for hand digging within the "tolerance zone" were noted.		
Project Director (daylighting/potholing tasks):		
E. Excavation (including drilling):		
1. The appropriate permits have been obtained for the work (e.g., hot-work permits, entry permits).	NA	JR
2. The utility-owner and/or agency representatives that requested to be on site during excavation work are present. (Trihydro Utility Locate Acknowledgement Form)	NA	JR
3. A safety ~~kickoff~~ meeting was conducted with the excavation contractor to review roles/responsibilities, work activities, anticipated hazards, this checklist, and emergency-response procedures before starting excavation work the site. The safety kickoff meeting was documented in the project file.	2/27	JR
4. A daily tailgate safety meeting was conducted and documented in the project file. Verify weather conditions, safety hazards, PPE requirements, job duties, communication, hand signals, etc.	2/27	JR
5. JSAs covering the work to be done are in place and have been reviewed, "marked up" where appropriate, and acknowledged by the excavation project-team members.	2/27	JR
6. Site workers have been reminded to look for hazardous conditions, processes, and activities, and that they are authorized to stop work if they see an unsafe condition.	2/27	JR
7. The emergency-response plan has been reviewed by all excavation project-team members (e.g., contact numbers, evacuation muster points, hospital routes).	2/27	JR
8. The excavation contractor has checked the excavation sites relative to overhead utilities, subsurface-utility locates, and adjacent surface structures.	2/27	JR
9. The excavation contractor has acknowledged the potential location of each subsurface utility marked in the excavation areas.	2/27	JR
10. Proper traffic control and exclusion zones have been established.	NA	JR
11. The excavation equipment (e.g., drill rig, backhoe) has been inspected for proper operation and condition.	2/27	JR
12. Emergency equipment (fire extinguisher, first aid kit, emergency shut-off switch, etc.) has been checked, is readily available, and is in working order.	2/27	JR
13. Excavation project-team members are wearing appropriate PPE per the Trihydro HASP and client/site-specific requirements.	2/27	JR
14. Power in the excavation area has been de-energized, if possible. If power cannot be de-energized, the excavation contractor was advised of the hazard.	NO	JR

109 S. 38th Street

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
Project Director (excavation/drilling tasks):		
F. If an unmarked utility line is discovered:		
1. Verify the One Call utility-locate request was made correctly.	2/27	JR
2. Identify the owner/operator of the unmarked utility line and contact One Call (dial "811") to request a "No Response" ticket. If the owner/operator fails to respond again, seek a third-party locating service to mark the utility before: a) excavation work begins, or b) advancing the excavation further.	NA	JR
3. Contact the owner/operator of non-locatable utilities to request they be taken out of service before excavation begins.	NA	JR
4. If possible, a representative of the unmarked utility line should be on site when the unmarked utility is daylighted.	NA	JR
Project Director (unmarked utility line tasks):		

Note:

-- If an item doesn't apply, please insert an "NA" in the "**Date**" column and provide an explanation in the "**Project Notes**" section below.

Sarah Sor Andrew Vann	Joel, Jake, Sarah	02/27/2018
Project Manager	Field Manager / Team Members	Date Reviewed
MDEQ / Billings PCE / 109 S. 38th Street	Trihydro	
Client / Project Name / Location	Excavator/Driller Name	Date Action Items Completed

Project Notes: [Please cross reference to the appropriate checklist-item number[s] when possible.]

109 S. 38th Street

OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 2/27/18

1. Name: Benjamin Munoz

   Address:
   109 S. 38th St.
   Billings, MT

   Home Phone: _____ Work Phone: _____

2. What is the best time to call to speak with you? — At: Work ☐ or Home ☐ ?

3. Are you the Owner ☑, Renter ☐, Other ☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

   _____

   _____

   _____

4. Total number of occupants/persons at this location? 1 adult
   Number of Children — Ages —

5. How long have you lived at this location? 3 yrs

General Home Description

6. Type of Home/Structure (check only one): Single Family Home ☑, Duplex ☐, Apartment ☐, Townhouse ☐ Other _____

7. Home/Structure Description:
   Number of floors: 1 main, 1 upstairs
   Basement ☑
   Crawlspace ☐
   Partial Crawlspace/Basement ☐ % of each _____
   Slab On Grade ☐
   Other ☐ _____

8. Age of Home/Structure: 1930's years, Not Sure/Unknown ☐

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood ☑, Brick ☐, Concrete ☐, Cement block ☐, Other ☐ _____
   Garage: ☐ Attached ☐ Detached ☐ None

10. Foundation Construction (check all that apply):
    Concrete Slab ☑
    Fieldstone ☐
    Concrete Block ☐
    Elevated Above Ground/Grade ☐
    Other ☐ _____

11. Do you have Private Well ☐ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____
used to be –

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____ city water / city sewer
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☐

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☐ Unfinished ☐ Partially Finished ☐ Partial Crawlspace ☐?

15. If finished, how many rooms are in the basement? 2
What are rooms used for? Bedrooms ☑ Family Room ☐ Storage ☑
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☑ No ☐

17. Is the basement floor (check all that apply) Concrete ☑, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☑, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐,
Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe_____

22. Are any of the following used or stored in the basement (check all that apply):
- [x] Paint (very small amount
- [ ] Solvents (degreasers, paint thinner, etc.)
- [ ] Fuels/Oils (gasoline, diesel, used oil)
- [ ] Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- [ ] Pesticides

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☐ No ☑
If yes, specify what was done, where in the home, and what month:

24. Have you installed new carpeting in your home within the last year? Yes ☐ No ☑
If yes, when and where? _____

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
No ☑

26. Does anyone in your home use solvents at work?
Yes ☐ If yes, how many persons?
No ☑ If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes ☐ No ☐ NO

28. Where is the washer/dryer located?
Basement ☑
Upstairs Utility Room ☐
Kitchen ☐
Garage ☐
Use a Laundromat ☐
Other, please specify ☐ _____

29. If you have a dryer, is it vented to the outdoors? Yes ☑ No ☐

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas ☑, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system:
- Forced Hot Air ☑
- Forced Hot Water ☐
- Steam ☐
- Radiant Floor Heat ☐
- Wood Stove ☐
- Coal Furnace ☐
- Fireplace ☐
- Other ☐ _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? _____
NO
How is/was the tank filled? _____
Is there staining near the tank? Yes ☐ No ☐

note nearby UST site gas station

32. Do you have air conditioning? Yes ☑ No ☐
Central Air Conditioning ☑
Window Air Conditioning Unit(s) ☐
Other (please specify) _____

33. Do you use any of the following? Room Fans ☐, Ceiling Fans ☑, Attic Fan ☐

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☑

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☑ Unknown ☐
If yes, please specify type of pest controlled _____
And approximate date of service _____

36. Water heater type: Gas ☐, Electric ☑, by Furnace ☐,
Other (please describe) _____

37. Water heater location: Basement ☑, Upstairs Utility Room ☐, Garage ☐,
Other (please specify) _____

38. What type of cooking appliance do you have? Electric ☐, Gas ☑
Other (please describe) _____

39. Is there a stove exhaust hood present? Yes ☑ No ☑
Does it vent to the outdoors? Yes ☑ No ☐

40. Smoking in Home:
None ☐, Rare (only guests) ☐, Moderate (residents, light smokers) ☑,
Heavy (at least one heavy smoker in household) ☐

41. If yes to question 40, what is smoked?
Cigarettes ☑ Cigars ☐
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☐ No ☑ seldom some candles

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____
NO

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation: _____
NO

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
~~Spray-on deodorant~~	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

45. Please check weekly household cleaning practices:

Dusting ☐

Dry Sweeping ☐

Vacuuming ☐

Polishing (furniture, etc.) ☐

Washing/Waxing Floors ☐

Other (describe) ☐ _____

46. Other comments:

_____

_____

_____

_____

_____

_____

_____

_____

_____

47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

VI Sample: 109 S 38th St_Subslab

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Kira Harris

Physical Address of property under investigation: 112 S 33rd St., Billings, MT

Mailing Address: —

Phone (optional): —

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/12/18	Indoor Air (main)	20180212-112S33RD ST-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/12/18	Indoor Air (basement)	20180212-112S33RD ST-02 *	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/13/18	Sub-slab vapor	20180213-112S33RD ST-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*

*OTHER (specify analysis) Indoor Air: VOCs (TO-15) Petroleum (APH)
Sub slab vapor: VOCs, APH, Fixed gases, Helium

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

*Duplicate with 20180212-C

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample. NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

Signature: on behalf DEQ

Printed Name: S. SEITZ (TRIHYDRO)

Telephone #: 406-556-4050

Date: 2/13/18

Property owner/operator copy = white DEQ copy = yellow

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	Billings PCE GW	Start Weather:	Sunny, cold, wind W 6 mph
		Start Outdoor Air Temp:	6°F
Project Name:	VI Investigation	Start Atmospheric Pressure:	30.5 in Hg
Sample Location:	112 S 33RD ST		
Date:	2/12/18	End Weather:	37°F, Sunny, cool, SW wind 18 mph
Field Personnel:	SS	End Outdoor Air Temp:	37°F
Recorded by:	SS	End Atmospheric Pressure:	30.0 in Hg

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
2/12/18	1630	2/13/18	1632	20180212-112S33RDST -01	2019	0521	—	-27	-2 in Hg	≈70°	
2/12/18	1632	2/13/18	16:30	20180212 - C	3465	0207	—	-29	-2 in Hg	≈68°	
2/12/18	1632	2/13/18	16:30	20180212 - 112S33RDST -02	0969	0705	—	-28	-2 in Hg	≈68°	

Comments:

-01 Main floor - kitchen table
-02 Basement middle of floor
-C Duplicate in basement

all passed shut in 2 min test 2/12/18

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID: ~~28 7th Street West~~ 3/3 Billings PCE GW

Project Name: BPCE
Sample location: 112 S 33rd ST.
Date: 2/13/18
Field Personnel: MO/SS
Recorded by: ST

PID (model/serial #): pine 10 12875, ppb RAE 3000
Helium Detector (model/serial #): Dielectric - Bte 28 #
Weather: 37°F, Sunny, cool, snowpack with SW 15 mph
Air Temp: 37°F
Atmospheric Pressure: 30.0 in Hg

Slab Data

Surface/slab Type: Concrete - poured
Surface/slab Thickness (inches): ≅ 4 inches
Slab/subsurface substrate comments:
Depth of hole through the slab: 6 1/2 "
Length of sampling train (feet): ≅ 3 ft + 0.5 ft (port) = 3.5 × 10 × 3 = 105

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft =

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
2/13/18	1642	50	25.9%	26.0%				
"	1643	100	25.7%	25.9%				
"	1645	200	25.2%	25.4%				
"	1646	250	24.8%	25.1%				
"	1646	300	24.5%	24.7%	0 ppm	—		

Conversion: 1.0% = 10,000 ppm
At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
2/13/18	1648	1729	20180213-112S 33CDST-01	3366	0984	—	-27.0	-3.0

Comments:
PID Reading in upstairs house ≅ 35 ppb
PID Reading in basement indoor air ≅ 0 ppb → drifted upward to 80 ppb
PID peak in sub slab 1137 ppb. LEL, H_2S, CO all 0
O_2 20.9%

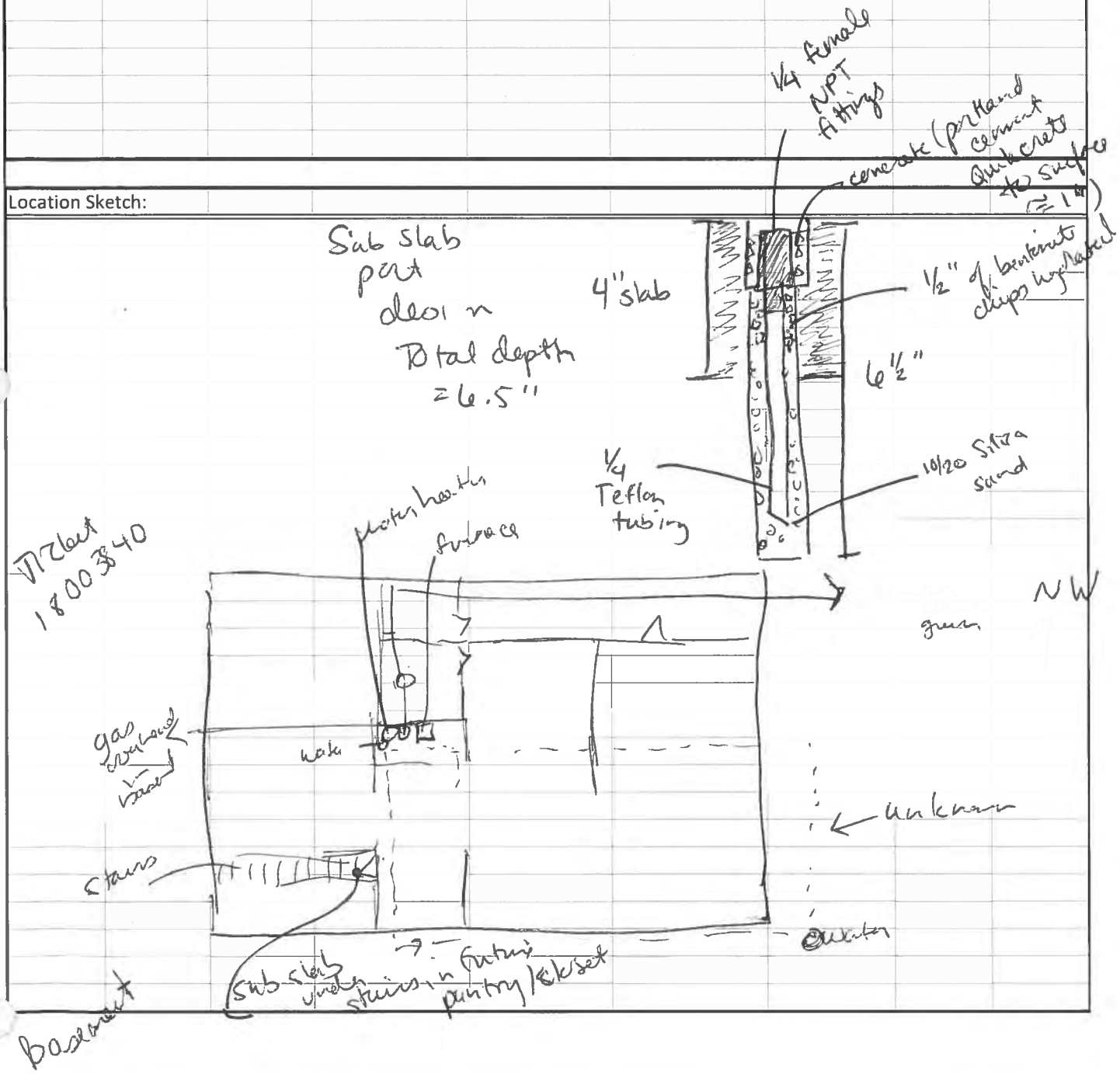
Sub-Slab Soil Vapor Sampling Field Data Sheet

Project Name: Sample Location/ ID:

Date:

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

Location Sketch:



OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 2/9/18

1. Name: Kira Harris

   Address: 112 S 33rd St.

   Home Phone: _____ Work Phone: _____

2. What is the best time to call to speak with you? _____ At: Work ☐ or Home ☐ ?

3. Are you the Owner ☑, Renter ☐, Other ☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

4. Total number of occupants/persons at this location? _____
   Number of Children _____ Ages _____

5. How long have you lived at this location? _____

General Home Description

6. Type of Home/Structure (check only one): Single Family Home ☐, Duplex ☐, Apartment ☐, Townhouse ☐ Other _____

7. Home/Structure Description:
   Number of floors: 1 main
   Basement ☑
   Crawlspace ☐
   Partial Crawlspace/Basement ☐ % of each _____
   Slab On Grade ☐
   Other ☐ _____

   Remodeling

8. Age of Home/Structure: _____ years, Not Sure/Unknown ☐

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood ☐, Brick ☐, Concrete ☑, Cement block ☐, Other ☐ _____
   Garage: ☐ Attached ☐ Detached ☐ None

10. Foundation Construction (check all that apply):
    Concrete Slab ☑
    Fieldstone ☐
    Concrete Block ☐
    Elevated Above Ground/Grade ☐
    Other ☐ _____

11. Do you have Private Well ☐ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____
NO

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____ city water city sewer
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☐

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☐ Unfinished ☑ Partially Finished ☐ Partial Crawlspace ☐?

15. If finished, how many rooms are in the basement? NA
What are rooms used for? Bedrooms ☐ Family Room ☐ Storage ☐
Other Will be bedroom, family, storage & bathroom

16. If not finished, do you plan on finishing in the future? Yes ☑ No ☐ in process

17. Is the basement floor (check all that apply) Concrete ☑, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☑, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☑

Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☑

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☑,
Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe _____ in future utility room in center

22. Are any of the following used or stored in the basement (check all that apply):
- [x] Paint
- [ ] Solvents (degreasers, paint thinner, etc.)
- [ ] Fuels/Oils (gasoline, diesel, used oil)
- [ ] Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- [ ] Pesticides

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes [x] No [ ] In process upstairs and
If yes, specify what was done, where in the home, and what month:

24. Have you installed new carpeting in your home within the last year? Yes [ ] No [x]
If yes, when and where? new flooring upstairs

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) [ ]
Yes, use dry-cleaning infrequently (monthly or less) [ ]
Yes, work at a dry cleaning service [ ]
No [x]

26. Does anyone in your home use solvents at work?
Yes [x] If yes, how many persons?
No [x] If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes [ ] No [ ]

28. Where is the washer/dryer located?
Basement [ ]
Upstairs Utility Room [x]
Kitchen [ ]
Garage [ ]
Use a Laundromat [ ]
Other, please specify [ ] _____

29. If you have a dryer, is it vented to the outdoors? Yes [x] No [ ]

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas [x], Oil [ ], Electric [ ], Wood [ ], Coal [ ],
Other [ ] _____

Heat conveyance system:
- Forced Hot Air [x]
- Forced Hot Water [ ]
- Steam [ ]
- Radiant Floor Heat [ ]
- Wood Stove [ ]
- Coal Furnace [ ]
- Fireplace [ ]
- Other [ ] _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? NA
How is/was the tank filled?
Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☐ No ☐
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☐
Other (please specify)

33. Do you use any of the following? Room Fans ☐, Ceiling Fans ☐, Attic Fan ☐

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☐ Unknown ☐
If yes, please specify type of pest controlled
And approximate date of service

36. Water heater type: Gas ☑, Electric ☐, by Furnace ☐,
Other (please describe)

37. Water heater location: Basement ☑, Upstairs Utility Room ☐, Garage ☐,
Other (please specify)

38. What type of cooking appliance do you have? Electric ☐, Gas ☐
Other (please describe)

39. Is there a stove exhaust hood present? Yes ☐ No ☐
Does it vent to the outdoors? Yes ☐ No ☐

40. Smoking in Home:
None ☐, Rare (only guests) ☐, Moderate (residents, light smokers) ☑,
Heavy (at least one heavy smoker in household) ☐

41. If yes to question 40, what is smoked?
Cigarettes ☑ Cigars ☐
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☐ No ☐

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐
Finishing basement

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation:
NO

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

45. Please check weekly household cleaning practices:

Dusting ☐

Dry Sweeping ☐

Vacuuming ☐

Polishing (furniture, etc.) ☐

Washing/Waxing Floors ☐

Other (describe) ☐ _____

46. Other comments:

_____

_____

_____

_____

_____

_____

_____

_____

47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

Kira

Saturday – noon

Monday / Tuesday

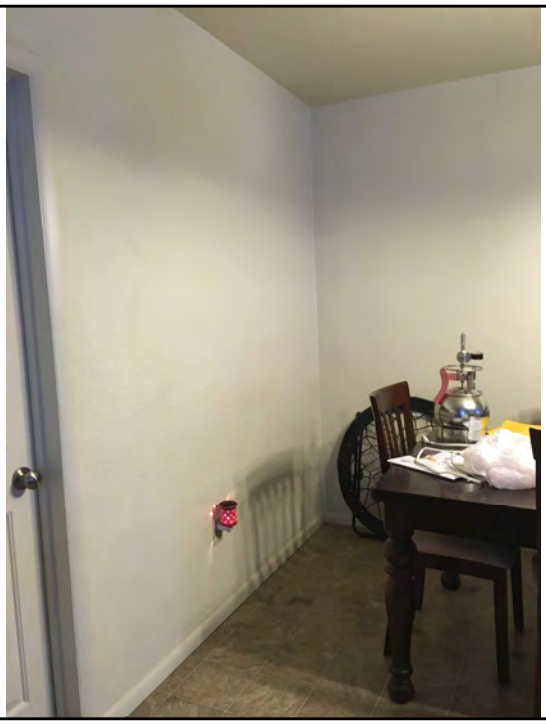
4:30 pm ~~XXX~~

4:30 pm ~~XXX~~

VI Sample: 112 S 33rd St_Subslab

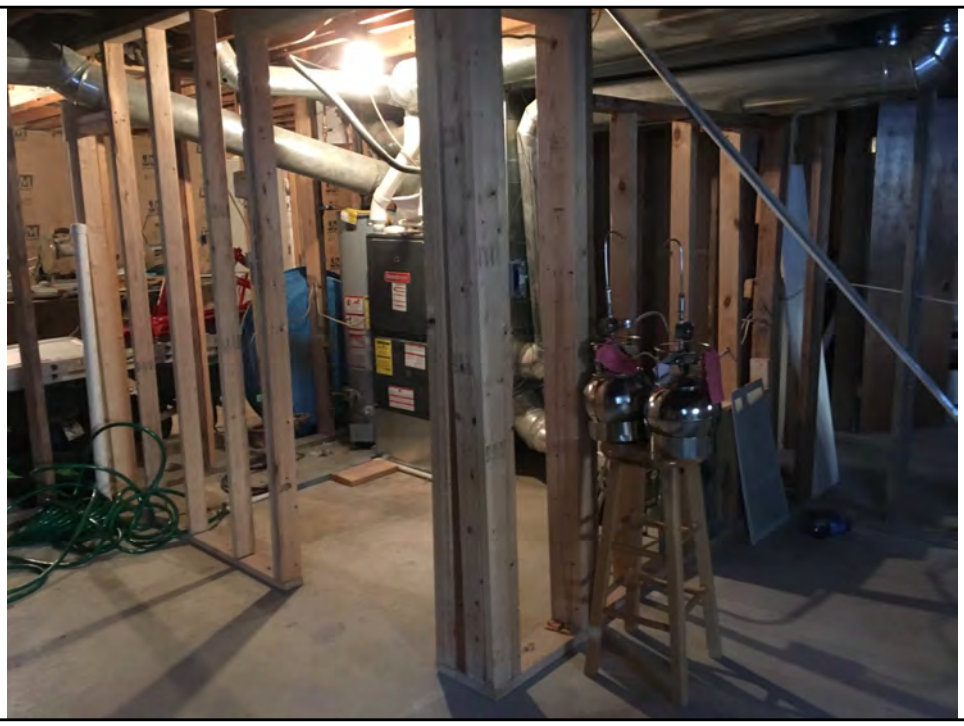
VI Sample: 112 S 33rd St_Subslab

VI Sample: 112 S 33rd St_Subslab



ADDRESS: 112 S 33RD ST

NOTES:
INDOOR AIR SAMPLE MAIN ON KITCHEN TABLE



ADDRESS: 112 S 33RD ST

NOTES:
INDOOR AIR SAMPLE BASEMENT - CENTRAL

ADDRESS: 112 S 33RD ST

NOTES:
VI SUBSLAB SAMPLE IN BASEMENT UNDER STAIRS

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Jeffrey Leschner Trust

Physical Address of property under investigation: 112 Wyoming Ave Billings MT 59101

Mailing Address: same

Phone (optional): _____

The following samples have been collected from this property:

Date	Media		Sample ID Number	Analysis to be performed
3/5/18	AIR	20180305-	112 WYOMING -01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15, API
3/5/18	AIR	20180305-	112 WYOMING -02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15, API
3/6/18	AIR	20180306-	112 WYOMING -01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15 API FIXED GASES, CH_4

*OTHER (specify analysis) _____

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☒ Without variation, or
- ☐ With the following variation(s) from the plan:

_____

_____

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.
- ☒ N/A

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☒ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason: _____

DEQ representative:

for DEQ
Signature

Syvis Trahan
Printed Name

Telephone #: 307-745-7474

Date: 3/14/18

Property owner/operator copy = white DEQ copy = yellow

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID: 112 Wyoming Ave.

Project Name: BPCE
Sample location: 112 Wyoming Ave
Date: 3/6/18
Field Personnel: BS, LD
Recorded by: BS

PID (model/serial #): PPB RAE3000 / 12875
Helium Detector (model/serial #): Dielectric / R1119
Weather: Sunny, 3 mph S
Air Temp: 38°F
Atmospheric Pressure: 30.38"

Slab Data

Surface/slab Type: Poured Concrete
Surface/slab Thickness (inches):
Slab/subsurface substrate comments: EPA Installed
Depth of hole through the slab:
Length of sampling train (feet): Assume 1'

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 150

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
3/6/18	1521	50	21.5	21.7			18.7	27.1
	1521	100	21.3	21.3				
	1522	150	21.0	21.2				
	1522	200	20.8	21.0				
	1522	250	20.6	20.8				

Conversion: 1.0% = 10,000 ppm
At 20% He, there should be no more than 2% (20,000 ppm) He in sample train

	1522	300	20.5	20.6	1,100 ppm	tedlar		

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
3/6/18	1533	1612	20180306-112Wyoming-01	0204	1185		28	4

Comments:

Sub-Slab Soil Vapor Sampling Field Data Sheet

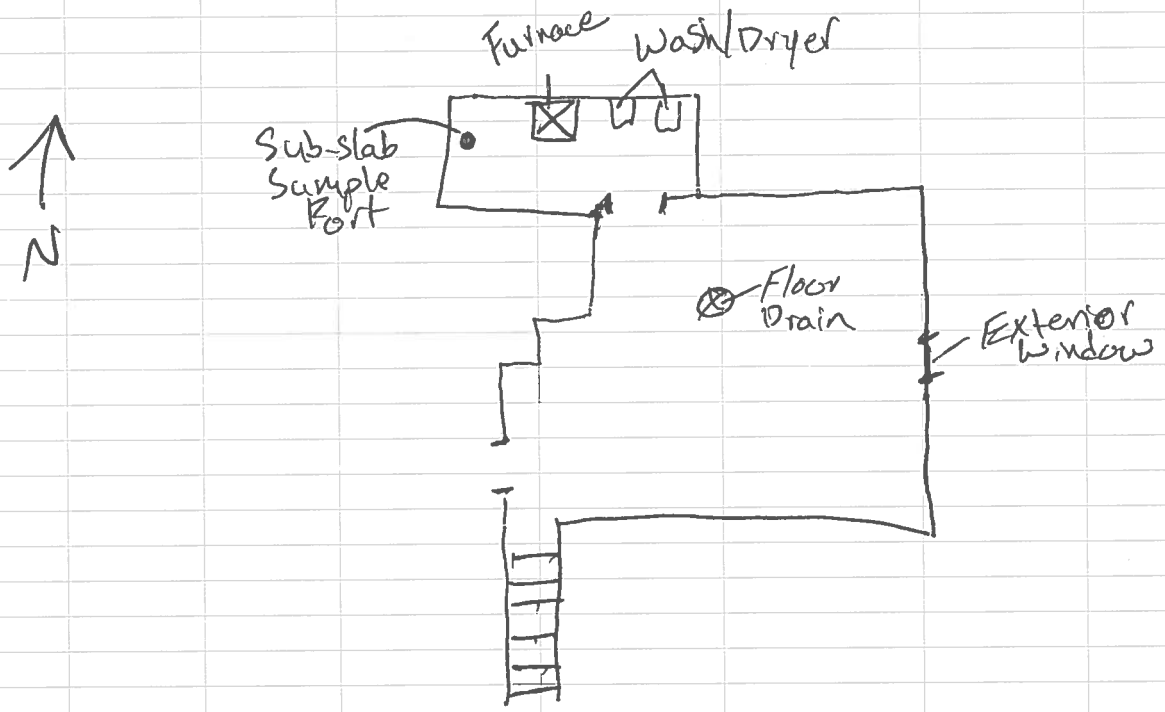
Project Name: BPCE
Date: 3/6/18

Sample Location/ ID: 112 Wyoming Ave.

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

EPA Installed

Location Sketch:



Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	112 Wyoming Ave.	Start Weather:	Cloudy.
		Start Outdoor Air Temp:	38°F
Project Name:	BPCE	Start Atmospheric Pressure:	30.17"
Sample Location:	112 Wyoming Ave.		
Date:	3/5/18	End Weather:	Sunny, 3 mph S.
Field Personnel:	BS, ST	End Outdoor Air Temp:	38°F
Recorded by:	BS	End Atmospheric Pressure:	30.38"

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
3/5/18	1511	3/6/18	1508	20180305-112Wyoming-01	2801	1450		27.5	2.5	70°F	70°F
3/5/18	1512	3/6/18	1510	20180305-112Wyoming-02	0052	0084		26	9	65°F	65°F

Comments:

01- Main floor
02- Basement

OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 3/5/18

1. Name: Jeff Leischner

   Address: 112 W Yoming

   Home Phone: 406-696-7735 Work Phone: _____

2. What is the best time to call to speak with you? _____ At: Work☐ or Home☐ ?

3. Are you the Owner☒, Renter☐, Other☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

4. Total number of occupants/persons at this location? unknown
   Number of Children_____ Ages_____

5. How long have you lived at this location? unknown

General Home Description

6. Type of Home/Structure (check only one): Single Family Home☒, Duplex☐, Apartment☐, Townhouse☐ Other _____

7. Home/Structure Description:
   Number of floors: 1
   Basement☒
   Crawlspace☐
   Partial Crawlspace/Basement☐ % of each _____
   Slab On Grade☐
   Other☐ _____

8. Age of Home/Structure: 113 years, Not Sure/Unknown☐

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood☒, Brick☐, Concrete☐, Cement block☐, Other☐ _____
   Garage: ☐Attached ☒Detached ☐None

10. Foundation Construction (check all that apply):
    Concrete Slab☒
    Fieldstone☐
    Concrete Block☐
    Elevated Above Ground/Grade☐
    Other☐ _____

11. Do you have Private Well ☐ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____
city water

12. Do you have a Septic System? Yes ☐ No ☑ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____
When was the last time it was serviced? city sewer
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☐
NO

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☑ Unfinished ☐ Partially Finished ☑ Partial Crawlspace ☐ ?
mostly unfinished for washer/dryer furnace heater (H2O)

15. If finished, how many rooms are in the basement? one bedroom likely
What are rooms used for? Bedrooms ☑ Family Room ☐ Storage ☑
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☑

17. Is the basement floor (check all that apply) Concrete ☑, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☑, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐ unknown
No ☐

Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐ unknown
No ☐

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐,
Floor Drain ☑, Other Hole/Opening In Floor ☐
Describe _____ yes

no floor cracks observed
- basement polymer/paint in unfinished area

22. Are any of the following used or stored in the basement (check all that apply):
- ☐ Paint
- ☐ Solvents (degreasers, paint thinner, etc.)
- ☐ Fuels/Oils (gasoline, diesel, used oil)
- ☐ Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- ☐ Pesticides

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

not observed

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☐ No ☐
If yes, specify what was done, where in the home, and what month: unknown

24. Have you installed new carpeting in your home within the last year? Yes ☐ No ☐
If yes, when and where? unknown

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
No ☒

26. Does anyone in your home use solvents at work?
Yes ☐ If yes, how many persons?
No ☒ If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes ☐ No ☐ N/A

28. Where is the washer/dryer located?
Basement ☒
Upstairs Utility Room ☐
Kitchen ☐
Garage ☐
Use a Laundromat ☐
Other, please specify ☐ _____

29. If you have a dryer, is it vented to the outdoors? Yes ☒ No ☐

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas ☒, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ furnace

Heat conveyance system:
- Forced Hot Air ☒
- Forced Hot Water ☐
- Steam ☐
- Radiant Floor Heat ☐
- Wood Stove ☐
- Coal Furnace ☐
- Fireplace ☐
- Other ☐ _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? _____
No UST.
How is/was the tank filled? _____
Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☒ No ☐
Central Air Conditioning ☒
Window Air Conditioning Unit(s) ☐
Other (please specify) _____

33. Do you use any of the following? Room Fans ☒, Ceiling Fans ☐, Attic Fan ☐ yes

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☒

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☒ Unknown ☐
If yes, please specify type of pest controlled _____
And approximate date of service _____

36. Water heater type: Gas ☒ Electric ☐, by Furnace ☐,
Other (please describe) _____

37. Water heater location: Basement ☒, Upstairs Utility Room ☐, Garage ☐,
Other (please specify) _____

38. What type of cooking appliance do you have? Electric ☐, Gas ☐ ~~N/A~~
Other (please describe) _____ unknown

39. Is there a stove exhaust hood present? Yes ☐ No ☐
Does it vent to the outdoors? Yes ☐ No ☐ unknown

40. Smoking in Home:
None ☐, Rare (only guests) ☐, Moderate (residents, light smokers) ☐, unknown
Heavy (at least one heavy smoker in household) ☐

41. If yes to question 40, what is smoked?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☐ No ☐ unknown

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____
unknown

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation: _____
no

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

no inventory

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

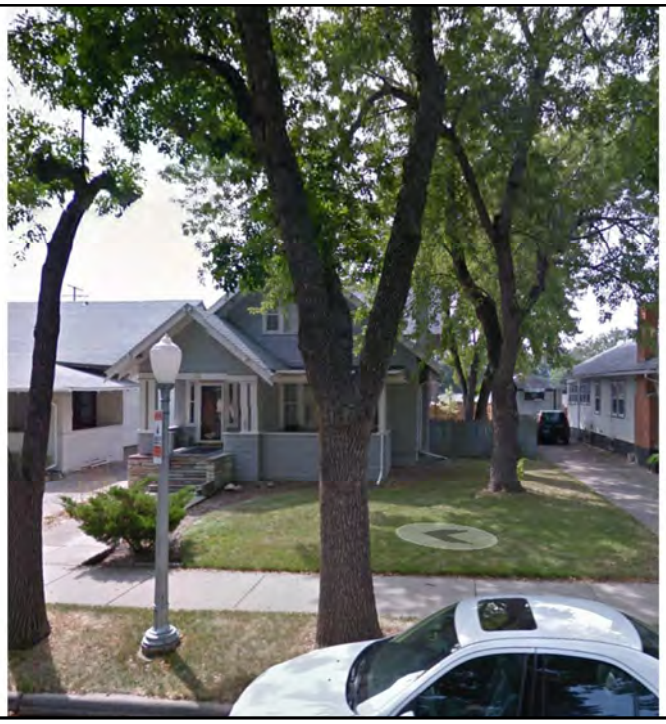
45. Please check weekly household cleaning practices:

- Dusting ☐
- Dry Sweeping ☐
- Vacuuming ☐
- Polishing (furniture, etc.) ☐
- Washing/Waxing Floors ☐
- Other (describe) ☐ _____

regular cleaning ✓

46. Other comments:

Note – EPA – installed sub slab part in basement was found and used



ADDRESS: 112 WYOMING

NOTES: OUTSIDE OF RESIDENCE – NO PICTURES FROM INSIDE SAMPLING

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Earleen Stanwarty

Physical Address of property under investigation: 117 Custer Ave, Billings, MT

Mailing Address: 117 Custer Ave, Billings

Phone (optional):

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/9/18	Indoor Air	20180209-117CUSTER-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/9/18	Indoor Air	20180209-117CUSTER-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/9/18	Indoor Air basement	20180209-117CUSTER-03	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/10/18	Subslab vapor	20180210-117CUSTER-01	TO-15 (VOCS), APH, Fixed gases, Helium

*OTHER (specify analysis) indoor air - VOCs (TO-15), Petroleum Air (APH)

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample. N/A

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

[signature] on behalf DEQ — Signature

S. SEITZ (TRI HYDRO) — Printed Name

Telephone #: 406-558-4850

Date: 2/10/18

Property owner/operator copy = white DEQ copy = yellow

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	117 Custer		
Project Name:	BPCE	**PID (model/serial #):**	RAE ppb 3000 / 594-000778
Sample location:	Basement Sub slab	**Helium Detector (model/serial #):**	Dilectric / 8628
Date:	2/10/18	**Weather:**	~~17°F~~ Sunny, light W wind
Field Personnel:	ST, MO, SS	**Air Temp:**	17°F
Recorded by:	ST	**Atmospheric Pressure:**	30.3 inHg.

Slab Data

Surface/slab Type: Concrete

Surface/slab Thickness (inches): Unk.

Slab/subsurface substrate comments: Unk.

Depth of hole through the slab: Unk.

Length of sampling train (feet): ~5 ft. (conservative) ≈ 150 ml

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 150 ml

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	**Time**	**Cumulative volume purged (ml)**	**Helium Beneath Shroud (%) min**	**Helium Beneath Shroud (%) max**	**Helium in Probe (ppm or %)**	**PID reading in probe (ppb)**	**Helium Beneath Shroud (%) min**	**Helium Beneath Shroud (%) max**
2/10/18	1358	50	23.4	23.4				
2/10/18	1359	100	23.1	23.3				
2/10/18	1359	150	22.8	22.9				
2/10/18	1400	200	22.4	22.5				
2/10/18	1400	250	22.0	22.2				

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

2/10/18	1400	300	21.5	21.8	175

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
2/10/18	1403	1445	20180210-117CUSTER-01	3437	1126		-26.5	-3.0

Comments:

Note He tanks low on He, so

PID - 98 ppb in port

CO, LEL, H2S All Ø

O_2 - 20%

1416 - 19 inHg in sample and 15.4% <10% He in shroud

1421 - 15.5

1431 - 9.7 5%

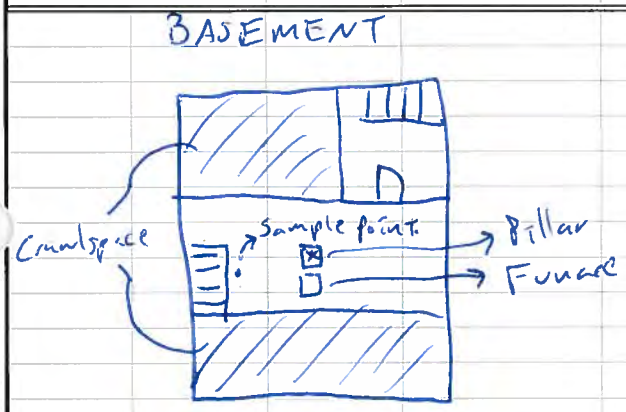
1445 - 3.5 3.5%

Sub-Slab Soil Vapor Sampling Field Data Sheet

Project Name:	Sample Location/ ID:
Date:	

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

Location Sketch:



Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	117 Custer Ave	**Start Weather:**	Mostly Sunny NNE 6 mph
		Start Outdoor Air Temp:	7°F
Project Name:	MT DEQ Billing PCE	**Start Atmospheric Pressure:**	30.50 in Hg
Sample Location:	main, top, & basement		
Date:	02/09/2018	**End Weather:**	~~17~~ Mostly Sunny, W 5 mph
Field Personnel:	Jock Riebli & Sarah Seltz	**End Outdoor Air Temp:**	17°F
Recorded by:	Jock Riebli	**End Atmospheric Pressure:**	30.3 in Hg

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
02/09/18	1309	2/10	1320	20180209-117Custer-01	2124	FC0886		-25.5	-2	68°F	68°F
02/09/18	1312	2/10	1322	20180209-117Custer-02	1055	FC 1382		-27.0	-3	72°F	68°F
02/09/18	1317	2/10	1337	20180209-117Custer-03	~~1096~~ 0196	FC 1430		-27.0	~~-17.2~~ -17.2	65°F	62°F

Comments:

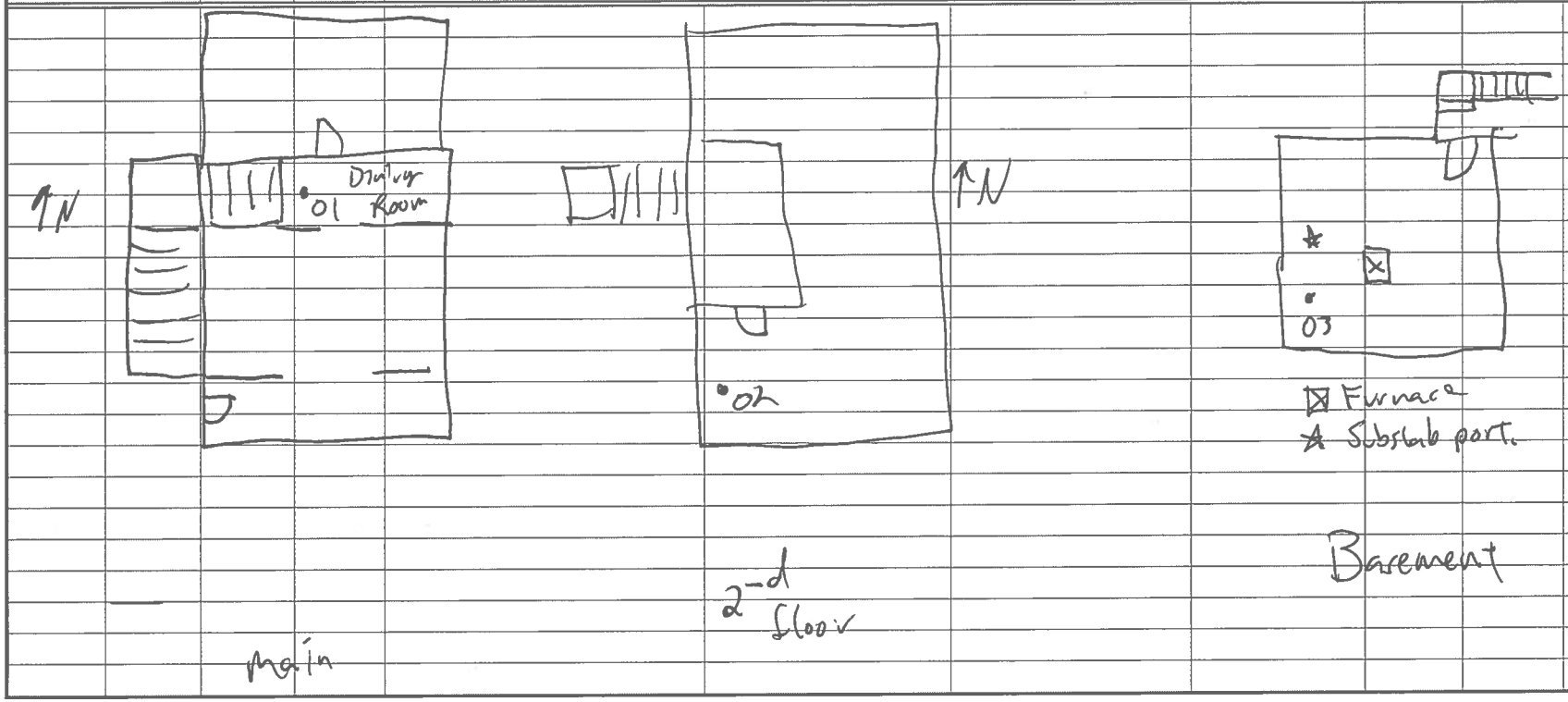
-01: Dining Room main floor
-02: Upstairs bedroom
-03: Basement near crawlspace

2/10/18 - Can 03 appears to be faulty, only decreased by 10 in Hg over 24 hrs

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

Location Sketch:



OCCUPIED DWELLING QUESTIONNAIRE

Nov 2017 &

Indoor Air Assessment Survey

Date: Feb 2018

1. Name: Earlene Stanwacity

   Address:
   117 Custer Ave
   Billings, MT

   Home Phone: 406-534-3621 ~~Work~~ Alt Phone: 406-861-5842

2. What is the best time to call to speak with you? _____ At: Work☐ or Home☐ ?

3. Are you the Owner☑, Renter☐, Other☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

   _____

   _____

   _____

4. Total number of occupants/persons at this location? 1
   Number of Children_____Ages_____

5. How long have you lived at this location? 13-14 yrs (since 2003)

General Home Description

6. Type of Home/Structure (check only one): Single Family Home☑, Duplex☐, Apartment☐, Townhouse☐ Other _____

7. Home/Structure Description:
   Number of floors: 2 above basement
   Basement☑
   Crawlspace☐
   Partial Crawlspace/Basement☐ % of each _____
   Slab On Grade☐
   Other☐ _____

8. Age of Home/Structure: _____years, Not Sure/Unknown☐ 1905

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood☑, Brick☐, Concrete☐, Cement block☐, Other☐ _____
   Garage: ☐Attached ☐Detached ☐None

   plaster

10. Foundation Construction (check all that apply):
    Concrete Slab☐
    Fieldstone☑
    Concrete Block☑
    Elevated Above Ground/Grade☐
    Other☐ _____

    Combination

11. Do you have Private Well ☑ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____
irrigation well not used since EPA emergency action
City Water

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? City Sewer
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☑

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☐ Unfinished ☐ Partially Finished ☐ Partial Crawlspace ☑?

15. If finished, how many rooms are in the basement? NA
What are rooms used for? Bedrooms ☐ Family Room ☐ Storage ☐
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐

17. Is the basement floor (check all that apply) Concrete ☐, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☑, Cement Block ☑, Stone ☑, Wood ☐,
Brick ☐, Other ☐ _____
stucco too combination

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☑
Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☑ very rarely 2 years
No ☐

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐,
Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe_____

22. Are any of the following used or stored in the basement (check all that apply):
- ☐ Paint
- ☐ Solvents (degreasers, paint thinner, etc.)
- ☐ Fuels/Oils (gasoline, diesel, used oil)
- ☐ Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- ☐ Pesticides

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☐ No ☐
If yes, specify what was done, where in the home, and what month:

24. Have you installed new carpeting in your home within the last year? Yes ☐ No ☑
If yes, when and where? _____

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
No ☑

26. Does anyone in your home use solvents at work?
Yes ☐ If yes, how many persons?
No ☑ If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes ☐ No ☐

28. Where is the washer/dryer located?
Basement ☐
Upstairs Utility Room ☐
Kitchen ☑ off kitchen main floor
Garage ☐
Use a Laundromat ☐
Other, please specify ☐ _____

29. If you have a dryer, is it vented to the outdoors? Yes ☑ No ☐

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas ☑, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system:
- Forced Hot Air ☑
- Forced Hot Water ☐
- Steam ☐
- Radiant Floor Heat ☐
- Wood Stove ☐
- Coal Furnace ☐
- Fireplace ☐
- Other ☐ _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? unknown (no) older potential coal shoot
How is/was the tank filled?
Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☑ No ☐
Central Air Conditioning ☑
Window Air Conditioning Unit(s) ☐
Other (please specify)

33. Do you use any of the following? Room Fans ☐, Ceiling Fans ☑, Attic Fan ☐
upstairs & main floor

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐

35. Has your home had termite or other pesticide treatment? Yes ☑ No ☑ Unknown ☐
If yes, please specify type of pest controlled
And approximate date of service 2003 none since

36. Water heater type: Gas ☑, Electric ☐, by Furnace ☐,
Other (please describe)

37. Water heater location: Basement ☑, Upstairs Utility Room ☐, Garage ☐,
Other (please specify)

38. What type of cooking appliance do you have? Electric ☑, Gas ☐
Other (please describe)

39. Is there a stove exhaust hood present? Yes ☑ No ☐
Does it vent to the outdoors? Yes ☑ No ☑

40. Smoking in Home:
None ☐, Rare (only guests) ☑, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐

41. If yes to question 40, what is smoked?
Cigarettes ☑ Cigars ☐
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☐ No ☑

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☑, Welding ☐, Model Glues ☐, Paints ☑,
Spray Paint ☑, Wood Finishing ☑, Other ☐
rarely art based work

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation:

NO

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

ask on return

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

45. Please check weekly household cleaning practices:

Dusting ☐

Dry Sweeping ☐

Vacuuming ☐

Polishing (furniture, etc.) ☐

Washing/Waxing Floors ☐

Other (describe) ☐ _____

46. Other comments:

_____

_____

_____

_____

_____

_____

_____

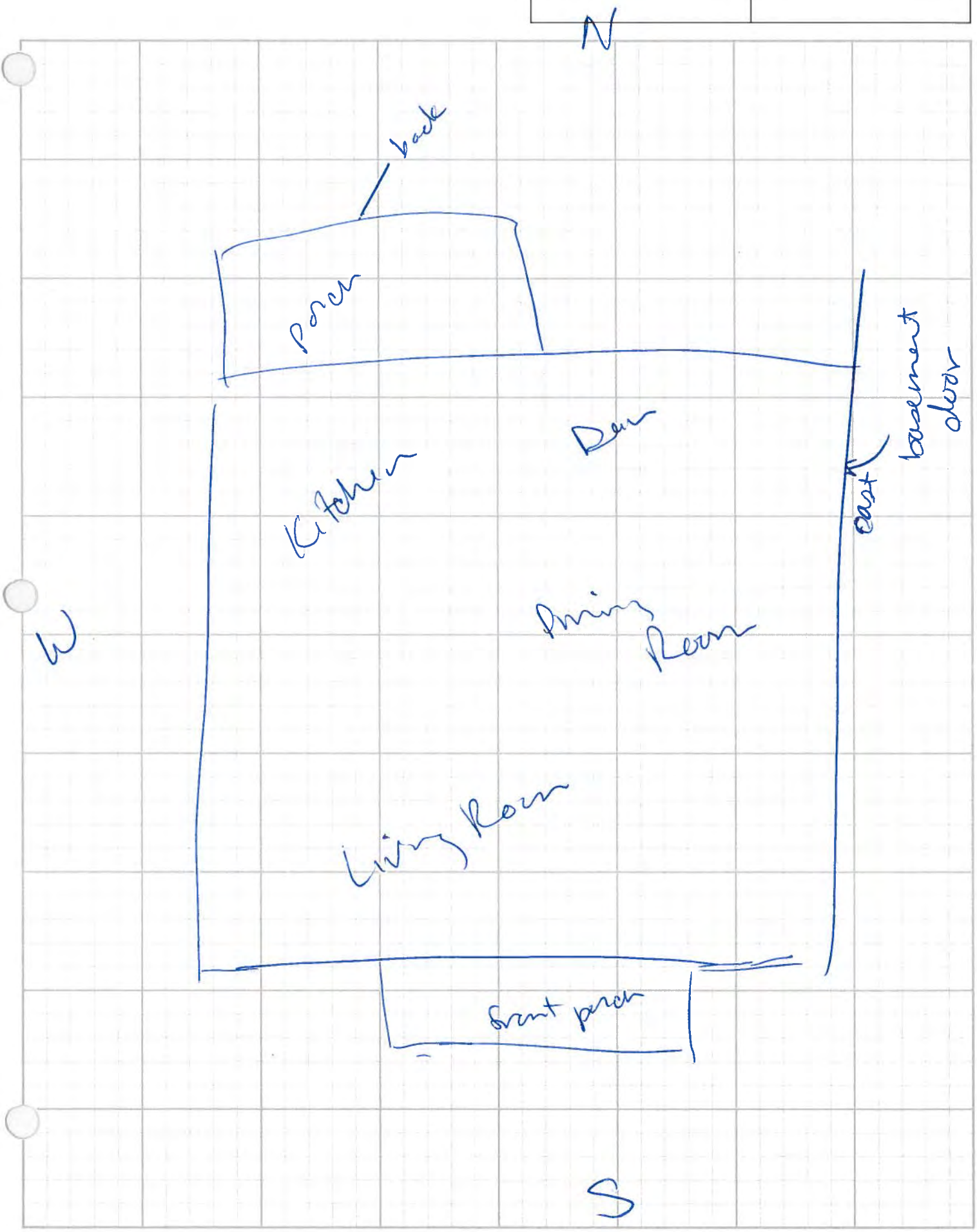
_____

_____

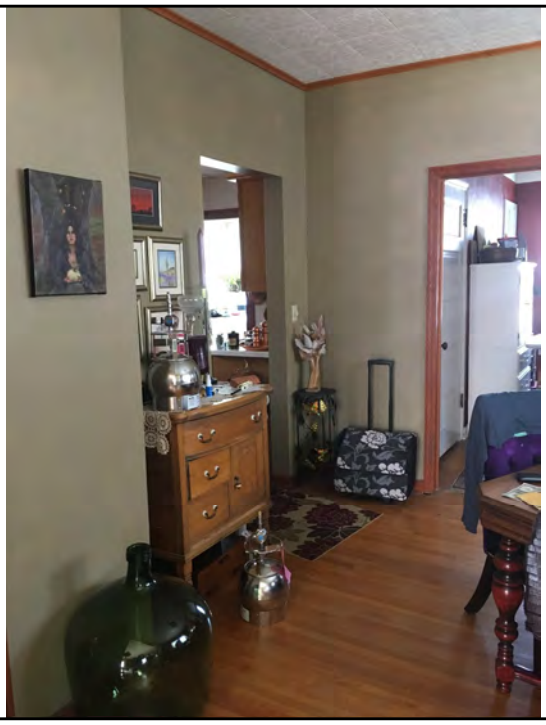
47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

TITLE

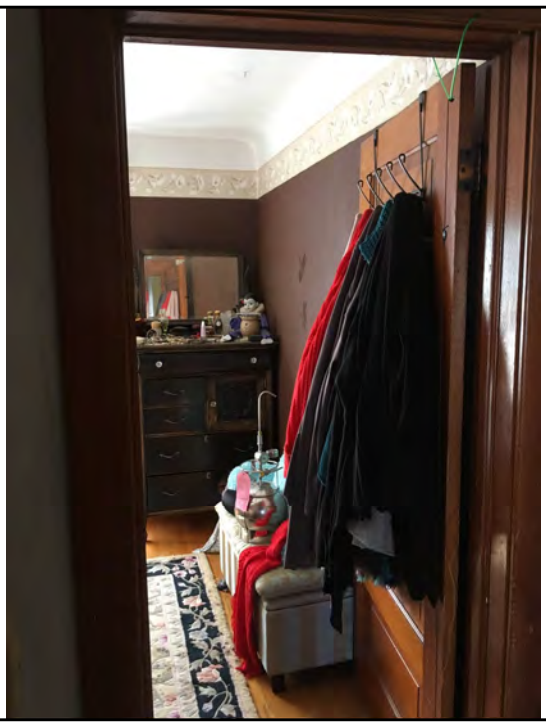

N
back
porch
Den
Kitchen
east
basement door
W
Dining Room
Living Room
front porch
S

TITLE	



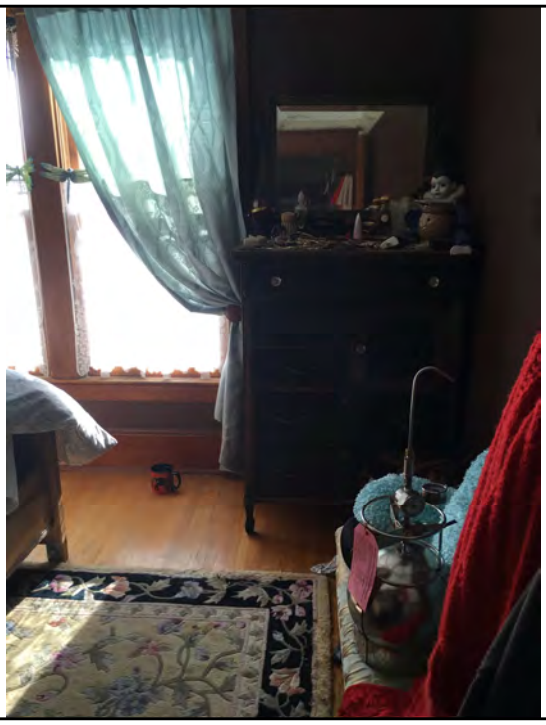
ADDRESS: 117 CUSTER AVE

NOTES:
INDOOR AIR MAIN SAMPLE LOCATION



ADDRESS: 117 CUSTER AVE

NOTES:
INDOOR AIR 2ND STORY SAMPLE LOCATION



ADDRESS: 117 CUSTER AVE

NOTES:
INDOOR AIR 2ND STORY SAMPLE LOCATION ALSO

ADDRESS: 117 CUSTER AVE

NOTES:
INDOOR AIR BASEMENT OPEN TO CRAWLSPACE

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Carolyn Villa

Physical Address of property under investigation: 120 S 35th St.

Mailing Address: Same

Phone (optional): 253-278-7359

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
3/3/18	AIR	20180303-120535TH ST-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15
3/3/18	AIR	20180303-120535TH ST-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15
3/4/18	AIR	20180304-120535TH ST-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15 FIXED GAS CH4

*OTHER (specify analysis) _____

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☐ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.

NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☒ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason: _____

DEQ representative:

Signature: for DEQ

Printed Name: Sara Trahan

Telephone #: 307-745-7474

Date: 3/4/18

Property owner/operator copy = white DEQ copy = yellow

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
A. Excavation-site planning:		
1. The local One Call regulations have been checked for local utility-notification requirements (e.g., 48 hours vs. 72 hours).	3/2/18	ST
2. Per the local One Call regulations, list the responsible party (generally the excavation/drilling contractor) for requesting and verifying completion of utility locates below: TH	3/2/18	ST
3. The property owner and/or business owner has been notified of the excavation schedule.	NA	
4. Each proposed excavation site or "area of interest" has been delineated for utility-line locators using white spray paint and/or wooden stakes/lathes with white flagging.	NA	
5. Public-utility locates have been requested by calling One Call at least 48 hours (72 hours in some states) before work is scheduled to begin, and the request includes depths, as available.	3/2	ST
6. Each utility company has been notified of the excavation schedule and invited to review the proposed excavation sites.	NA	
7. On-site meetings have been scheduled with the appropriate representatives of critical utility facilities (e.g., gas/oil pipelines, high-voltage cables, fiber-optic lines).	NA	
8. Private-utility locates—including fuel lines; tanks; and water, sewer, gas, electricity, and other utilities—have been requested.	NA	
9. The property owner was contacted to determine if he/she knows of privately owned subsurface facilities within 5 feet of the proposed excavation sites. (Review locations with the manager/owner.) Examples of privately owned facilities that are not commonly marked on private property include:	3/2	ST
a) Water and sewer laterals		
b) Gas lines		
c) Power lines (including those for landscape/yard lighting, pool and spa lines, and "out building" lines)		
d) Irrigation lines		
e) Communication lines (cable, telephone, Internet)		
f) Propane tank lines	NA	
10. The proposed excavation sites have been reviewed by the appropriate stakeholders (e.g., owner, tenant, driller, excavator) and the Trihydro project manager.	3/2	ST
11. Proposed excavation sites have been visually inspected, and available plans and aerial photos have been reviewed for evidence of potential utilities.	3/2	ST
12. A scaled site plan showing the proposed excavation sites relative to subsurface utilities has been prepared and is available for stakeholder/Management review.	NA	
13. The basis for each buried utility line's location and the accuracy of the data defining the utility location are documented on the site plan.	NA	
14. The proposed excavation sites are at least 5 feet from subsurface utilities shown on the building plans.	NA	
15. The proposed excavation sites are at least 5 feet from subsurface utilities shown on public right-of-way / street-improvement plans. [Note: Work with utility companies to determine if they require a representative present during excavation activities.]	3/2	ST
16. The proposed excavation sites are at least 7 feet from the pad surrounding underground storage tanks (USTs) shown on the building plans.	NA	
17. The utility-locate ticket number is available on site.	3/2	ST
18. A traffic-control plan has been prepared if appropriate. Note: If the project area encompasses a public street or right of way, the local and/or state authority must approve the traffic-control plan before fieldwork begins.	NA	
19. Arrangements have been made to contact the appropriate personnel if utility-line repairs are needed. (Who must be contacted if a line is unexpectedly damaged?)	NA	
20. Contact information is in place and readily available with the driller, excavator, and other project stakeholders.	NA	
21. The client and other relevant stakeholders (if any) have been notified of the excavation planning/pre-planning steps and results.	NA	
22. A detailed work scope was developed by the project team and reviewed by the Project Director and Contracting Team.		
Project Director (excavation-site planning tasks):		

120 S 35th St.

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
B. Utility-line marking:		
1. Electrical circuits are energized during utility-line marking for subsurface power lines (e.g., circuits on timers or light-sensing switches).	NA	
2. Public-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	NA	
3. Private-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	NA	
4. Verify that One Call locators marked their facilities in the designated excavation area or provided notification that they do not have any facilities near the proposed excavation sites.	3/2	ST
5. One Call was contacted to request a "refresh" if utility-locate markings are missing, difficult to see, or more than 14 days old (7 days in some states). "Refresh" markings must be performed by the original marking organization.	NA	
Project Director (utility-line marking tasks):		
C. Job walk:		
1. Visual verification that each proposed excavation site does not lie on a line connecting two similar-looking manhole covers (e.g., sanitary sewers or storm drains). (Consider having the line snaked to confirm their locations.)		
2. Visual verification that each proposed excavation site does not lie on a line with any water, gas, electrical meters, utility cleanouts, or other utility boxes in the surrounding areas.	NA	
3. Visual verification that the pavement near each proposed excavation site has not subsided or give the appearance it may be covering a previous excavation (e.g., linear cracks or sagging curbs).		
4. Visual verification that each proposed excavation has adequate overhead clearance for the excavation equipment (e.g., at least 10 feet from overhead-utility lines and/or reasonable distance from canopies).		
5. Fences and fields have been checked for markers, signs, posts, valves, stub outs, etc.		
6. Surface structures such as tank batteries, wells, valves, phone pedestals, and electrical junction boxes have been checked for evidence of subsurface utilities.		
7. Observed evidence of subsurface utilities has been photographed, sketched, or otherwise documented.		
8. Proposed excavation sites have been "walked"/reviewed by the excavation contractor, Trihydro project manager, and other stakeholders (e.g., client representative, property owner, tenant).		
9. Proposed excavation sites are located at least 5 feet from marked utilities (i.e., the "tolerance zone"), or written approval to excavate within the 5-foot tolerance zone has been obtained from the appropriate utility owner. In no case shall a proposed excavation be located closer than 2 feet from the outside edge of a marked utility. (Note: The tolerance zone is measured from the outside edge of a subsurface structure—not its centerline.)		
10. Verify that the excavation contractor (with help from appropriate utility-line locators, if part of the client-approved work scope) has walked each proposed excavation site to verify all expected utility-line markings are present.		
11. Traffic-control devices, safety barricades, caution tape, and other safety-management devices are in place as needed to protect project personnel.		
Project Director (job-walk tasks):		
D. Daylighting / potholing / "soft digging":		
1. The proposed excavation sites located within the "tolerance zone" (and sites located outside the "tolerance zone" when required by the client) have been potholed to a depth below the anticipated utility zone using "minimally intrusive excavation methods" such as vacuum excavation (either air-entrainment or water-jet) and careful hand-tool use.		
2. Monitoring and emergency equipment is available on site when hazardous atmospheres are expected to be encountered in the potholing excavations.		
3. A list of emergency-contact names/numbers is maintained at the potholing excavation site.		
4. The project health and safety plan addresses potential hazards and safety-performance requirements related to utility-clearance operations.		
5. The location of and directions to the nearest hospital are known by all members of the project team.		
6. Representatives of utility owners that requested to be on site for utility locates are present.		

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
7. Pothole excavations have been visually checked with a flashlight by the excavation contractor, Trihydro project manager, or her/his designee.		
8. Utilities adjacent to the excavation or that cross the excavation have been daylighted using "minimally intrusive excavation methods."		
9. The areal extent of the excavation-clearance pothole has been verified to extend at least 120% beyond the outside diameter of the largest-diameter down-hole tool to be used in the borehole, or at least 2 feet on each side of daylighted/exposed lines, whichever is greater.		
10. If vacuum excavation (e.g., air knife, air vac, hydro-vac) is not available to daylight utility lines, verify that the non-conductive probe method was used as follows: Scratch the ground no more than 10 inches deep above the utility and then probe the scratched area. If the utility isn't found in the scratched area, repeat the first step until the utility is located. Once the utility is found, its depth must be continually verified with the probe until 2 feet of soil remain above the utility. Carefully hand dig the remaining overburden to expose the utility.		
11. The soil encountered in the excavation-clearance pothole has been verified to be free of bedding material (e.g., clean gravel, clean sand, aggregate base [gravelly sand with ~10% fines], or other non-native-looking material) that could indicate the presence of a previously installed utility line.		
12. Excavation work within 2 feet of an underground utility was "hand dug."		
13. Once the utility lines were exposed and the excavations were safe to enter, the exposed lines (including their protective coating) was examined for damage.		
14. The condition of each utility line exposed during daylighting was documented, and the documentation was forwarded to the Trihydro project manager to place in the project file.		
15. If a utility line was damaged in any way, it was reported to the utility owner and Trihydro project manager and documented in the project file.		
16. Damage to a utility line was documented and repaired before it was reburied. The utility owner signed off on the repairs.		
17. Employees entering the excavation followed the procedures described in the Trihydro "Trenching and Excavation Program" and used the Trihydro "Daily Excavation/Trench Inspection Report" to document excavation condition.		
18. The location of daylighted utilities was documented and photographed after daylighting was completed and before the pothole excavation was backfilled.		
19. Locations for hand digging within the "tolerance zone" were noted.		
Project Director (daylighting/potholing tasks):		
E. Excavation (including drilling):		
1. The appropriate permits have been obtained for the work (e.g., hot-work permits, entry permits).	NA	
2. The utility-owner and/or agency representatives that requested to be on site during excavation work are present. (Trihydro Utility Locate Acknowledgement Form)	NA	
3. A safety kickoff meeting was conducted with the excavation contractor to review roles/responsibilities, work activities, anticipated hazards, this checklist, and emergency-response procedures before starting excavation work the site. The safety kickoff meeting was documented in the project file.	3/2	ST
4. A daily tailgate safety meeting was conducted and documented in the project file. Verify weather conditions, safety hazards, PPE requirements, job duties, communication, hand signals, etc.	3/2	ST
5. JSAs covering the work to be done are in place and have been reviewed, "marked up" where appropriate, and acknowledged by the excavation project-team members.	3/2	ST
6. Site workers have been reminded to look for hazardous conditions, processes, and activities, and that they are authorized to stop work if they see an unsafe condition.	3/2	ST
7. The emergency-response plan has been reviewed by all excavation project-team members (e.g., contact numbers, evacuation muster points, hospital routes).	3/2	ST
8. The excavation contractor has checked the excavation sites relative to overhead utilities, subsurface-utility locates, and adjacent surface structures.	NA	
9. The excavation contractor has acknowledged the potential location of each subsurface utility marked in the excavation areas.	3/2	ST
10. Proper traffic control and exclusion zones have been established.	NA	
11. The excavation equipment (e.g., drill rig, backhoe) has been inspected for proper operation and condition.	NA	
12. Emergency equipment (fire extinguisher, first aid kit, emergency shut-off switch, etc.) has been checked, is readily available, and is in working order.	3/2	ST
13. Excavation project-team members are wearing appropriate PPE per the Trihydro HASP and client/site-specific requirements.	3/2	ST
14. Power in the excavation area has been de-energized, if possible. If power cannot be de-energized, the excavation contractor was advised of the hazard.	NA	

Excavation, Drilling, and Utility-Locating Checklist

Task			Date	Initials
		Project Director (excavation/drilling tasks):		
F. If an unmarked utility line is discovered:				
1. Verify the One Call utility-locate request was made correctly.				
2. Identify the owner/operator of the unmarked utility line and contact One Call (dial "811") to request a "No Response" ticket. If the owner/operator fails to respond again, seek a third-party locating service to mark the utility before: a) excavation work begins, or b) advancing the excavation further.				
3. Contact the owner/operator of non-locatable utilities to request they be taken out of service before excavation begins.				
4. If possible, a representative of the unmarked utility line should be on site when the unmarked utility is daylighted.				
		Project Director (unmarked utility line tasks):		
Note:				
-- If an item doesn't apply, please insert an "NA" in the "**Date**" column and provide an explanation in the "**Project Notes**" section below.				
	Scott Taylor	3/2/15		
Project Manager	Field Manager / Team Members	Date Reviewed		
Client / Project Name / Location	Excavator/Driller Name	Date Action Items Completed		
Project Notes: [Please cross reference to the appropriate checklist-item number[s] when possible.]				

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	120 S 35th St.		
Project Name:	BPCE	PID (model/serial #):	4GAS : QRAE II / 152-M1984 ppb RAE 3000 / 12875
Sample location:	120 S. 35th St.	Helium Detector (model/serial #):	Dielectric / 8824
Date:	3/4/18	Weather:	Snowy, N 12MPH
Field Personnel:	ST/BS	Air Temp:	21°F
Recorded by:	ST	Atmospheric Pressure:	29.88 inHg

Slab Data

Surface/slab Type: Poured Concrete

Surface/slab Thickness (inches): 3"

Slab/subsurface substrate comments:

Depth of hole through the slab: 1/2"

Length of sampling train (feet): 3 1/2" ~36" train

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 90

Helium Tracer Leak Test Field Data

Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)
3/4/18	1830	50	33.3	33.7		
	1830	100	32.8	33.2		
	1831	150	32.1	32.6		
	1831	200	31.3	31.9		
	1832	250	30.5	31.1		
	1832	300	29.5	30.2	0 ppm	

Sample Collection Data

Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
large sample,	33.7 30.5

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
3/4/18	1834	1913	20180304-120S35THST-01	3483	1171		26.5	4

Basement ambient air - 0 ppb on PID.

Comments: Shut In test: START 26.5 inH, no change @ 2 min

PID - 49.44 ppm Peak

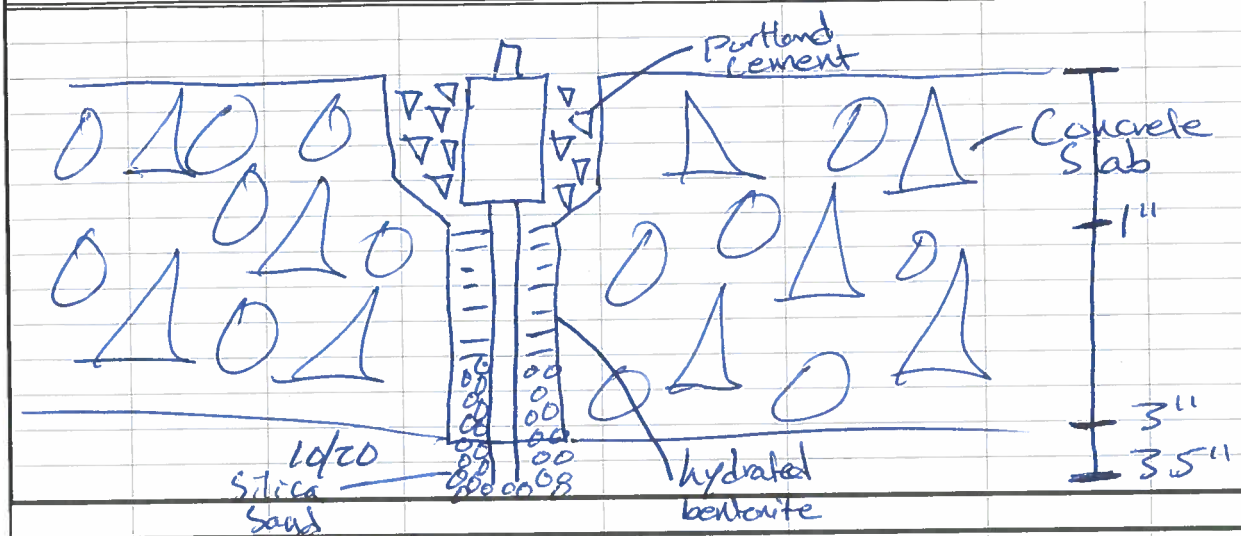
H_2S, LEL, CO: 0, O_2 19.5%

Sub-Slab Soil Vapor Sampling Field Data Sheet

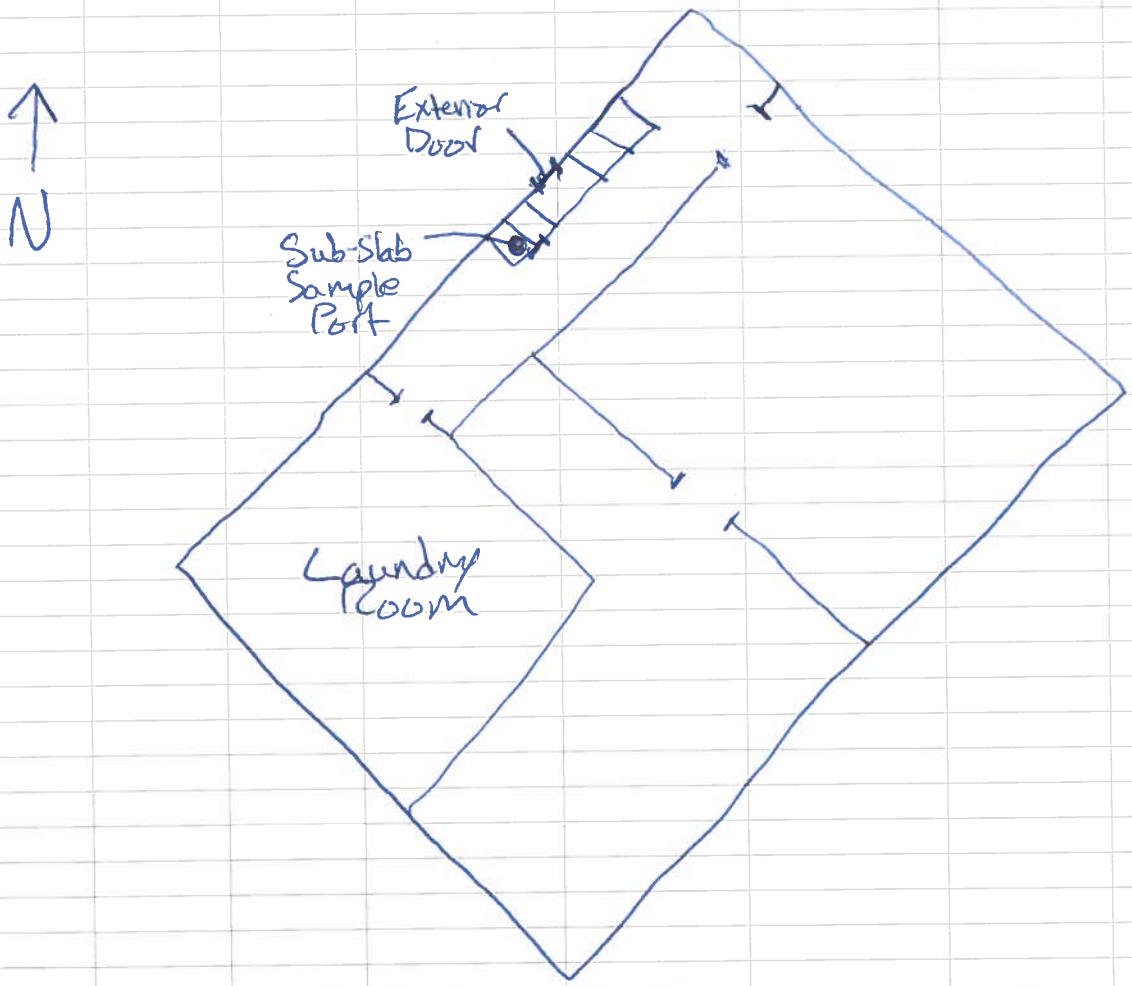
Project Name: BPCE
Date: 3/2/18

Sample Location/ ID: 120 S. 35th St.

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.



Location Sketch: Basement



Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	120 S 35TH ST	Start Weather:	~~22°~~ Snowy, Cloudy 7 mph N
		Start Outdoor Air Temp:	22°F
Project Name:	BPCE	Start Atmospheric Pressure:	29.9
Sample Location:	Indoor Air		
Date:	3/3/18	End Weather:	Snowy, N 12 mph
Field Personnel:	ST/BS	End Outdoor Air Temp:	21°F
Recorded by:	ST	End Atmospheric Pressure:	29.88

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
3/3/18	1831	3/4/18	1820	20180303-1205 35THST-01	1508	0106		26	1.5	70°F	70°F
3/3/18	1834	3/4/18	1821	20180303-120535THST-02	1292	0848		27	2.5	65°F	65°F

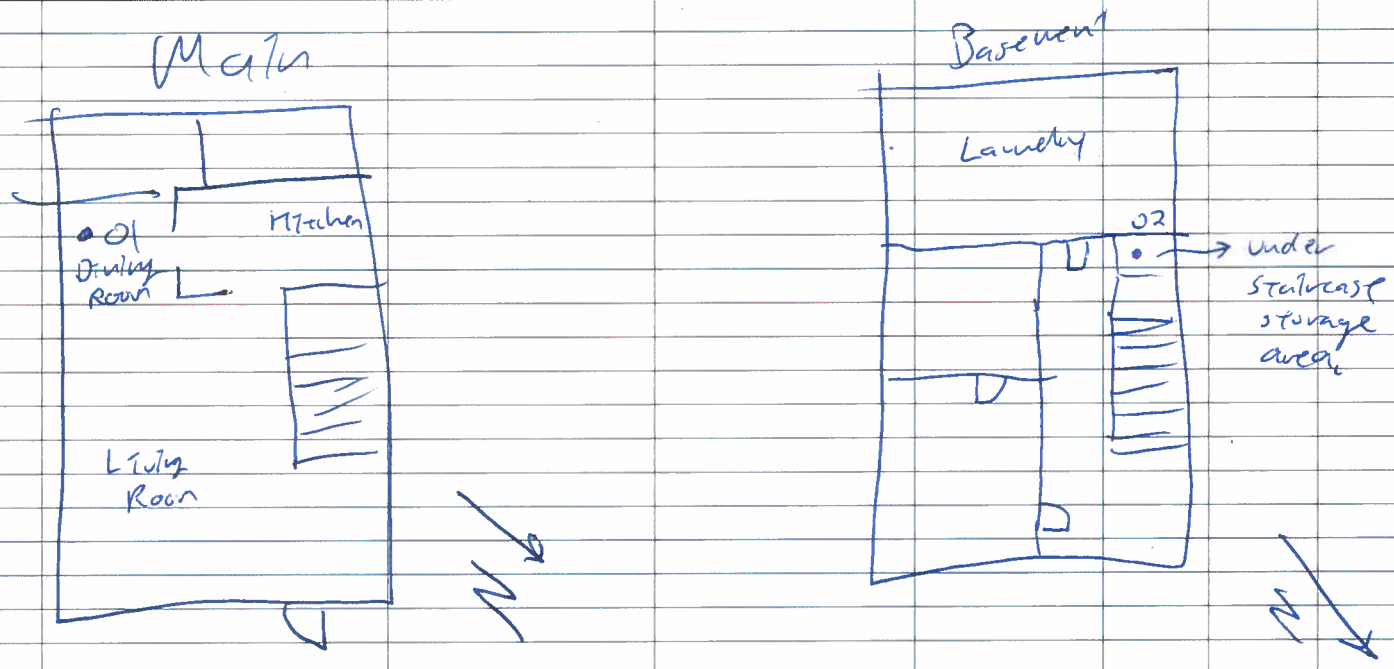
Comments:

01 - Main Floor Dining room
02 - Basement Air

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

Location Sketch:



Completed by S. Trahan after sampling via phone.

OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 3/3/18

1. Name: Carolyn Villa

   Address: 120 S. 35th St. Billings MT 59101

   Home Phone: 253-278-7359 Work Phone: _____

2. What is the best time to call to speak with you? _____ At: Work ☐ or Home ☐ ?

3. Are you the Owner ☒ Renter ☒, Other ☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

4. Total number of occupants/persons at this location? 2
   Number of Children 0 Ages _____

5. How long have you lived at this location? 6 yrs.

General Home Description

6. Type of Home/Structure (check only one): Single Family Home ☒, Duplex ☐, Apartment ☐, Townhouse ☐ Other _____

7. Home/Structure Description:
   Number of floors: 2
   Basement ☒
   Crawlspace ☐
   Partial Crawlspace/Basement ☐ % of each _____
   Slab On Grade ☐
   Other ☐ _____

8. Age of Home/Structure: 112 years, Not Sure/Unknown ☐

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood ☒, Brick ☐, Concrete ☐, Cement block ☐, Other ☐ _____
   Garage: ☐ Attached ☐ Detached ☐ None

10. Foundation Construction (check all that apply):
    Concrete Slab ☒
    Fieldstone ☐
    Concrete Block ☐
    Elevated Above Ground/Grade ☐
    Other ☐ _____

11. Do you have Private Well ☐ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____

12. Do you have a Septic System? Yes ☐ No ☒ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☐

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☒ Unfinished ☐ Partially Finished ☐ Partial Crawlspace ☐?

15. If finished, how many rooms are in the basement? 2
What are rooms used for? Bedrooms ☐ Family Room ☒ Storage ☒
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐

17. Is the basement floor (check all that apply) Concrete ☐, Tile ☒, Carpeted ☒, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☒, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☒

Describe the moisture problem _____

20. Does the basement ever flood?

Yes, frequently (3 or more times/year) ☐

Yes, occasionally (1-2 times/year) ☐

Yes, rarely (less that 1 time/year) ☐

No ☒

21. Does the basement have any of the following? Floor Cracks ☒, Wall Cracks ☐, Sump ☐,
Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe_____

22. Are any of the following used or stored in the basement (check all that apply):
- [x] Paint
- [ ] Solvents (degreasers, paint thinner, etc.)
- [ ] Fuels/Oils (gasoline, diesel, used oil)
- [ ] Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- [ ] Pesticides

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☐ No ☒
If yes, specify what was done, where in the home, and what month:

24. Have you installed new carpeting in your home within the last year? Yes ☐ No ☒
If yes, when and where? _____

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
No ☒

26. Does anyone in your home use solvents at work?
Yes ☐ If yes, how many persons?
No ☒ If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes ☐ No ☐

28. Where is the washer/dryer located?
Basement ☒
Upstairs Utility Room ☐
Kitchen ☐
Garage ☐
Use a Laundromat ☐
Other, please specify ☐ _____

29. If you have a dryer, is it vented to the outdoors? Yes ☒ No ☐

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas ☒, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system:
Forced Hot Air ☒
Forced Hot Water ☐
Steam ☐
Radiant Floor Heat ☐
Wood Stove ☐
Coal Furnace ☐
Fireplace ☐
Other ☐ _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? _____

How is/was the tank filled? _____

Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☐ No ☐
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☐
Other (please specify) _____

33. Do you use any of the following? Room Fans ☐, Ceiling Fans ☐, Attic Fan ☐

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☐ Unknown ☐
If yes, please specify type of pest controlled _____
And approximate date of service _____

36. Water heater type: Gas ☒, Electric ☐, by Furnace ☐,
Other (please describe)_____

37. Water heater location: Basement ☒, Upstairs Utility Room ☐, Garage ☐,
Other (please specify) _____

38. What type of cooking appliance do you have? Electric ☐, Gas ☐
Other (please describe) _____

39. Is there a stove exhaust hood present? Yes ☐ No ☐
Does it vent to the outdoors? Yes ☐ No ☐

40. Smoking in Home:
None ☒ Rare (only guests) ☐, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐

41. If yes to question 40, what is smoked?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☐ No ☐

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation: _____

NO

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

45. Please check weekly household cleaning practices:

Dusting ☐

Dry Sweeping ☐

Vacuuming ☐

Polishing (furniture, etc.) ☐

Washing/Waxing Floors ☐

Other (describe) ☐ _____

46. Other comments:

_____

_____

_____

_____

_____

_____

_____

_____

_____

47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

ADDRESS: 120 S 35th Streeet

NOTES: OUTSIDE OF STRUCTURE - RESIDENTIAL

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Mary Sand Nolte

Physical Address of property under investigation: 120 Wyoming Avenue Billings, MT

Mailing Address:

Phone (optional): 406-690-2947

The following samples have been collected from this property:

Date	Media		Sample ID Number	Analysis to be performed
3/6/18	AIR	20180306-	120WYOMING-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15
3/6/18	AIR	20180306-	120WYOMING-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15
3/6/18	AIR	20180306-	20WYOMING-03	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15
3/7/18	AIR	20180307-	120WYOMING-01	TO-15, FIXED GASES, CH_4

*OTHER (specify analysis)

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☒ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.
- ☒ N/A

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☒ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

for DEQ — Syris Trahan

Signature — Printed Name

Telephone #: 307-745-7474 — Date: 3/14/18

Property owner/operator copy = white — DEQ copy = yellow

Indoor ~~Ambient~~ Outdoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	120 Wyoming.	Start Weather:	Clear, 3 mph E
		Start Air Temp:	32°F
Project Name:	BPCE	Start Atmospheric Pressure:	30.35"
Sample location:	120 Wyoming Ave.		
Date:	3/6/18	End Weather:	Clear, 0 mph West
Field Personnel:	BS, CD	End Air Temp:	39°F
Recorded by:	BS	End Atmospheric Pressure:	30.11"

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	
3/6/18	1800	3/7/18	1801	20180306-120Wyoming-01	0241	0001		27	3	65°F
3/6/18	1806	3/7/18	1806	20180306-120Wyoming-02	0782	1435		27.5	4	70°F
3/6/18	1808	~~3/6/18~~ 3/7/18	~~1809~~ 1808	20180306-120Wyoming-03	0566	0452		27.5	25	70°F

Comment/location description:

01- Basement
02- Main
03- ~~B~~ 2nd Floor

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID: 120 Wyoming Ave.

Project Name: BPCE
Sample location: 120 Wyoming Ave
Date: 3/7/18
Field Personnel: BS, ST
Recorded by: BS

PID (model/serial #): PPb RAE 3000/12875
Helium Detector (model/serial #): Dielectric/ R1189
Weather: Clear, 0 mph W.
Air Temp: 39°F
Atmospheric Pressure: 30.11"

Slab Data

Surface/slab Type: Poured Concrete
Surface/slab Thickness (inches):
Slab/subsurface substrate comments: EPA Installed.
Depth of hole through the slab:
Length of sampling train (feet): Assume 1'

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 120

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
3/7/18	1810	50	26.8	27.4			max = 23.4%	
	1811	100	25.8	26.4				
	1811	150	24.8	25.5				
	1811	200	24.0	24.5				
	1812	250	23.0	23.7				
	1812	300	22.1	22.8	1,275 ppm in tedlar			

Conversion: 1.0% = 10,000 ppm
At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
3/7/18	1815	1651	20180307-120wyoming-01	0543	0678		27	4

Ambient = 0 ppb - NO 4 Gas hits

Comments:

PID peaked at 1327 ppb dropped to 0 after less than 1 min. Sub Slab

PID: 1327 ppb
O_2: 20 %
CO: 0
H_2S: 0
LEL: 4%

Sub-Slab Soil Vapor Sampling Field Data Sheet

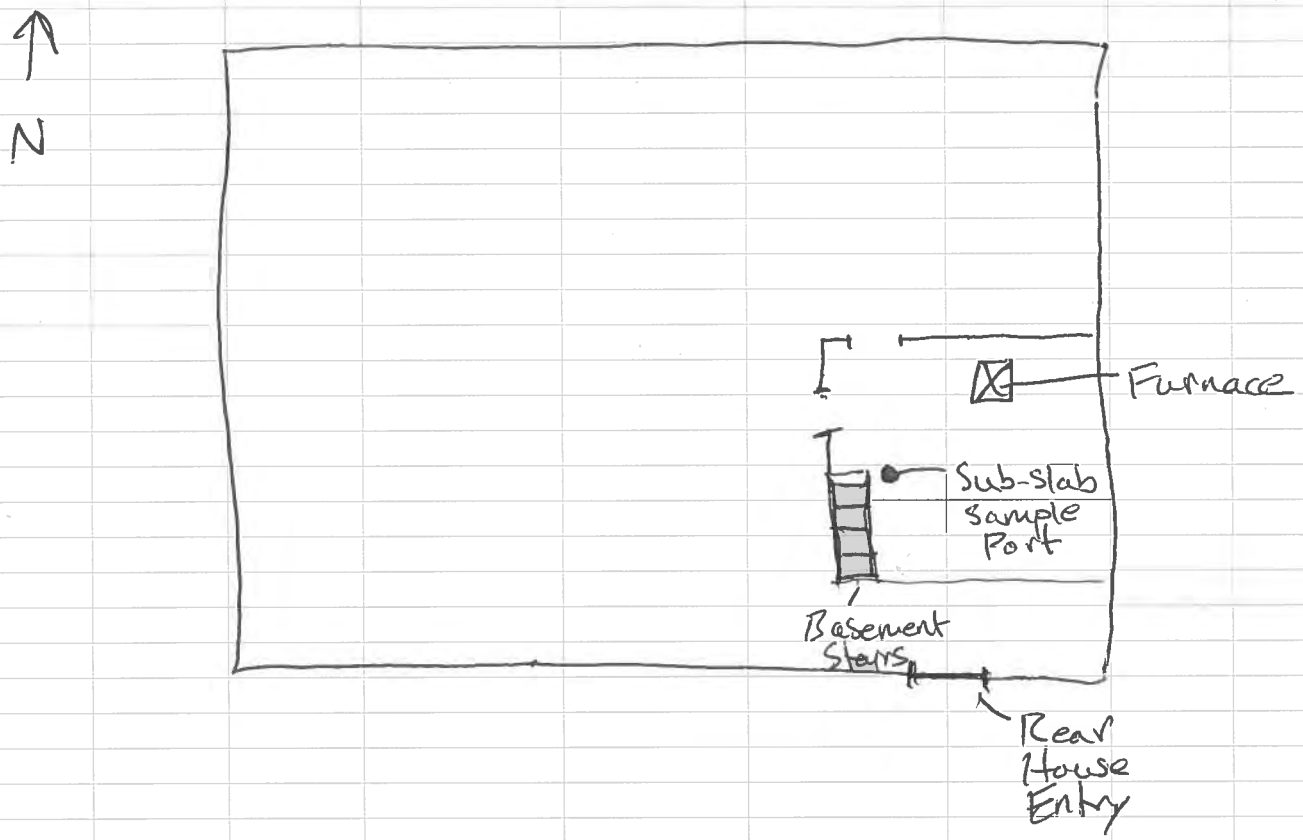
Project Name: BPCE
Date: 3/7/18
Sample Location/ ID: 120 Wyoming Ave

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

Poured concrete.

EPA Installed

Location Sketch: Basement



Filled out after Sampling by S Trahan

OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 10/3/18

1. Name: Mary - Sand - Nolte

   Address: 5.T 120 ~~112~~ Wyoming Ave. (120 Wyoming Ave)

   Home Phone: 406-690-2947 Work Phone: _____

2. What is the best time to call to speak with you? _____ At: Work ☐ or Home ☐ ?

3. Are you the Owner ☒, Renter ☐, Other ☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

   _____

   _____

   _____

4. Total number of occupants/persons at this location? adults only

   Number of Children _____ Ages _____

5. How long have you lived at this location? unknown

General Home Description

6. Type of Home/Structure (check only one): Single Family Home ☒, Duplex ☐, Apartment ☐, Townhouse ☐ Other _____

7. Home/Structure Description:

   Number of floors: 2

   Basement ☒

   Crawlspace ☐

   Partial Crawlspace/Basement ☐ % of each _____

   Slab On Grade ☐

   Other ☐ _____

8. Age of Home/Structure: ~~113~~ 5.T 101 years, Not Sure/Unknown ☐

9. General Above-Ground Home/Structure construction (check all that apply):

   Wood ☑, Brick ☐, Concrete ☐, Cement block ☐, Other ☐ _____

   Garage: ☐ Attached ☑ Detached ☐ None

10. Foundation Construction (check all that apply):

    Concrete Slab ☒

    Fieldstone ☐

    Concrete Block ☐

    Elevated Above Ground/Grade ☐

    Other ☐ _____

11. Do you have Private Well ☐ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____
no city

12. Do you have a Septic System? Yes ☐ No ☑ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____
When was the last time it was serviced? city water/sewer
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☐
NO

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☑ one room Unfinished ☑ Partially Finished ☐ Partial Crawlspace ☐ ? Mostly city

15. If finished, how many rooms are in the basement? one room finished
What are rooms used for? Bedrooms ☑ Family Room ☐ Storage ☐
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐ unknown

17. Is the basement floor (check all that apply) Concrete ☑, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☑, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐ unknown
No ☐

Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐ unknown
No ☐

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐,
Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe _____
none noted

22. Are any of the following used or stored in the basement (check all that apply):
- ☐ Paint
- ☐ Solvents (degreasers, paint thinner, etc.)
- ☐ Fuels/Oils (gasoline, diesel, used oil)
- ☐ Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- ☐ Pesticides

none observed

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☐ No ☐
If yes, specify what was done, where in the home, and what month:
_____
unknown

24. Have you installed new carpeting in your home within the last year? Yes ☐ No ☐
If yes, when and where? _____ unknown

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
No ☒

26. Does anyone in your home use solvents at work?
Yes ☐ If yes, how many persons?
No ☐ If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes ☐ No ☐

28. Where is the washer/dryer located?
Basement ☒
Upstairs Utility Room ☐
Kitchen ☐
Garage ☐
Use a Laundromat ☐
Other, please specify ☐ _____

29. If you have a dryer, is it vented to the outdoors? Yes ☒ No ☐

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas ☒, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system:
- Forced Hot Air ☒
- Forced Hot Water ☐
- Steam ☐
- Radiant Floor Heat ☐
- Wood Stove ☐
- Coal Furnace ☐
- Fireplace ☐
- Other ☐ _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? _____
NA no
How is/was the tank filled? _____ NOT
Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☐ No ☐
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☐ unknown
Other (please specify) _____

33. Do you use any of the following? Room Fans ☐, Ceiling Fans ☐, Attic Fan ☐ unknown

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐ unknown

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☑ Unknown ☐
If yes, please specify type of pest controlled _____
And approximate date of service _____

36. Water heater type: Gas ☑, Electric ☐, by Furnace ☐,
Other (please describe) _____

37. Water heater location: Basement ☑, Upstairs Utility Room ☐, Garage ☐,
Other (please specify) _____

38. What type of cooking appliance do you have? Electric ☐, Gas ☐
Other (please describe) _____

39. Is there a stove exhaust hood present? Yes ☐ No ☐
Does it vent to the outdoors? Yes ☐ No ☐

40. Smoking in Home:
None ☑, Rare (only guests) ☐, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐ no oder

41. If yes to question 40, what is smoked?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☐ No ☐ unknown

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____
unknown

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation: _____
NO

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

inventory not completed

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

45. Please check weekly household cleaning practices:

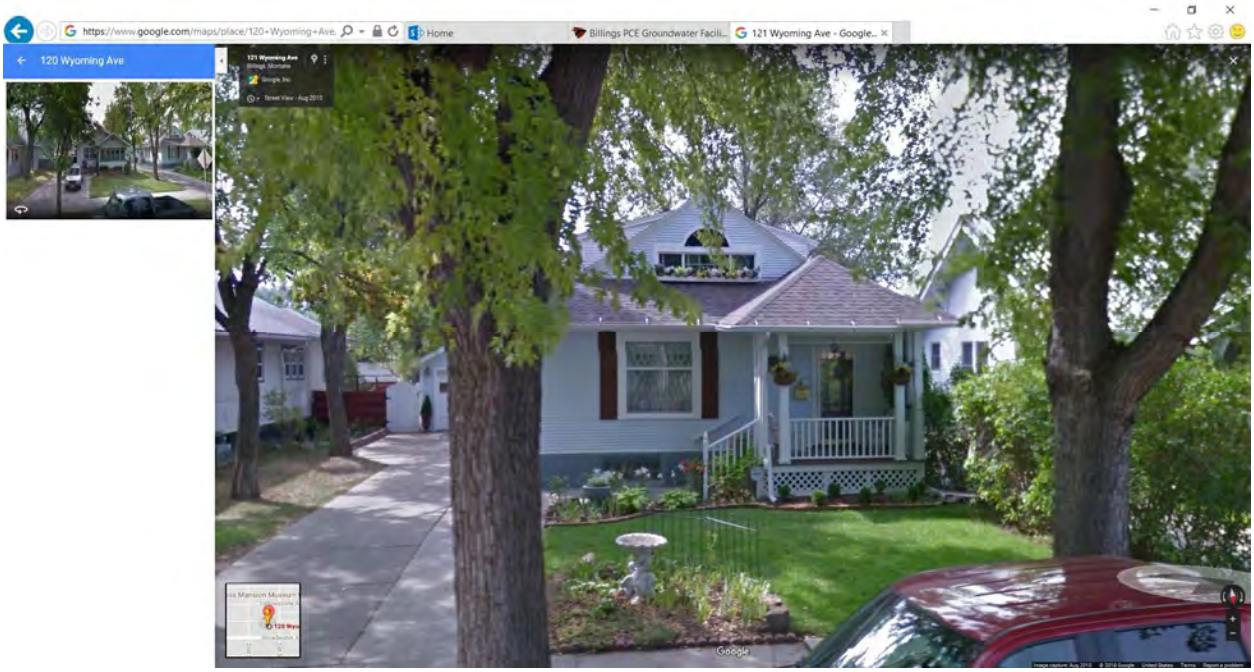
Dusting ☐
Dry Sweeping ☐
Vacuuming ☐
Polishing (furniture, etc.) ☐
Washing/Waxing Floors ☐
Other (describe) ☐ _____

appears to have regular cleaning

46. Other comments:

_____
_____
_____
_____
_____
_____
_____
_____
_____

120 Wyoming Ave structure



Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Louise Johnston

Physical Address of property under investigation: 125 Broadwater Ave, Billings MT

Mailing Address: 1131 Nugget Place Billings MT 59105

Phone (optional): _____

The following samples have been collected from this property:

Date	Media		Sample ID Number	Analysis to be performed
3/1/18	AIR	20180301-	25 BROADWATER-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-5
3/1/18	AIR	20180301	-A (Dup[illegible] of above sample)	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15
3/1/18	AIR	20180301-	125 BROADWATER-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15

*OTHER (specify analysis) _____

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☒ Without variation, or
- ☐ With the following variation(s) from the plan:

_____

_____

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.
- ☐ N/A

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☒ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason: _____

DEQ representative:

for DEQ
Signature

Syris Trahan
Printed Name

Telephone #: 307-745-7474

Date: 3/14/18

Property owner/operator copy = white DEQ copy = yellow

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	125 Broadwater Ave	Start Weather:	Partly Cloudy, winds SW 4mph
		Start Outdoor Air Temp:	20°F
Project Name:	MDEQ Billings PCE	Start Atmospheric Pressure:	30.09 in
Sample Location:	Crawl space & main Floor		
Date:	03/01/18 → 03/02/2018	End Weather:	Cloudy; N 5 mph
Field Personnel:	Joel Riehli & Jake Scott	End Outdoor Air Temp:	19°F
Recorded by:	Joel Riehli	End Atmospheric Pressure:	29.87 in

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
03/01/18	0905	03/02/18	0905	20180301-125Broadwater-01	0804	FC1364	—	-28.8	-5.5	~65°F	~65°F
03/01/18	0909	03/02/18	0909	20180301-125Broadwater-02	1070	FC0745	—	-28.2	-4.5	~75°F	~75°F
03/01/18	0905	03/02/18	0905	20180301-A	2359	FC0303	—	-25.0	-3.0	~65°F	~65°F

Comments:

Leak test (2min)

		Initial	Final	
0804	FC 1364	-28.8	-29.2	Pass
2359	FC0303	-24.9	-24.9	Pass
1070	FC 0745	-27.8	-28.2	Pass

(PID) ppbRAE 3000 / PGM 7340 = 0 ppb in crawl space

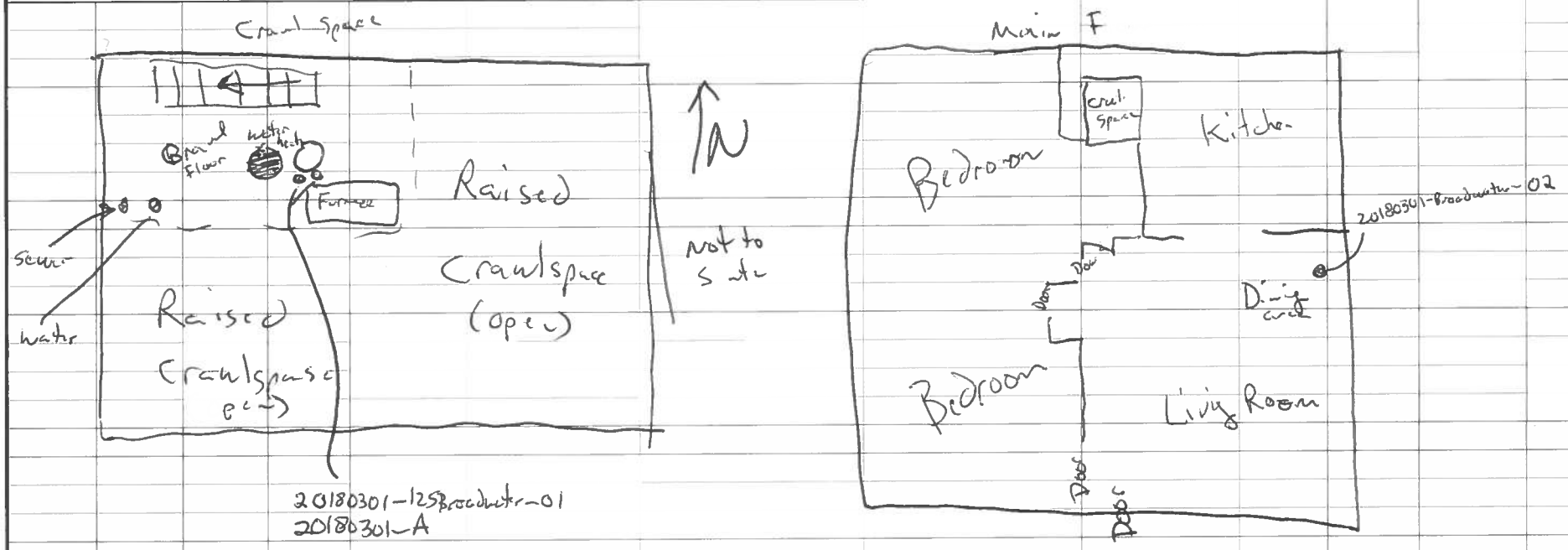
(Gas) QRAE II / 255561 = CO = 0 ppm H_2S = 0.0 ppm Oxy = 20.9 % LEL = 0 % LEL in crawlspace

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s): MDEQ Billings PCE 125 Broadwater Ave

- Crawl space (20180301-125Broadwater-01 & 20180301-A duplicate) placed on the gravel floor in the crawlspace near the water heater & Furnace.
- Main Floor (20180301-125Broadwater-02) placed on dining table in the dining/Living Room

Location Sketch:



OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 3/14/18

1. Name: Louise Johnston

   Address:
   125 Broadwater Ave., Billings MT 59105

   Home Phone: 406-259-6558 Work Phone: _____

2. What is the best time to ~~call to speak~~ with you? _____ At: Work ☐ or Home ☐ ?

3. Are you the Owner ☒, Renter ☒, Other ☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:
   Owner Roger & Louise Johnston
   1131 Nugget Place
   Billings MT
   } Owner address

4. Total number of occupants/persons at this location? Renters @ location
   Number of Children unk @ least one Ages adults observed

5. How long have you lived at this location? unknown

General Home Description

6. Type of Home/Structure (check only one): Single Family Home ☒, Duplex ☐, Apartment ☐, Townhouse ☐ Other _____

7. Home/Structure Description:
   Number of floors: 1
   Basement ☐
   Crawlspace ☒
   Partial Crawlspace/Basement ☐ % of each _____
   Slab On Grade ☐
   Other ☐ _____

8. Age of Home/Structure: 98 years, Not Sure/Unknown ☐

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood ☒, Brick ☐, Concrete ☐, Cement block ☐, Other ☐ _____
   Garage: ☐ Attached ☐ Detached ☐ None

10. Foundation Construction (check all that apply):
    Concrete Slab ☒
    Fieldstone ☐
    Concrete Block ☐
    Elevated Above Ground/Grade ☐
    Other ☐ _____

11. Do you have Private Well ☑ NO or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____
_____
_____ city water

12. Do you have a Septic System? Yes ☐ No ☑ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____
When was the last time it was serviced? _____ city sewer
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☐

unknown

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☐ Unfinished ☑ Partially Finished ☐ Partial Crawlspace ☑? Crawlspace
2570 752

15. If finished, how many rooms are in the basement? _____ storage
What are rooms used for? Bedrooms ☐ Family Room ☐ Storage ☑
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☑

17. Is the basement floor (check all that apply) Concrete ☐, Tile ☐, Carpeted ☐, Dirt ☑, crawlspace
Other ☐ _____

18. Are the basement walls Poured Concrete ☐, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

Describe the moisture problem _____
_____
_____

20. Does the basement ever flood?

Yes, frequently (3 or more times/year) ☐

Yes, occasionally (1-2 times/year) ☐

Yes, rarely (less that 1 time/year) ☐

No ☐

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐,
Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe_____

22. Are any of the following used or stored in the basement (check all that apply):
- ☐ Paint
- ☐ Solvents (degreasers, paint thinner, etc.)
- ☐ Fuels/Oils (gasoline, diesel, used oil)
- ☐ Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- ☐ Pesticides

none observed

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☐ No ☐
If yes, specify what was done, where in the home, and what month: unknown

24. Have you installed new carpeting in your home within the last year? Yes ☐ No ☐
If yes, when and where? unknown

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
No ☒

26. Does anyone in your home use solvents at work?
Yes ☐ If yes, how many persons?
No ☐ If no, go to question 28

unknown

27. If yes for question 26, are the work clothes washed at home? Yes ☒ No ☐

28. Where is the washer/dryer located?
Basement ☐
Upstairs Utility Room ☒
Kitchen ☐
Garage ☐
Use a Laundromat ☐
Other, please specify ☐ _____

29. If you have a dryer, is it vented to the outdoors? Yes ☒ No ☐

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas ☐, Oil ☒, Electric ☒, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system:
- Forced Hot Air ☐
- Forced Hot Water ☐
- Steam ☐
- Radiant Floor Heat ☒
- Wood Stove ☐
- Coal Furnace ☐
- Fireplace ☐
- Other ☐ _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? unknown
How is/was the tank filled?
Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☐ No ☐
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☐ unknown
Other (please specify)

33. Do you use any of the following? Room Fans ☐, Ceiling Fans ☐, Attic Fan ☐ unknown

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☒

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☒ Unknown ☐
If yes, please specify type of pest controlled
And approximate date of service

36. Water heater type: Gas ☒, Electric ☐, by Furnace ☐,
Other (please describe)

37. Water heater location: Basement ☒, Upstairs Utility Room ☐, Garage ☐,
Other (please specify)

38. What type of cooking appliance do you have? Electric ☒, Gas ☐
Other (please describe)

39. Is there a stove exhaust hood present? Yes ☐ No ☐
Does it vent to the outdoors? Yes ☐ No ☐ unknown

40. Smoking in Home:
None ☐, Rare (only guests) ☐, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐ unknown

41. If yes to question 40, what is smoked?
Cigarettes ☐ Cigars ☐ unknown
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☐ No ☐ unknown

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐
unknown

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation:

No

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

unknown

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

45. Please check weekly household cleaning practices:

- Dusting ☐
- Dry Sweeping ☐
- Vacuuming ☐
- Polishing (furniture, etc.) ☐
- Washing/Waxing Floors ☐
- Other (describe) ☐ _____

appears to get regular cleaning

46. Other comments:

_____

_____

_____

_____

_____

_____

_____

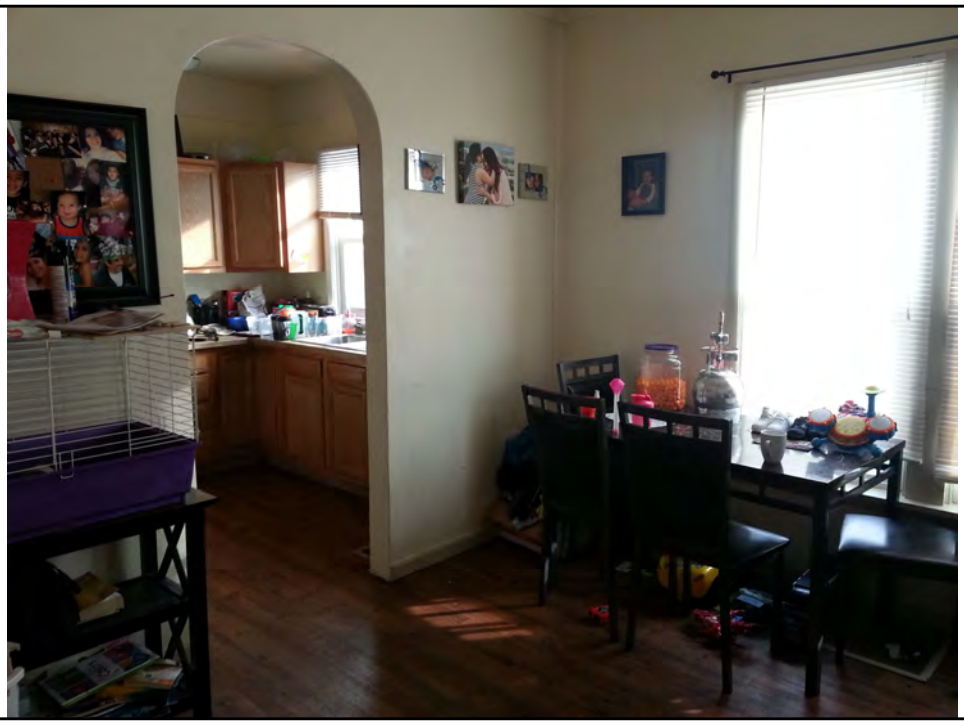
_____

_____

47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

VI Sample: 125 Broadwater Ave_Crawlspace



ADDRESS: 125 BROADWATER AVE

NOTES:
INDOOR AIR SAMPLE MAIN

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Joe Sherman

Physical Address of property under investigation: 146 Terry

Mailing Address: same

Phone (optional):

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
02/05/18	Indoor Air	20180205-146Terry -01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
02/05/18	Indoor Air/crawl	20180205-146Terry -02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
02/06/18	Sub-slab vapor	20180206-146Terry -01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*

*OTHER (specify analysis) Indoor Air = TO-15 (VOCs), APH (Petroleum)
Sub-slab = TO-15 (VOCs), APH (Petroleum), Fixed Gases, Helium

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample. NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

S. Seitz behalf of DEQ — Signature

S. SEITZ for TRI HYDRO — Printed Name

Telephone #: 406-558-4850

Date: 2/10/18

Property owner/operator copy = white DEQ copy = yellow

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	146 Terry	**Start Weather:**	Snowy
		Start Outdoor Air Temp:	19°F
Project Name:	Billings PCE	**Start Atmospheric Pressure:**	30.3 in Hg
Sample Location:	Indoor Air + basement/CS air		
Date:	2/5/18	**End Weather:**	Mostly Cloudy
Field Personnel:	ST, MO, JR	**End Outdoor Air Temp:**	28°F
Recorded by:	ST	**End Atmospheric Pressure:**	30.24 in Hg

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
2/5/18	1315	2/6/18	1307	20180205-146TERRY-01	0741	1455		-27.5	-2.3	70°F	70°F
2/5/18	1318	2/6/18	1309	20180205-146TERRY-02	1060	1436		-27.0	-2.1	~65°F	~65°F

basement / crawlspace

indoor main floor house

Comments:

Canister 0741 Shut in test Start -27.5 inHg @ 2:00 min -27.5 inHg

Canister 1060 Shut in test Start -27.0 inHg @ 2:00 min -27.0 inHg

Indoor Air Sampling Field Data Sheet

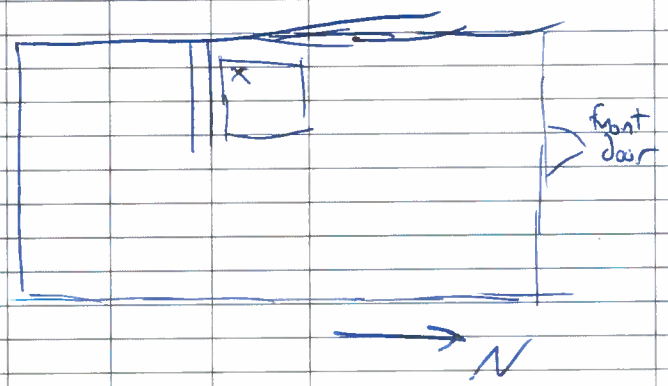
Description of Sample Locations (s):

Canister _01 upstairs indoor air - on kitchen table

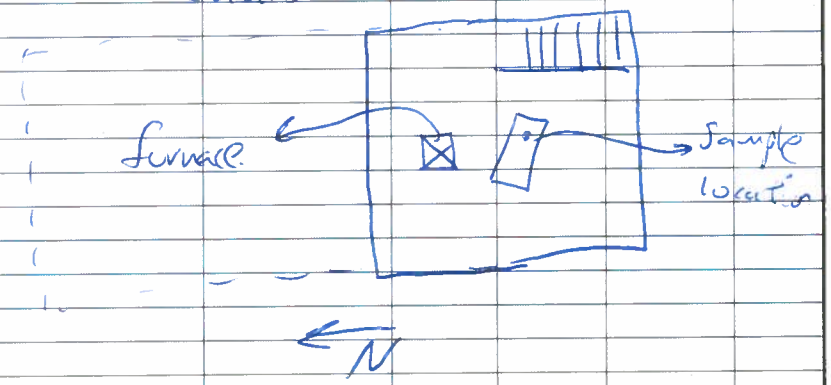
Canister _02 basement air - on freezer (photo on Mo phone) some chemicals on shelf

Location Sketch:

Canister 01



Canister 02



Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	146 Terry Ave, Billings MT		
Project Name:	Billings PCE	**PID (model/serial #):**	PPBRAE 3000 PGM-7340
Sample location:	Sub-Slab basement	**Helium Detector (model/serial #):**	Dielectric 8628
Date:	02/06/2018	**Weather:**	Mostly Cloudy
Field Personnel:	Joel & Cameron	**Air Temp:**	28°F outside ~65°F in Basement
Recorded by:	Joel Riebli	**Atmospheric Pressure:**	30

Slab Data

Surface/slab Type:	Concrete	Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft =
Surface/slab Thickness (inches):	~12"	
Slab/subsurface substrate comments:	Previously installed by EPA	
Depth of hole through the slab:	~12"	
Length of sampling train (feet):		

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	**Time**	**Cumulative volume purged (ml)**	**Helium Beneath Shroud (%) min**	**Helium Beneath Shroud (%) max**	**Helium in Probe (ppm or %)**	**PID reading in probe (ppb)**	**Helium Beneath Shroud (%) min**	**Helium Beneath Shroud (%) max**
2/6/2018	2:27	100	22.9	23.1				
	2:28	200	22.2	22.6				
	2:28	300	21.7	22.2				
	2:29	400	20.5	21.7				
	2:30	500	21.3	21.6	825 ppm	0 ppb		

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
2/6/2018	2:32	3:03	20180206-146Terry-01	#0929	FC 552		-25.8	-3.8

Comments:

Note like dryer vent may be disconnected from hose in basement before looking outsi

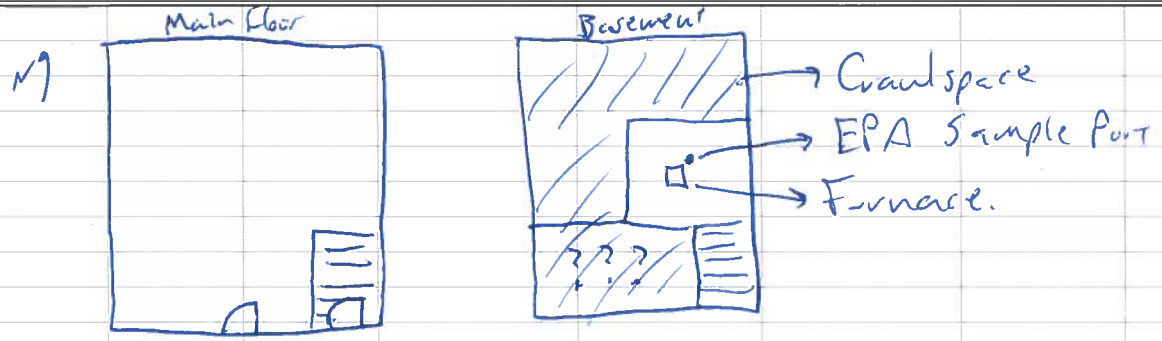
CO = 0 ppm H_2S = 0 ppm O_{xy} = 19.4% LEL = 0

Sub-Slab Soil Vapor Sampling Field Data Sheet

Project Name:	Sample Location/ ID:
Date:	

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

Location Sketch:



OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: Feb. 2018

1. Name: Joe Sherman

   Address: 146 Terry Ave
   Billings, MT

   Home Phone: 406-208-3856 Work Phone: _____

2. What is the best time to call to speak with you? _____ At: Work☐ or Home☐ ?

3. Are you the Owner☑, Renter☐, Other☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:
   1944

4. Total number of occupants/persons at this location? 1
   Number of Children — Ages adults only

5. How long have you lived at this location? 25+ years

General Home Description

6. Type of Home/Structure (check only one): Single Family Home☐, Duplex☐, Apartment☐, Townhouse☐ Other _____

7. Home/Structure Description:
   Number of floors: _____
   Basement☐
   Crawlspace☒ around rest of house - access to crawlspace from billy
   Partial Crawlspace/Basement☒ % of each concrete floor - no holes 12x12 w/ stairs
   Slab On Grade☐
   Other☐ _____

   open to basement

   main floor

8. Age of Home/Structure: _____years, Not Sure/Unknown☐

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood☐, Brick☐, Concrete☐, Cement block☐, Other☐ _____
   Garage: ☐Attached ☐Detached ☐None

10. Foundation Construction (check all that apply):
    Concrete Slab☑
    Fieldstone☐
    Concrete Block☑ combo
    Elevated Above Ground/Grade☐
    Other☐ _____

11. Do you have Private Well ☐ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____ No well

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____ City water/sewer
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☐

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☐ Unfinished ☑ Partially Finished ☐ Partial Crawlspace ☐?

15. If finished, how many rooms are in the basement? _____
What are rooms used for? Bedrooms ☐ Family Room ☐ Storage ☐
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐

17. Is the basement floor (check all that apply) Concrete ☐, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☐, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☑ years ago - sewer leak
No ☐ New sewer leak, not much since then except sprinkler leaking & huge rain

Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐,
Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe _____

22. Are any of the following used or stored in the basement (check all that apply):
- ☐ Paint
- ☐ Solvents (degreasers, paint thinner, etc.)
- ☐ Fuels/Oils (gasoline, diesel, used oil)
- ☐ Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- ☐ Pesticides

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☐ No ☑
If yes, specify what was done, where in the home, and what month:

24. Have you installed new carpeting in your home within the last year? Yes ☐ No ☑
If yes, when and where? _____

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
No ☐

26. Does anyone in your home use solvents at work?
Yes ☐ If yes, how many persons?
No ☐ If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes ☐ No ☐

28. Where is the washer/dryer located?
Basement ☐
Upstairs Utility Room ☑
Kitchen ☐
Garage ☐
Use a Laundromat ☐
Other, please specify ☐ _____

29. If you have a dryer, is it vented to the outdoors? Yes ☑ No ☐

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas ☑, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ forced air

Heat conveyance system:
- Forced Hot Air ☑
- Forced Hot Water ☐
- Steam ☐
- Radiant Floor Heat ☐
- Wood Stove ☐
- Coal Furnace ☐
- Fireplace ☐
- Other ☐ _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? _____ None [illegible]
_____
How is/was the tank filled? _____
_____
Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☐ No ☑
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☑ window out/covered
Other (please specify) _____

33. Do you use any of the following? Room Fans ☐, Ceiling Fans ☑, Attic Fan ☐ bathroom

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☑

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☑ Unknown ☐
If yes, please specify type of pest controlled _____
And approximate date of service _____

36. Water heater type: Gas ☑, Electric ☐, by Furnace ☐,
Other (please describe) _____

37. Water heater location: Basement ☑, Upstairs Utility Room ☐, Garage ☐,
Other (please specify) _____

38. What type of cooking appliance do you have? Electric ☑, Gas ☐
Other (please describe) _____

39. Is there a stove exhaust hood present? Yes ☑ No ☐ microwave to inside vent
Does it vent to the outdoors? Yes ☐ No ☑

40. Smoking in Home:
None ☐, Rare (only guests) ☐, Moderate (residents, light smokers) ☑,
Heavy (at least one heavy smoker in household) ☐

41. If yes to question 40, what is smoked?
Cigarettes ☑ Cigars ☐
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☑ No ☑ no - not typically

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ NO
_____
_____

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation: _____
_____
No - ~~some radon~~ no testing done that he knows

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

45. Please check weekly household cleaning practices:

Dusting ☐

Dry Sweeping ☐

Vacuuming ☐

Polishing (furniture, etc.) ☐

Washing/Waxing Floors ☐

Other (describe) ☐ _____

46. Other comments:

_____

_____

_____

_____

_____

_____

_____

_____

_____

47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

VI Sample: 146 Terry Ave_Basement/Crawlspace

VI Sample: 146 Terry Ave_Basement/Crawlspace

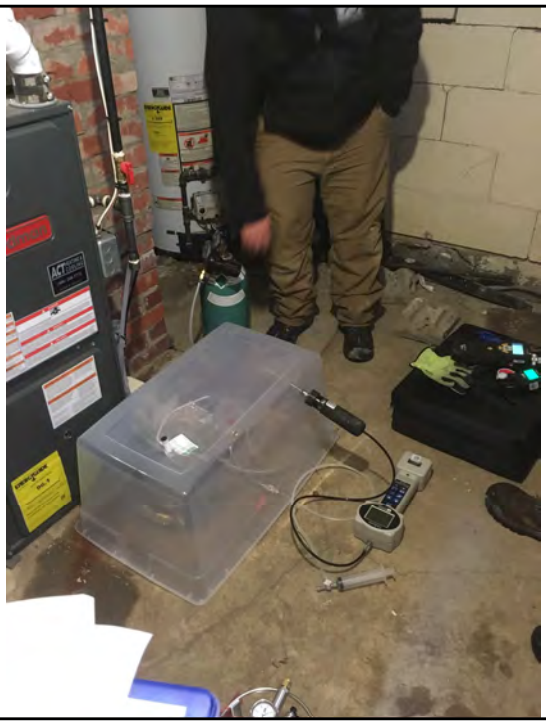
VI Sample: 146 Terry Ave_Basement/Crawlspace

146 Terry Ave Utility Locate

146 Terry Ave Structure

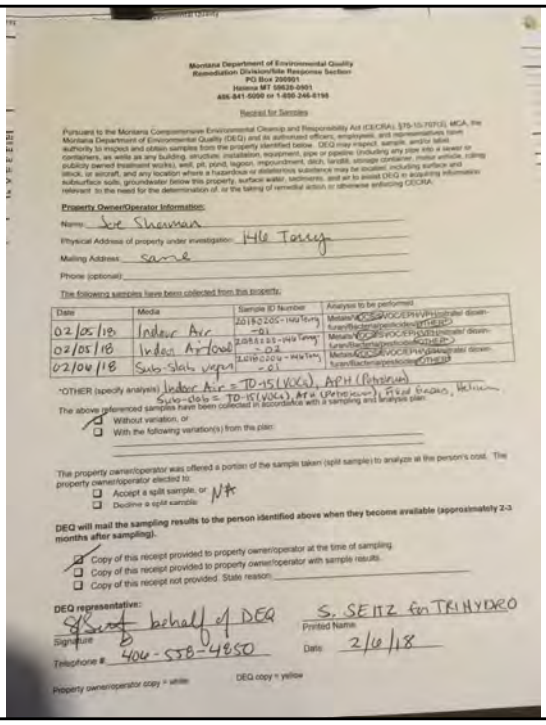
146 Terry Ave Utility Locate

146 Terry Ave Utility Locate



ADDRESS: 146 TERRY AVE

NOTES:
SUBSLAB SAMPLE LOCATION



Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-6196

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(2), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or take containers, as well as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Joe Sherman

Physical Address of property under investigation: 146 Terry

Mailing Address: same

Phone (optional): _____

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
02/05/18	Indoor Air	20180205-146 Terry -01	Metals/~~PCBs~~/VOC/EPH/VPH/Herbicide/dioxin/furan/Bacteria/pesticides/OTHER?
02/05/18	Indoor Air Dup	20180205-146 Terry -02	Metals/~~PCBs~~/VOC/EPH/VPH/Herbicide/dioxin/furan/Bacteria/pesticides/OTHER?
02/06/18	Sub-Slab vapor	20180206-146 Terry -01	Metals/~~PCBs~~/VOC/EPH/VPH/Herbicide/dioxin/furan/Bacteria/pesticides/OTHER?

*OTHER (specify analysis) Indoor Air = TO-15 (VOCs), APH (Petroleum)
Sub-Slab = TO-15 (VOCs), APH (Petroleum), Fixed Gases, Helium

The above referenced samples have been collected in accordance with a sampling and analysis plan:

☑ Without variation, or
☐ With the following variation(s) from this plan: _____

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

☐ Accept a split sample, or NA
☐ Decline a split sample

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

☑ Copy of this receipt provided to property owner/operator at the time of sampling.
☐ Copy of this receipt provided to property owner/operator with sample results.
☐ Copy of this receipt not provided. State reason: _____

DEQ representative:

Signature: S. Seitz behalf of DEQ
Printed Name: S. SEITZ for TRI HYDRO
Telephone #: 406-558-4850
Date: 2/6/18

Property owner/operator copy = white DEQ copy = yellow

ADDRESS: 146 TERRY AVE

NOTES:
SAMPLE RECEIPT

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Ernest Ortivez

Physical Address of property under investigation: 201 S 37th St. Billings MT

Mailing Address: Same

Phone (optional): 406-534-8395

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/28/18	AIR	20180228-201 S 37 Ti-ST-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15, APH
2/28/18	AIR	20180228-201 S 37 Ti-ST-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15, APH
2/28/18	AIR	20180228-201 S 37 Ti-ST-03	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15, APH

*OTHER (specify analysis) _____

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☒ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.
- ☒ NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☒ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason: _____

DEQ representative:

Signature: _____ Printed Name: Syris Trahan

Telephone #: 307-745-7474 Date: 3/6/18

Property owner/operator copy = white DEQ copy = yellow

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Ernest Ortiz

Physical Address of property under investigation: 201 S. 37th St. Billings MT

Mailing Address: Same

Phone (optional): 406-534-8395

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/27/18	AIR	20180227-C (DUPLICATE of 20180227-01)	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15, APH
		20180227-01)	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
3/1/18	AIR	20180301-201 37TH ST-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15, APH FIXED, CH4

*OTHER (specify analysis) _____

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☒ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.
- ☒ NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☒ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason: _____

DEQ representative:

Signature: [signature] Printed Name: Sviis Trahan

Telephone #: 307-745-7474 Date: 3/6/18

Property owner/operator copy = white DEQ copy = yellow

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	201 S. 37th Street	**Start Weather:**	Clear, Sunny; WSW 13mph
		Start Outdoor Air Temp:	38°F
Project Name:	MDEQ Billings PCE	**Start Atmospheric Pressure:**	30.03 in
Sample Location:	Basement, Basement Crawlspace, Main Floor		
Date:	2/28/2018 → 3/1/2018	**End Weather:**	Mostly Cloudy; NNE 6mph
Field Personnel:	Joel Riebli & Jake Scott	**End Outdoor Air Temp:**	31°F
Recorded by:	Joel Riebli	**End Atmospheric Pressure:**	29.99 in

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
02/28/18	1305	3/1/18	1305	20180228-201S37ST-01	Ø428	FCØ377	—	-26.5	-1.5	~70°F	~65°F
02/28/18	1301	03/01/18	1301	20180228-201S37ST-02	3481	FC 2861	—	-27.0	-2.5	~75°F	~65°F
02/28/18	1312	03/01/18	1312	20180228-201S37ST-03	2127	FCØ458	—	-26.5	-4.2	~80°F	~75°F
02/28/18	1305	3/1/18	1305	20180228-C	Ø186	FCØ454	—	-27.5	-3.8	~70°F	~65°F

Comments:

Shut in Test Results (2 min)

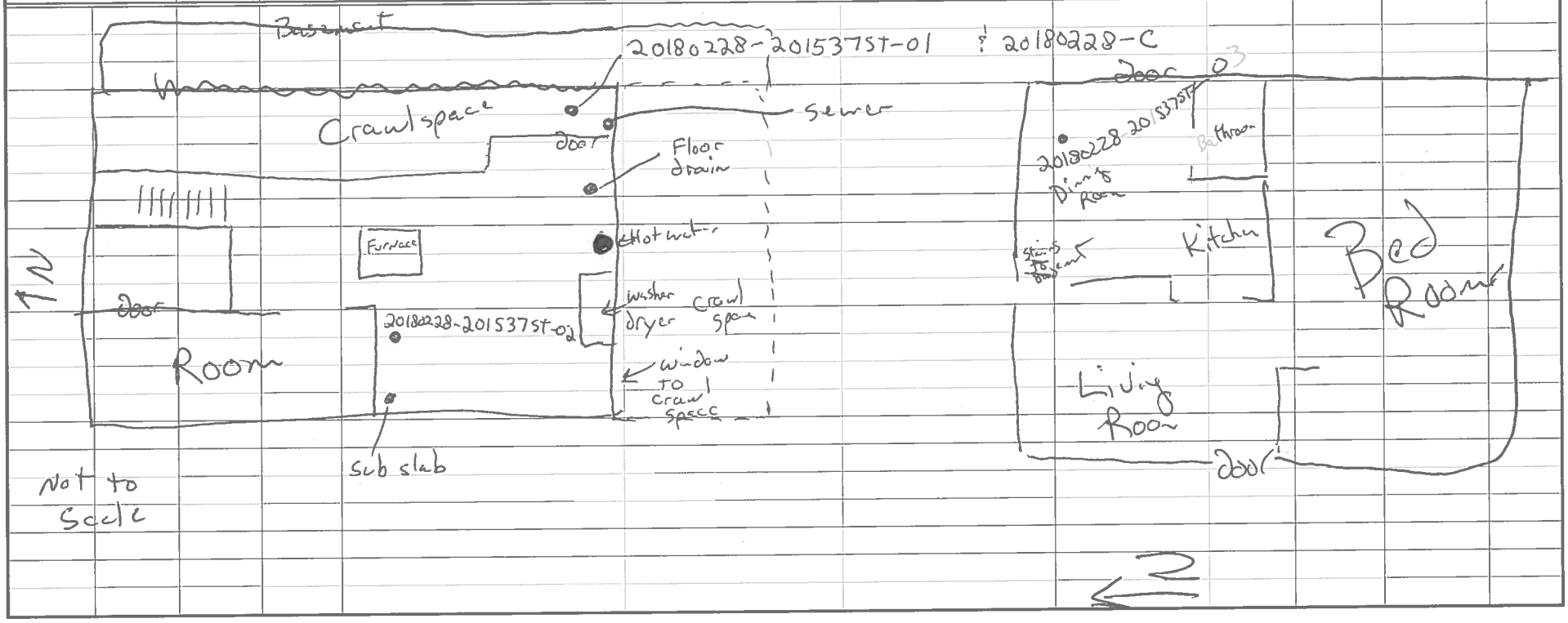
Canister ID	Flow Controller #	Initial	Final	
Ø428	FCØ377	-26.5	-26.5	Passed
3481	FC2861	-26.5	-26.5	Passed
2127	FCØ458	-26.5	-26.5	Passed
Ø186	FCØ454	-27.0	-27.0	Passed

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s): MDEQ Billings PCE 201 S. 37th Street

- 20180228-201S37ST-01 & 20180228-C collected from the inside the crawlspace (Behind the door
- 20180228-201S37ST-02 placed approx 4' off the ground near the sub-slab sample part of the basement.
- 20180228-201S37ST-03 placed on table in dining room table

Location Sketch:



Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	201 S. 37th St.	4 GAS #):	QRAE2 / 152-M1984
Project Name:	BPCE	PID (model/serial #):	ppb RAE 3000 / 12875
Sample location:	Basement Sub-slab	Helium Detector (model/serial #):	Dialectric / 041554
Date:	03/01/2018	Weather:	Mostly Cloudy, N 7mph
Field Personnel:	BS, ST, SS, JR, JS	Air Temp:	33°F
Recorded by:	Joel Ridl.	Atmospheric Pressure:	29.97 in

Slab Data

Surface/slab Type: Poured Concrete

Surface/slab Thickness (inches): 2 3/4"

Slab/subsurface substrate comments: Unknown substrate material below concrete pad

Depth of hole through the slab: 7 1/4" TD

Length of sampling train (feet): ~~3'~~ 4'

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 120 mL

Helium Tracer Leak Test Field Data

Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Sample Collection Data: Helium Beneath Shroud (%) min	Sample Collection Data: Helium Beneath Shroud (%) max
03/01/18	1317	100	22.1	22.4				
	1318	200	21.1	22.1				
	1318	300	20.1	21.1				
	1320	400	21.2	21.4				
	1320	500	20.6	21.2	4,000 ppm	0 ppb		

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
3/1/18	1324	1359	20180301-201537ST-01	3472	FC 0916	—	-25.5	-4.1

Comments:

2 minute shut down test. Initial -26.0 in Final -26.0 Pass

4 gas readings → CO_2, H_2S, OXY, LEL = 0ppm, 0ppm, 20.9%, 0% (respectively)

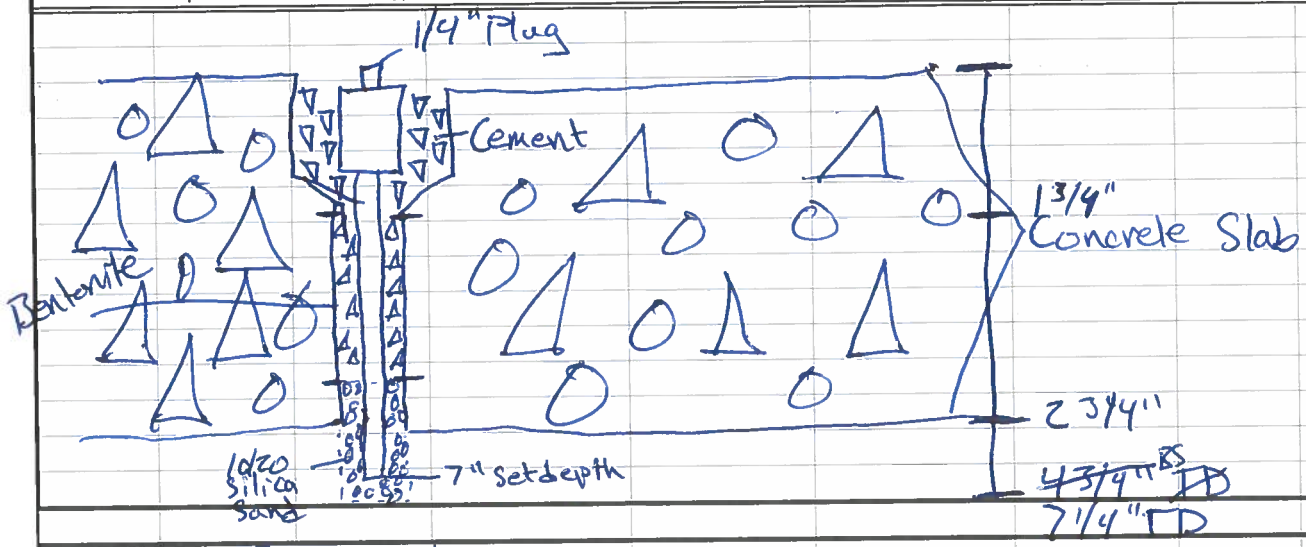
Maximum He in the shroud = 24.5 %

Sub-Slab Soil Vapor Sampling Field Data Sheet

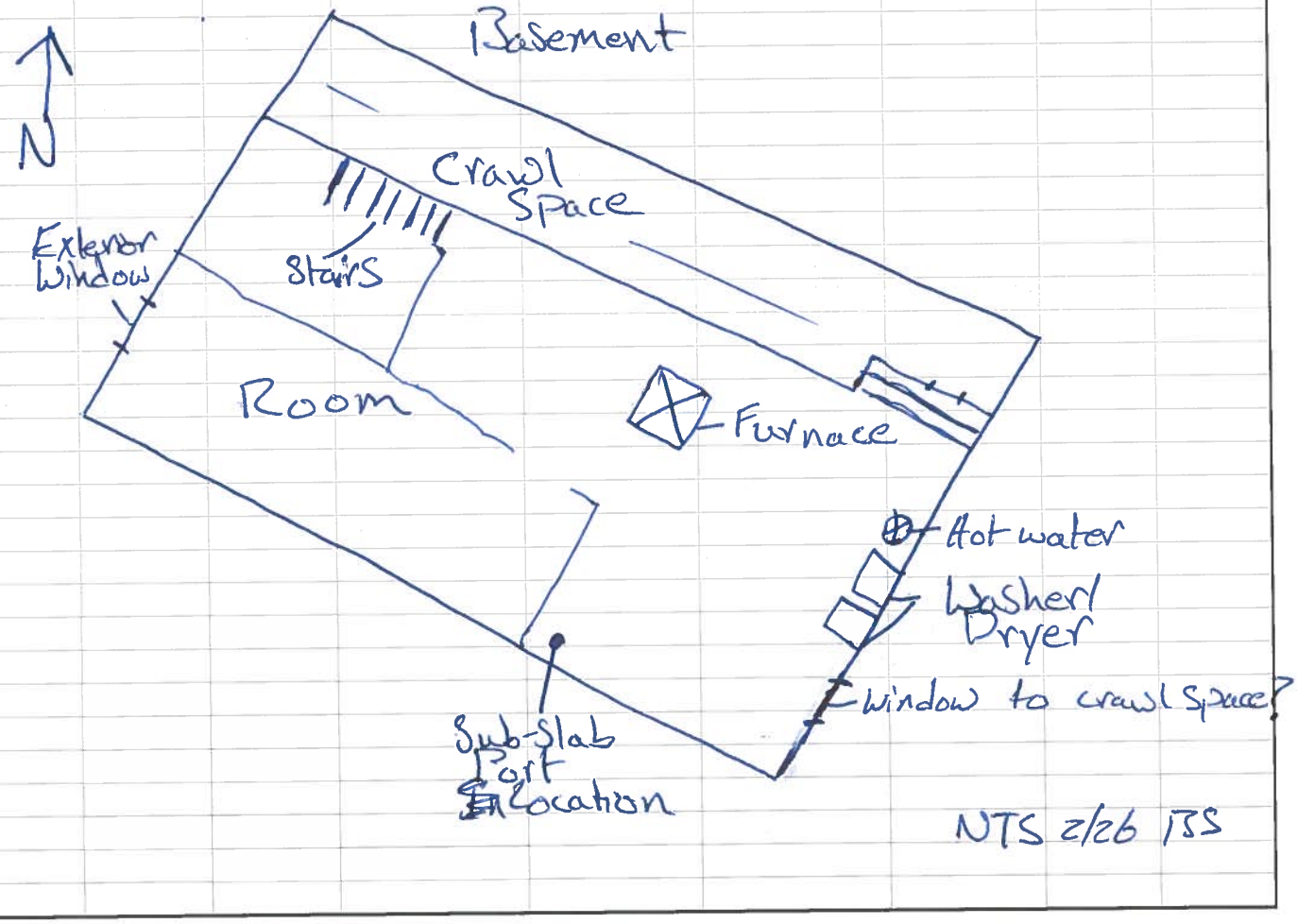
Project Name: BPCE
Date: 2/26/18

Sample Location/ ID: 201 S. 37th St.

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.



Location Sketch: Basement



OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Filled out by S. Seitz

Date: 2/26/18

1. Name: Ernest Ortiz

   Address: ~~201 37th St.~~ 201 S 37th St.
   ~~B/S~~ Billings MT 59101

   Home Phone: 406-534-8395 Work Phone: _____

2. What is the best time to call to speak with you? _____ At: Work☐ or Home☐ ?

3. Are you the Owner☑, Renter☐, Other☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

   _____

   _____

   _____

4. Total number of occupants/persons at this location? 1
   Number of Children — Ages adult

5. How long have you lived at this location? 3 months

General Home Description

6. Type of Home/Structure (check only one): Single Family Home☑, Duplex☐, Apartment☐, Townhouse☐ Other _____

7. Home/Structure Description:
   Number of floors: 1 main
   Basement☑ basement storage & bedroom
   Crawlspace☐
   Partial Crawlspace/Basement☑ % of each 33%
   Slab On Grade☐
   Other☐ _____

8. Age of Home/Structure: 1942 years, Not Sure/Unknown☐

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood☑, Brick☐, Concrete☐, Cement block☐, Other☐ _____
   Garage: ☐Attached ☐Detached ☐None

10. Foundation Construction (check all that apply):
    Concrete Slab☐
    Fieldstone☐
    Concrete Block☑
    Elevated Above Ground/Grade☐
    Other☐ _____

11. Do you have Private Well ☑ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____
lawn – backyard

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____ city water city sewer
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☑

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☐ Unfinished ☐ Partially Finished ☑ Partial Crawlspace ☑? basement bedroom

15. If finished, how many rooms are in the basement? 1 empty bedroom
What are rooms used for? Bedrooms ☐ Family Room ☐ Storage ☑
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐

17. Is the basement floor (check all that apply) Concrete ☐, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☑ floor, Cement Block ☑ walls, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☑
Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☑ unknown

21. Does the basement have any of the following? Floor Cracks ☑, Wall Cracks ☑, Sump ☐,
Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe_____

22. Are any of the following used or stored in the basement (check all that apply):
- ☐ Paint
- ☐ Solvents (degreasers, paint thinner, etc.)
- ☐ Fuels/Oils (gasoline, diesel, used oil)
- ☐ Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- ☐ Pesticides

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

Nothing in basement for storage

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☐ No ☐
If yes, specify what was done, where in the home, and what month:

24. Have you installed new carpeting in your home within the last year? Yes ☐ No ☐
If yes, when and where? _____

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
No ☑

26. Does anyone in your home use solvents at work?
Yes ☐ If yes, how many persons?
No ☑ If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes ☑ No ☐

28. Where is the washer/dryer located?
Basement ☑
Upstairs Utility Room ☐
Kitchen ☐
Garage ☐
Use a Laundromat ☐
Other, please specify ☐ _____

29. If you have a dryer, is it vented to the outdoors? Yes ☑ No ☐ vents to SW/west

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas ☑, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system:
- Forced Hot Air ☑
- Forced Hot Water ☐
- Steam ☐
- Radiant Floor Heat ☐
- Wood Stove ☐
- Coal Furnace ☐
- Fireplace ☐
- Other ☐ _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? underneath
How is/was the tank filled? Delay not
Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☑ No ☐
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☐
Other (please specify) _____

33. Do you use any of the following? Room Fans ☐, Ceiling Fans ☐, Attic Fan ☐ NO

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☑

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☐ Unknown ☐
If yes, please specify type of pest controlled _____
And approximate date of service _____

36. Water heater type: Gas ☑, Electric ☐, by Furnace ☐,
Other (please describe) basement

37. Water heater location: Basement ☑, Upstairs Utility Room ☐, Garage ☐,
Other (please specify) _____

38. What type of cooking appliance do you have? Electric ☐, Gas ☑
Other (please describe) _____

39. Is there a stove exhaust hood present? Yes ☑ No ☐
Does it vent to the outdoors? Yes ☑ No ☐

40. Smoking in Home:
None ☑, Rare (only guests) ☐, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐

41. If yes to question 40, what is smoked?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐ NO

42. Do you regularly use air fresheners? Yes ☐ No ☑

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____
NO

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation: _____

Oxidation system W in basement on furnace

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	not yet Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	not yet Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

routine cleaners

45. Please check weekly household cleaning practices:

- Dusting ☐
- Dry Sweeping ☐
- Vacuuming ☐
- Polishing (furniture, etc.) ☐
- Washing/Waxing Floors ☐
- Other (describe) ☐ _____

regularly

46. Other comments:

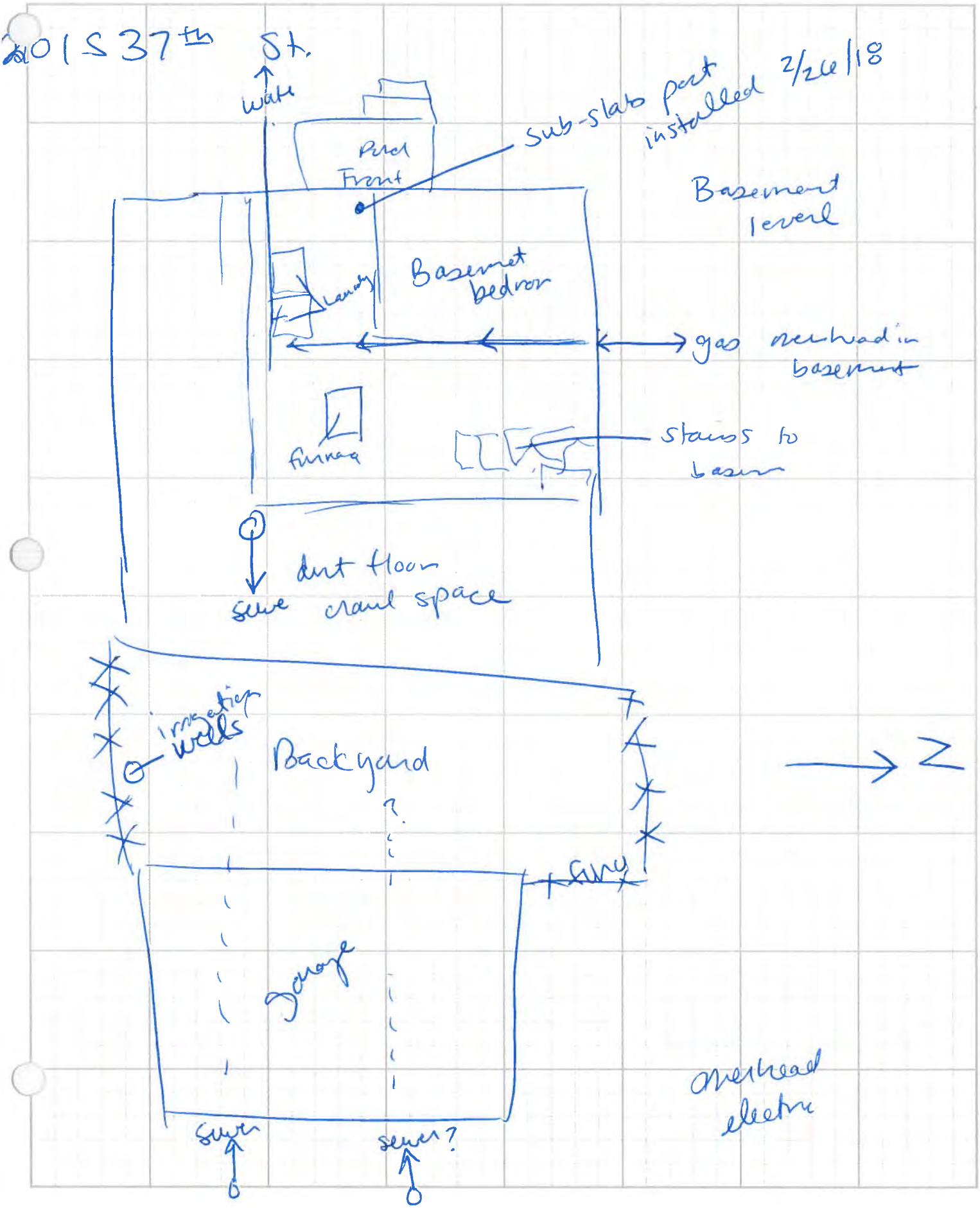
_____
_____
_____
_____
_____
_____
_____
_____
_____

47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

NA - [illegible]
2/24/18

TITLE


201 S 37th St.
water
Bed Front
sub-slab port installed 2/26/18
Basement level
Basement bedroom
laundry
gas overhead in basement
furnace
stairs to basement
dirt floor crawl space
sewer
irrigation wells
Backyard
N
garage
sewer
sewer?
overhead electric

Excavation, Drilling, and Utility-Locating Checklist

Task: Subslab VI install	Date	Initials
A. Excavation-site planning:		
1. The local One Call regulations have been checked for local utility-notification requirements (e.g., 48 hours vs. 72 hours).	2/26	SS
2. Per the local One Call regulations, list the responsible party (generally the excavation/drilling contractor) for requesting and verifying completion of utility locates below: TRI HYDRO	2/26	SS
3. The property owner and/or business owner has been notified of the excavation schedule. ✓	2/26	SK
4. Each proposed excavation site or "area of interest" has been delineated for utility-line locators using white spray paint and/or wooden stakes/lathes with white flagging.	NA	—
5. Public-utility locates have been requested by calling One Call at least 48 hours (72 hours in some states) before work is scheduled to begin, and the request includes depths, as available. ✓	2/26	SS
6. Each utility company has been notified of the excavation schedule and invited to review the proposed excavation sites. 811 / one call	2/26	SK
7. On-site meetings have been scheduled with the appropriate representatives of critical utility facilities (e.g., gas/oil pipelines, high-voltage cables, fiber-optic lines).		NA
8. Private-utility locates—including fuel lines; tanks; and water, sewer, gas, electricity, and other utilities—have been requested.	NA	—
9. The property owner was contacted to determine if he/she knows of privately owned subsurface facilities within 5 feet of the proposed excavation sites. (Review locations with the manager/~~owner.~~) Examples of privately owned facilities that are not commonly marked on private property include:	2/26	JR
a) Water and sewer laterals — Water front, Sewer back	2/26	JR
b) Gas lines — North side	2/26	JR
c) Power lines (including those for landscape/yard lighting, pool and spa lines, and "out building" lines) — back	2/26	JR
d) Irrigation lines	NA	JR
e) Communication lines (cable, telephone, Internet) — front ? back	2/26	JR
f) Propane tank lines	NA	JR
10. The proposed excavation sites have been reviewed by the appropriate stakeholders (e.g., owner, tenant, driller, excavator) and the Trihydro ~~project manager~~. Trihydro office	NA	SS
11. Proposed excavation sites have been visually inspected, and available plans and aerial photos have been reviewed for evidence of potential utilities.	NA	SS
12. A scaled site plan showing the proposed excavation sites relative to subsurface utilities has been prepared and is available for stakeholder/Management review.	NA	—
13. The basis for each buried utility line's location and the accuracy of the data defining the utility location are documented on the site plan.	NA	JR
14. The proposed excavation sites are at least 5 feet from subsurface utilities shown on the building plans.	2/26	JR
15. The proposed excavation sites are at least 5 feet from subsurface utilities shown on public right-of-way / street-improvement plans. [Note: Work with utility companies to determine if they require a representative present during excavation activities.]	2/26	JR
16. The proposed excavation sites are at least 7 feet from the pad surrounding underground storage tanks (USTs) shown on the building plans.	NA	JR
17. The utility-locate ticket number is available on site. 18004861 Located by 2/24/18	2/26	JR
18. A traffic-control plan has been prepared if appropriate. Note: If the project area encompasses a public street or right of way, the local and/or state authority must approve the traffic-control plan before fieldwork begins.	NA	—
19. Arrangements have been made to contact the appropriate personnel if utility-line repairs are needed. (Who must be contacted if a line is unexpectedly damaged?)	NA	—
20. Contact information is in place and readily available with the driller, excavator, and other project stakeholders. TRI HYDRO	2/26	SS
21. The client and other relevant stakeholders (if any) have been notified of the excavation planning/pre-planning steps and results. Work Plan ✓	NA	—
22. A detailed work scope was developed by the project team and reviewed by the Project Director and Contracting Team. Addendum ✓	2/26	SK
Project Director (excavation-site planning tasks):		

NO US WTR

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
B. Utility-line marking:		
1. Electrical circuits are energized during utility-line marking for subsurface power lines (e.g., circuits on timers or light-sensing switches). NOT unenergized	NO	SJS
2. Public-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	2/26	SJ
3. Private-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	NA	—
4. Verify that One Call locators marked their facilities in the designated excavation area or provided notification that they do not have any facilities near the proposed excavation sites.	2/26	SR
5. One Call was contacted to request a "refresh" if utility-locate markings are missing, difficult to see, or more than 14 days old (7 days in some states). "Refresh" markings must be performed by the original marking organization.	NA	SJ
Project Director (utility-line marking tasks):		
C. Job walk:		
1. Visual verification that each proposed excavation site does not lie on a line connecting two similar-looking manhole covers (e.g., sanitary sewers or storm drains). (Consider having the line ~~snaked to confirm~~ their locations.) Not snaked	2/26	SR
2. Visual verification that each proposed excavation site does not lie on a line with any water, gas, electrical meters, utility cleanouts, or other utility boxes in the surrounding areas.	2/26	SR
3. Visual verification that the pavement near each proposed excavation site has not subsided or give the appearance it may be covering a previous excavation (e.g., linear cracks or sagging curbs).	2/26	SR
4. Visual verification that each proposed excavation has adequate overhead clearance for the excavation equipment (e.g., at least 10 feet from overhead-utility lines and/or reasonable distance from canopies).	2/26	SR
5. Fences and fields have been checked for markers, signs, posts, valves, stub outs, etc.	NA	SR
6. Surface structures such as tank batteries, wells, valves, phone pedestals, and electrical junction boxes have been checked for evidence of subsurface utilities.	NA	SR
7. Observed evidence of subsurface utilities has been photographed, sketched, or otherwise documented.	2/26	SR
8. Proposed excavation sites have been "walked"/reviewed by the excavation contractor, Trihydro project manager, and other stakeholders (e.g., client representative, property owner, tenant). TRI HYDRO excavation	2/26	SR
9. Proposed excavation sites are located at least 5 feet from marked utilities (i.e., the "tolerance zone"), or written approval to excavate within the 5-foot tolerance zone has been obtained from the appropriate utility owner. In no case shall a proposed excavation be located closer than 2 feet from the outside edge of a marked utility. (Note: The tolerance zone is measured ~~from the~~ outside edge of a subsurface structure—not its centerline.)	NA	SR
10. Verify that the excavation contractor (with help from appropriate utility-line locators, if part of the client-approved work scope) has walked each proposed excavation site to verify all expected utility-line markings are present.	2/26	SR
11. Traffic-control devices, safety barricades, caution tape, and other safety-management devices are in place as needed to protect project personnel.	NA	insuch
Project Director (job-walk tasks):		
D. Daylighting / potholing / "soft digging":		
1. The proposed excavation sites located within the "tolerance zone" (and sites located outside the "tolerance zone" when required by the client) have been potholed to a depth below the anticipated utility zone using "minimally intrusive excavation methods" such as vacuum excavation (either air-entrainment or water-jet) and careful hand-tool use.	NA	SJ
2. Monitoring and emergency equipment is available on site when hazardous atmospheres are expected to be encountered in the potholing excavations.	↓	↓
3. A list of emergency-contact names/numbers is maintained at the potholing excavation site.		
4. The project health and safety plan addresses potential hazards and safety-performance requirements related to utility-clearance operations.		
5. The location of and directions to the nearest hospital are known by all members of the project team.		
6. Representatives of utility owners that requested to be on site for utility locates are present.		

201 S. 37th Street

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
7. Pothole excavations have been visually checked with a flashlight by the excavation contractor, Trihydro project manager, or her/his designee.	NA	S/S
8. Utilities adjacent to the excavation or that cross the excavation have been daylighted using "minimally intrusive excavation methods."		
9. The areal extent of the excavation-clearance pothole has been verified to extend at least 120% beyond the outside diameter of the largest-diameter down-hole tool to be used in the borehole, or at least 2 feet on each side of daylighted/exposed lines, whichever is greater.		
10. If vacuum excavation (e.g., air knife, air vac, hydro-vac) is not available to daylight utility lines, verify that the non-conductive probe method was used as follows: Scratch the ground no more than 10 inches deep above the utility and then probe the scratched area. If the utility isn't found in the scratched area, repeat the first step until the utility is located. Once the utility is found, its depth must be continually verified with the probe until 2 feet of soil remain above the utility. Carefully hand dig the remaining overburden to expose the utility.		
11. The soil encountered in the excavation-clearance pothole has been verified to be free of bedding material (e.g., clean gravel, clean sand, aggregate base [gravelly sand with ~10% fines], or other non-native-looking material) that could indicate the presence of a previously installed utility line.		
12. Excavation work within 2 feet of an underground utility was "hand dug."		
13. Once the utility lines were exposed and the excavations were safe to enter, the exposed lines (including their protective coating) was examined for damage.		
14. The condition of each utility line exposed during daylighting was documented, and the documentation was forwarded to the Trihydro project manager to place in the project file.		
15. If a utility line was damaged in any way, it was reported to the utility owner and Trihydro project manager and documented in the project file.		
16. Damage to a utility line was documented and repaired before it was reburied. The utility owner signed off on the repairs.		
17. Employees entering the excavation followed the procedures described in the Trihydro "Trenching and Excavation Program" and used the Trihydro "Daily Excavation/Trench Inspection Report" to document excavation condition.		
18. The location of daylighted utilities was documented and photographed after daylighting was completed and before the pothole excavation was backfilled.		
19. Locations for hand digging within the "tolerance zone" were noted.		
Project Director (daylighting/potholing tasks):		
E. Excavation (including drilling):		
1. The appropriate permits have been obtained for the work (e.g., hot-work permits, entry permits).	NA	—
2. The utility-owner and/or agency representatives that requested to be on site during excavation work are present. (Trihydro Utility ~~Locate Acknowledgement~~ Form)	NA	—
3. A safety kickoff meeting was conducted with the excavation contractor to review roles/responsibilities, work activities, anticipated hazards, this checklist, and emergency-response procedures before starting excavation work the site. The safety kickoff meeting was documented in the project file. TSM	2/26	S/S
4. A daily tailgate safety meeting was conducted and documented in the project file. Verify weather conditions, safety hazards, PPE requirements, job duties, communication, hand signals, etc. see day	2/26	S/S
5. JSAs covering the work to be done are in place and have been reviewed, "marked up" where appropriate, and acknowledged by the excavation project-team members.	2/26	S/S
6. Site workers have been reminded to look for hazardous conditions, processes, and activities, and that they are authorized to stop work if they see an unsafe condition.	2/26	S/S
7. The emergency-response plan has been reviewed by all excavation project-team members (e.g., contact numbers, evacuation muster points, hospital routes). HASP	2/26	S/S
8. The excavation contractor has checked the excavation sites relative to overhead utilities, subsurface-utility locates, and adjacent surface structures. TRI HYDRO	2/26	S/S
9. The excavation contractor has acknowledged the potential location of each subsurface utility marked in the excavation areas.	2/26	S/S
10. Proper traffic control and exclusion zones have been established. NA	NA	—
11. The excavation equipment (e.g., ~~drill rig, backhoe~~) has been inspected for proper operation and condition. drill	2/26	S/S
12. Emergency equipment (fire extinguisher, first aid kit, emergency shut-off switch, etc.) has been checked, is readily available, and is in working order. in vehicle	2/26	S/S
13. Excavation project-team members are wearing appropriate PPE per the Trihydro HASP and client/site-specific requirements.	2/26	S/S
14. Power in the excavation area has been de-energized, if possible. If power cannot be de-energized, the excavation contractor was advised of the hazard. NO	NO	S/S

201 S. 37th St.

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
Project Director (excavation/drilling tasks):	NA	—
F. If an unmarked utility line is discovered:		
1. Verify the One Call utility-locate request was made correctly.	2/26	SJ
2. Identify the owner/operator of the unmarked utility line and contact One Call (dial "811") to request a "No Response" ticket. If the owner/operator fails to respond again, seek a third-party locating service to mark the utility before: a) excavation work begins, or b) advancing the excavation further.	NA	—
3. Contact the owner/operator of non-locatable utilities to request they be taken out of service before excavation begins.	NA	—
4. If possible, a representative of the unmarked utility line should be on site when the unmarked utility is daylighted.	NA	—
Project Director (unmarked utility line tasks):	NA	—

Note:

-- If an item doesn't apply, please insert an "NA" in the "**Date**" column and provide an explanation in the "**Project Notes**" section below.

SJ for AVam	Syris, Sarah, Brent, Jake & Joel	2/26/18
Project Manager	Field Manager / Team Members	Date Reviewed
~~MOU~~ MT DEQ 776-030-001	TRIHYDRO	
Client / Project Name / Location	Excavator/Driller Name	Date Action Items Completed

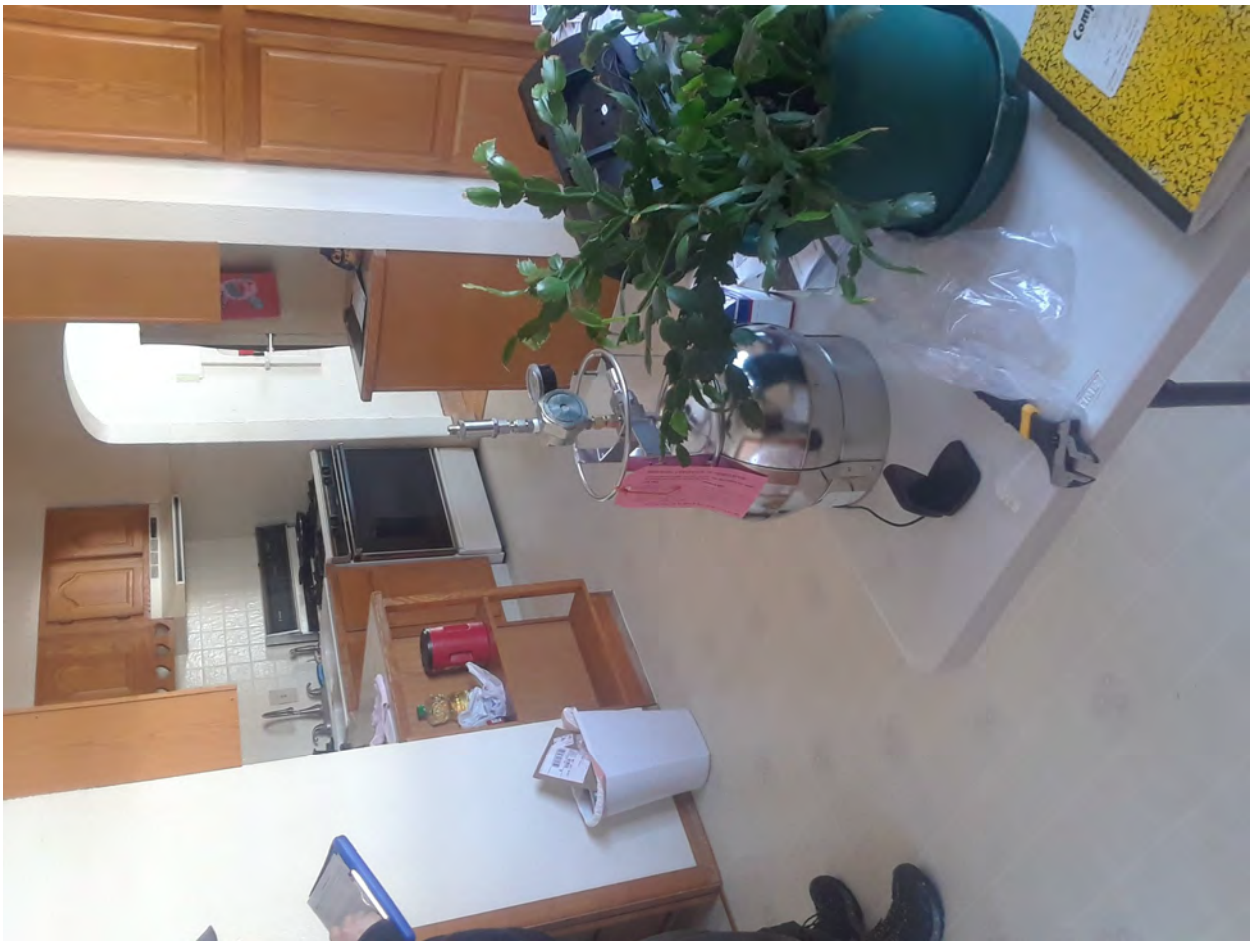
Project Notes: [Please cross reference to the appropriate checklist-item number[s] when possible.]

201 S. 37th Street

VI Sample: 201 S 37th St_Crawlspace

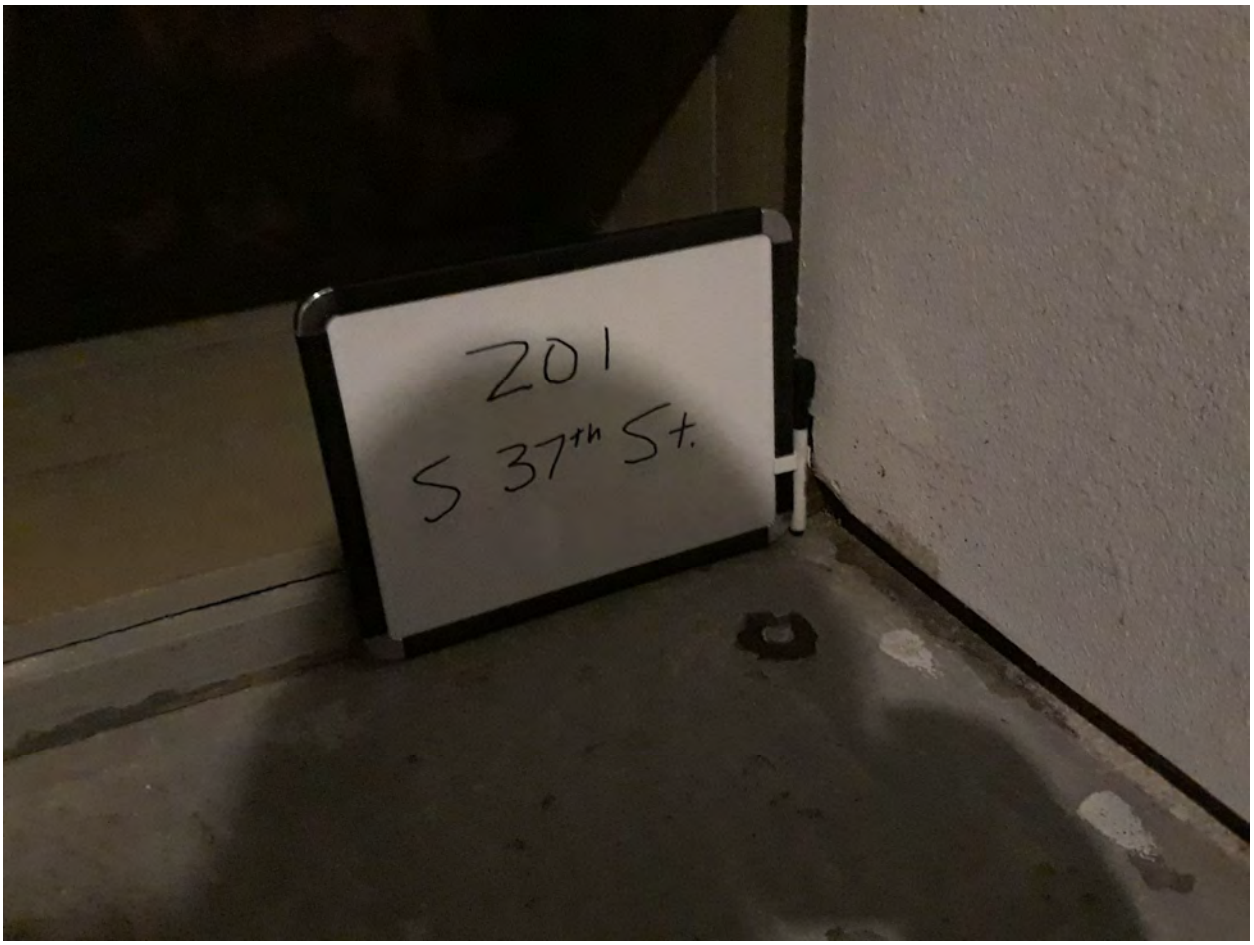
VI Sample: 201 S 37th St_Basement

VI Sample: 201 S 37th St_Main

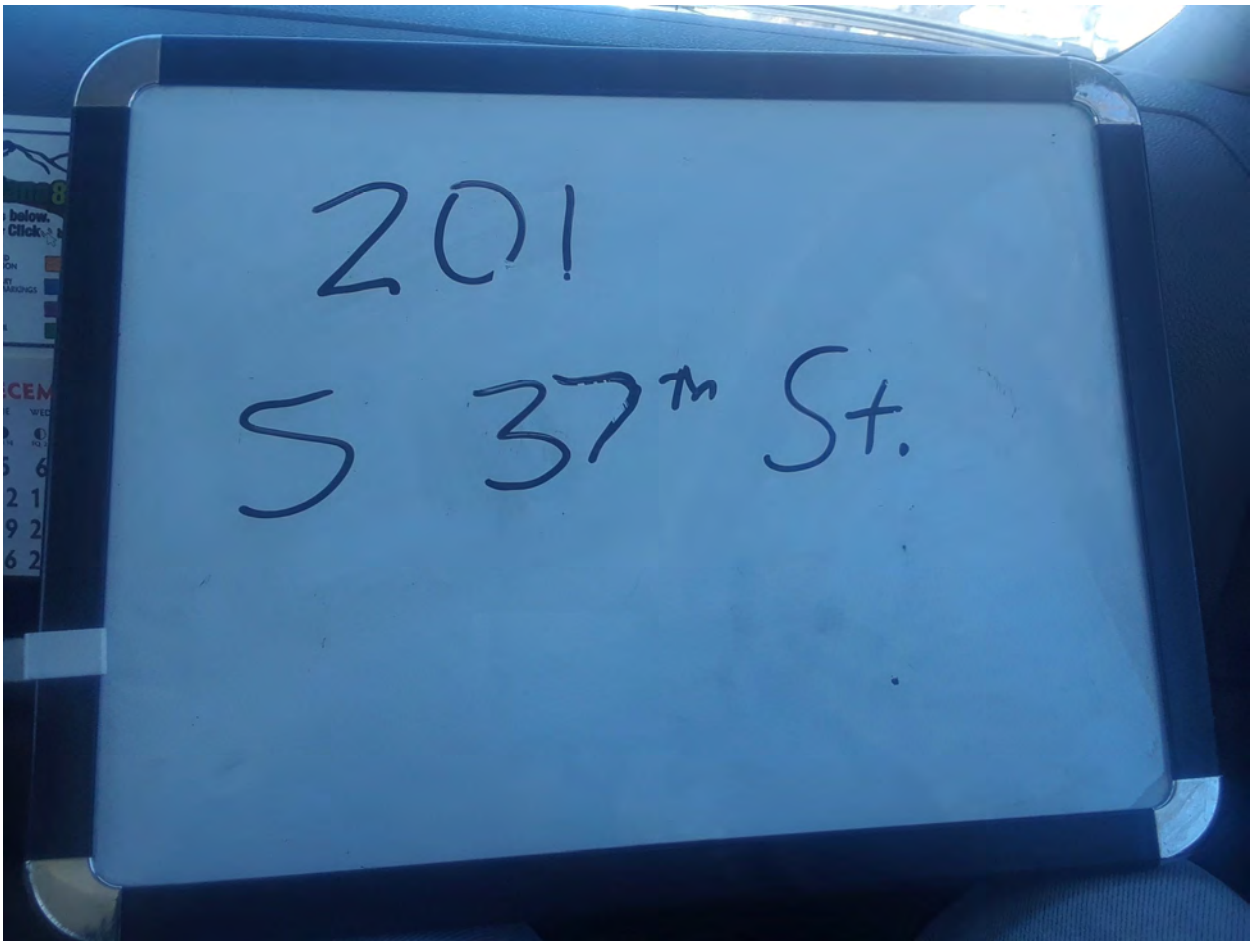


VI Sample: 201 S 37th St_Subslab

VI Sample: 201 S 37th St_Subslab



201 S 37th St



Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Karolyn Smith

Physical Address of property under investigation: 202 9th Street West Billings, MT

Mailing Address:

Phone (optional):

The following samples have been collected from this property:

Date	Media		Sample ID Number	Analysis to be performed
3/6/18	AIR	20180306-	202 9TH ST-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15
3/6/18	AIR	20180306-	202 9TH ST-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15
3/6/18	AIR	20180306-A (DUPLICATE OF -01 ABOVE).		Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15
3/7/18	AIR	20180307-	202 9TH ST-01	TO-15 TUBED C

*OTHER (specify analysis)

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☐ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.
- ☒ N/A

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☒ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

Signature

Printed Name: Syris Trahan

Telephone #: 307-745-7477

Date: 3/7/18

Property owner/operator copy = white DEQ copy = yellow

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	202 9th St. W.		
Project Name:	BPCE	PID (model/serial #):	Dielectric / R 11189
Sample location:	202 9th St. W.	Helium Detector (model/serial #):	ppb RAE 3000 / 12875
Date:	~~3/5/18~~ 3/7/18	Weather:	Sunny, SW 13 mph
Field Personnel:	BS, ST	Air Temp:	23°F
Recorded by:	BS	Atmospheric Pressure:	30.15 in Hg.

Slab Data

Surface/slab Type: Poured Concrete
Surface/slab Thickness (inches): 4"
Slab/subsurface substrate comments:
Depth of hole through the slab: 4 3/4"
Length of sampling train (feet): 4 1/2"

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 135

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
3/7/18	1100	50	26.1	26.6				
	1101	100	25.6	26.0				31.5
	1101	150	25.2	25.5				32.2
	1101	200	24.9	25.2				
	1102	250	24.5	24.8				
	1102	300	24.1	24.4				

Conversion: 1.0% = 10,000 ppm
At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

Max in tedlar = 0 ppb

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
~~3/7/18~~	1104	1142	20180307-202 9TH ST-01	3504	0685		28	5
3/7/18 ~~3/7/18~~	1104	1142	20180307-A	3422	1205		25.5	3

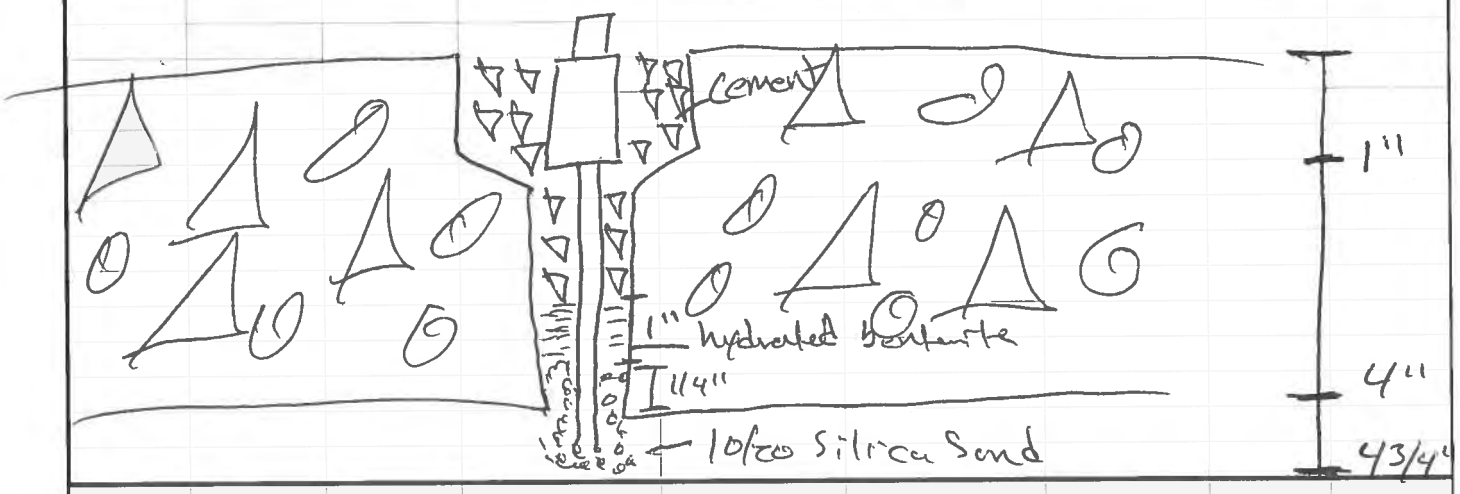
Comments:
Ambient air in basement - 0 ppb, 20.9%, 0 LEL, H_2S, CO.
Basement air - 226.8 ppm after 3 min, still climbing occasionally.
O2 - 16.7 LEL - 7% H_2S - 0 CO - 0

Sub-Slab Soil Vapor Sampling Field Data Sheet

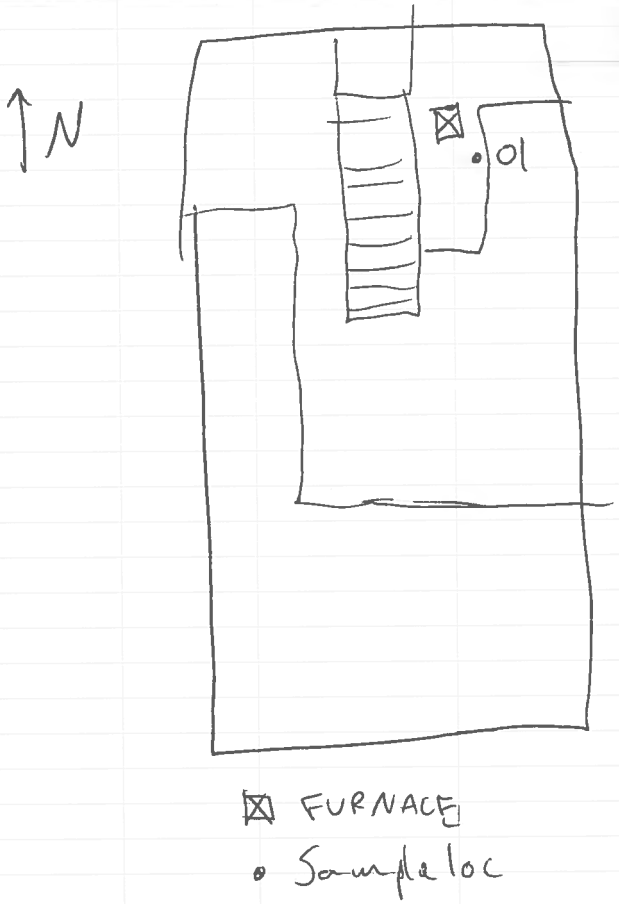
Project Name: BPCE
Date: 3/5/18

Sample Location/ ID: 202 9th St. W.

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.



Location Sketch:



Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	202 9th St. W.	Start Weather:	Clear, 15 mph SW
		Start Outdoor Air Temp:	36°F
Project Name:	BPCE	Start Atmospheric Pressure:	30.39"
Sample Location:	202 9th St. W.		
Date:	3/6/18	End Weather:	Clear SW 13 mph
Field Personnel:	BS, CD	End Outdoor Air Temp:	28°F
Recorded by:	BS	End Atmospheric Pressure:	30.15 inHg

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
3/6/18	1028	3/7/18	1032	20180306-2029thst-01	0531	1456		-27.5	2	70°F	70°F
3/6/18	1030	3/7/18	1033	20180306-2029thst-02	1658	0352		-24	0.5	70°F	70°F
3/6/18	1028	3/7/18	1032	20180306-A	2803	0758		-26	12.5	70°F	70°F

Comments:

01/A - Basement

02 - Main

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

Location Sketch:

Filled out by Trihydro from site visit & Cadastral SB

OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 2018

1. Name: Karolyn Smith.

   Address: 202 9th Street West

   Home Phone: _____ Work Phone: _____

2. What is the best time to call to speak with you? _____ At: Work ☐ or Home ☐ ?

3. Are you the Owner ☒, Renter ☐, Other ☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

4. Total number of occupants/persons at this location? 3 adults

   Number of Children — Ages —

5. How long have you lived at this location? unknown > 2008 according to Cadastral

General Home Description

6. Type of Home/Structure (check only one): Single Family Home ☒, Duplex ☐, Apartment ☐, Townhouse ☐ Other _____

7. Home/Structure Description:
   Number of floors: 1
   Basement ☒
   Crawlspace ☐
   Partial Crawlspace/Basement ☐ % of each _____
   Slab On Grade ☐
   Other ☐ _____

   Split level – walk in @ ½ floor above grade & living room/bedrooms ½ floor below grade

8. Age of Home/Structure: 63 years, Not Sure/Unknown ☐

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood ☒, Brick ☐, Concrete ☐, Cement block ☐, Other ☐ _____
   Garage: ☐ Attached ☒ Detached ☐ None

10. Foundation Construction (check all that apply):
    Concrete Slab ☒
    Fieldstone ☐
    Concrete Block ☐
    Elevated Above Ground/Grade ☐
    Other ☐ _____

11. Do you have Private Well ☐ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____

city water

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? city sewer
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☐

unknown

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☒ Unfinished ☐ Partially Finished ☐ Partial Crawlspace ☐?

15. If finished, how many rooms are in the basement? _____
What are rooms used for? Bedrooms ☒ Family Room ☒ Storage ☒
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐ unknown

17. Is the basement floor (check all that apply) Concrete ☒, Tile ☐, Carpeted ☒, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☒, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐ unknown
No ☐

Describe the moisture problem _____

20. Does the basement ever flood?

Yes, frequently (3 or more times/year) ☐

Yes, occasionally (1-2 times/year) ☐

Yes, rarely (less that 1 time/year) ☐ unknown

No ☐

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐,
Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe _____

none observed

22. Are any of the following used or stored in the basement (check all that apply):
- ☐ Paint
- ☐ Solvents (degreasers, paint thinner, etc.)
- ☐ Fuels/Oils (gasoline, diesel, used oil)
- ☐ Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- ☐ Pesticides

unknown

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☐ No ☐
If yes, specify what was done, where in the home, and what month: unknown

24. Have you installed new carpeting in your home within the last year? Yes ☐ No ☐
If yes, when and where? _____ unknown

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
No ☒

26. Does anyone in your home use solvents at work?
Yes ☐ If yes, how many persons?
No ☒ If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes ☐ No ☐
NA

28. Where is the washer/dryer located?
Basement ☒
Upstairs Utility Room ☐
Kitchen ☐
Garage ☐
Use a Laundromat ☐
Other, please specify ☐ _____

29. If you have a dryer, is it vented to the outdoors? Yes ☒ No ☐

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas ☒, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system:
- Forced Hot Air ☒
- Forced Hot Water ☐
- Steam ☐
- Radiant Floor Heat ☐
- Wood Stove ☐
- Coal Furnace ☐
- Fireplace ☐
- Other ☐ _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? unknown

How is/was the tank filled? _____

Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☒ No ☐
Central Air Conditioning ☒
Window Air Conditioning Unit(s) ☐
Other (please specify) _____

33. Do you use any of the following? Room Fans ☐, Ceiling Fans ☒, Attic Fan ☐

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐ unknown

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☐ Unknown ☐
If yes, please specify type of pest controlled _____
And approximate date of service unknown

36. Water heater type: Gas ☒, Electric ☐, by Furnace ☐,
Other (please describe) _____

37. Water heater location: Basement ☒, Upstairs Utility Room ☐, Garage ☐,
Other (please specify) _____

38. What type of cooking appliance do you have? Electric ☒, Gas ☐
Other (please describe) _____

39. Is there a stove exhaust hood present? Yes ☒ No ☐
Does it vent to the outdoors? Yes ☐ No ☐ unknown

40. Smoking in Home:
None ☒, Rare (only guests) ☐, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐ no odor

41. If yes to question 40, what is smoked?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐ NA

42. Do you regularly use air fresheners? Yes ☐ No ☐ unknown

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____
unknown

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation: _____
unknown

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

unknown

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

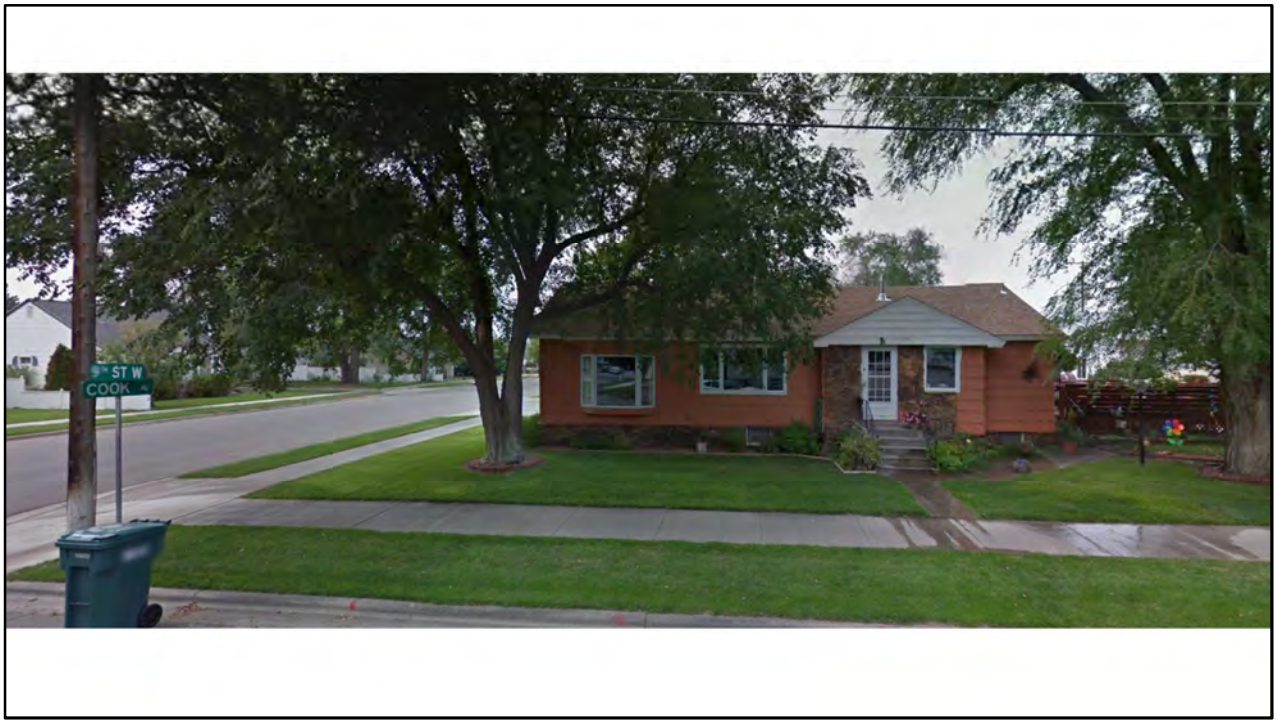
45. Please check weekly household cleaning practices:

- Dusting ☐
- Dry Sweeping ☐
- Vacuuming ☐
- Polishing (furniture, etc.) ☐
- Washing/Waxing Floors ☐
- Other (describe) ☐ _____

clean house appears to get regular cleaning

46. Other comments:

_____
_____
_____
_____
_____
_____
_____
_____
_____



ADDRESS: 202 9th Street, Billings MT

NOTES: OUTSIDE OF STRUCTURE - RESIDENTIAL

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

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Property Owner/Operator Information:

Name: Brenda

Physical Address of property under investigation: 202 S. 38th St. Billings MT

Mailing Address: _____

Phone (optional): _____

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/28/18	AIR	20180228-202538th St-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15
2/28/18	AIR	20180228-202538th St-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15
3/1/18	AIR	20180301-202538th St-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15, FIXED, CH_4

*OTHER (specify analysis) _____

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☒ Without variation, or
- ☐ With the following variation(s) from the plan:

_____

_____

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.
- ☒ NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☒ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason: _____

DEQ representative:

Signature: _____ Printed Name: Sue Trahan

Telephone #: 307-745-7474 Date: 3/6/18

Property owner/operator copy = white DEQ copy = yellow

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	202 S. 38th Street	Start Weather:	Sunny, Clear, WSW 9 mph
		Start Outdoor Air Temp:	37°F
Project Name:	MDEQ Billings PCE	Start Atmospheric Pressure:	30.02 in
Sample Location:	Basement & Main Floor		
Date:	02/28/2018 → 03/01/2018	End Weather:	Cloudy, N 6 mph
Field Personnel:	Joel Riebli & Jake Scott	End Outdoor Air Temp:	30°F
Recorded by:	Joel Riebli	End Atmospheric Pressure:	29.93 in

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
02/28/18	1712	03/01/18	1712	20180228-202S38ST-01	3476	FC 1401	—	-27.5	-2.8	~65°F	~65°F
02/28/18	1710	03/01/18	1710	20180228-202S38ST-02	3475	FC ØØØ4	—	-28.0 ~~-25.5~~	-2.8	~65°F	~65°F

Comments:

Shut down test (2 min)	3476	FC1401	-27.5	-27.5 Pass
	3475	FCØØ04	-27.5	-27.5 Pass

Indoor Air Sampling Field Data Sheet

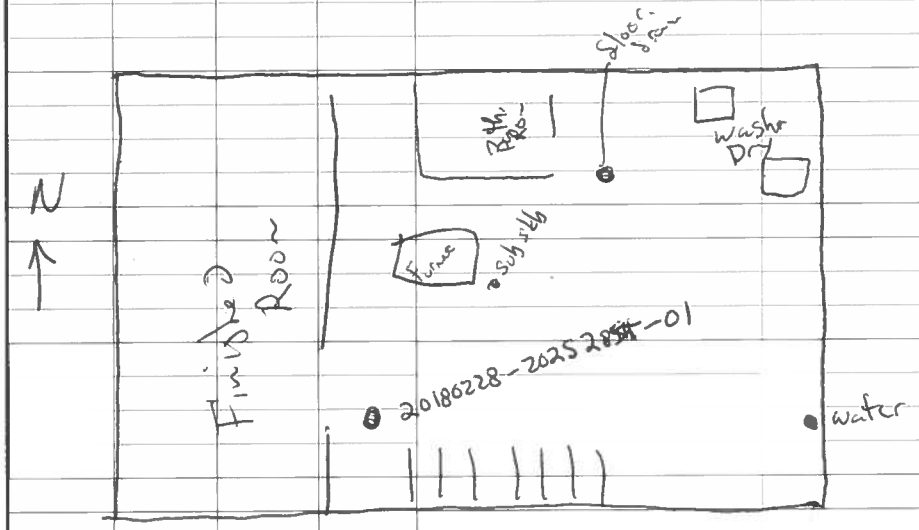
Description of Sample Locations (s): MDEQ Billings PCE 202 S. 38th Street

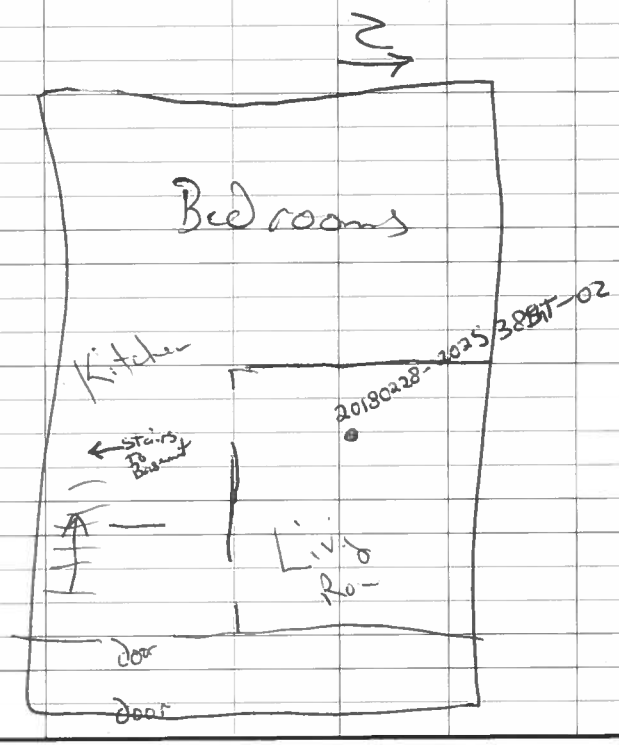
- 20180228-202S28ST-01 in Basement on chair with door open between the finished room and the main furnace room.

- 20180228-202S28ST-02 set summa canister on ~~chair~~ table in dining room of main floor.

- did not test the upper floor.

Location Sketch:





Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	202S 38th St	4 Gas :	QRAE2 / 152-M 1984
Project Name:	Billings VI Investigation	PID (model/serial #):	ppbRAE 3000 / 12875
Sample location:	Basement sub slab	Helium Detector (model/serial #):	Dialectic / 041554
Date:	03/01/2018	Weather:	Cloudy ; N 6mph
Field Personnel:	Joel Richli ; Jake Scott	Air Temp:	30°F
Recorded by:	Joel Richli	Atmospheric Pressure:	29.93 in

Slab Data

Surface/slab Type:	Poured Concrete	Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 120mL
Surface/slab Thickness (inches):	4 1/2"	
Slab/subsurface substrate comments:	Unknown substrate below concrete slab	
Depth of hole through the slab:	7 1/4"	
Length of sampling train (feet):	5" bgs → 4' total	

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
03/01/18	1721	100	22.7	23.2				
	1722	200	21.8	22.7				
	1722	300	21.2	21.8				
	1723	400	20.4	21.2				
	1724	500	21.9	22.1	Ø ppm	Ø ppb		

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
03/01/18	1726*	1922	20180301-202S38ST-01	1656	FC 1198	—	-27.5	-4.5

Comments:

		Initial	Final	
Leak test (2 min)	#1656	27.3 in	27.3	Pass

CO = 0 ppm H_2S = 0.0 ppm Oxy = 17.7 % LEL = 3 %

* ~~1800~~ – 1816 Canister valve turned off as we changed out helium Tanks.

– Highest He during under the shroud testing = 23.4 % He

Sub-Slab Soil Vapor Sampling Field Data Sheet

202 S. 38th Street

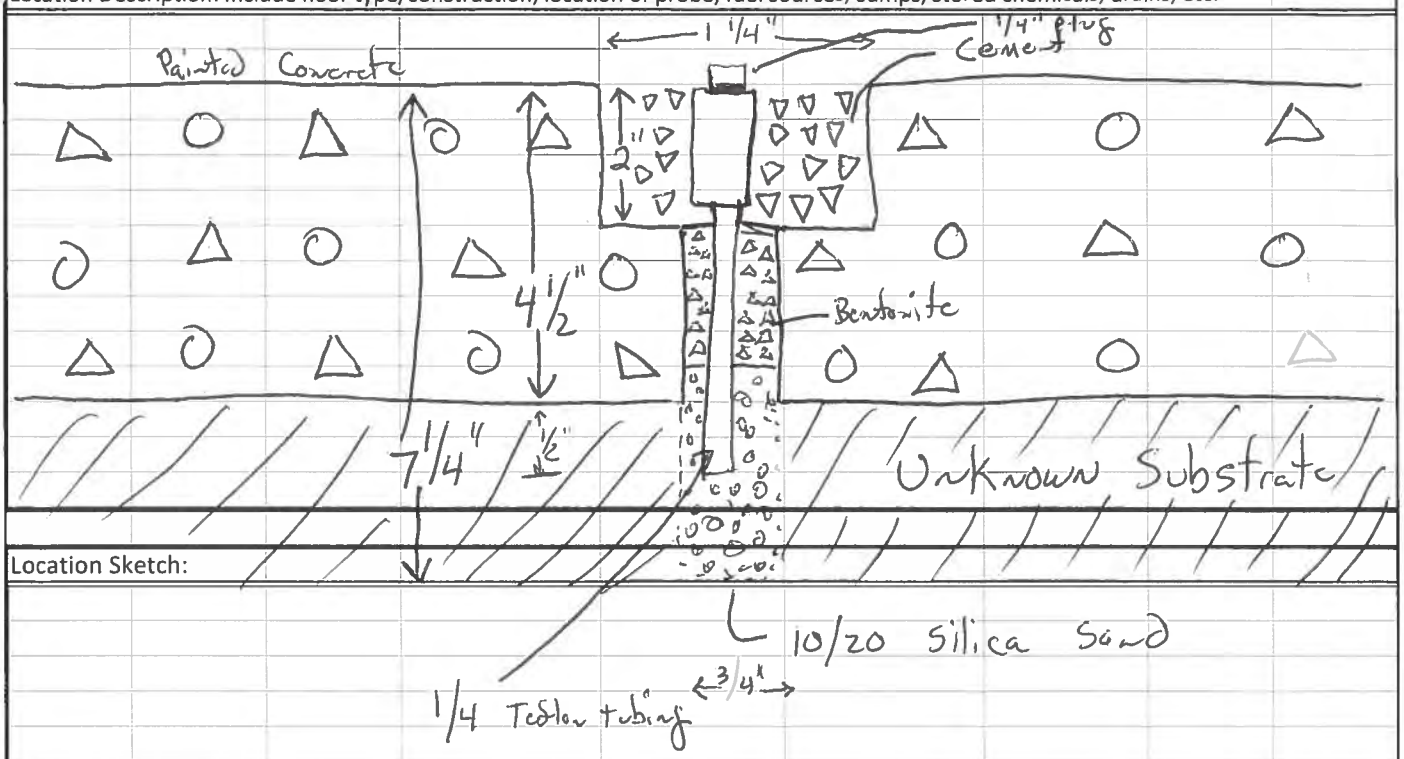
Project Name: MDEQ Billing PCE

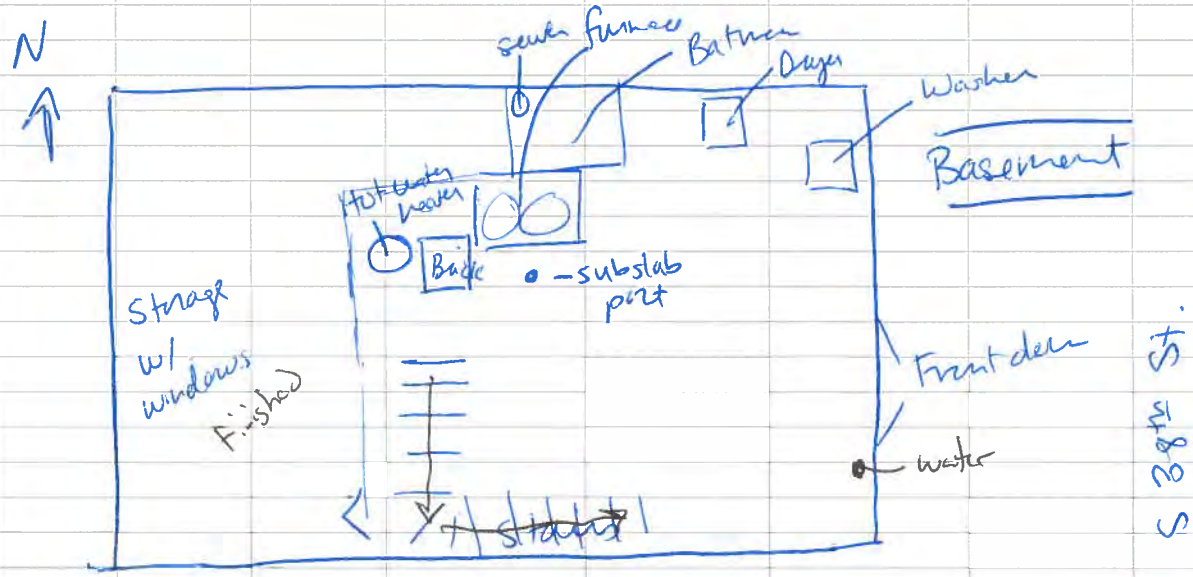
Sample Location/ ID: 20180301-202S38ST-01

Date:

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

Location Sketch:





Excavation, Drilling, and Utility-Locating Checklist

Task: Sub-slab install	Date	Initials
A. Excavation-site planning:		
1. The local One Call regulations have been checked for local utility-notification requirements (e.g., 48 hours vs. 72 hours).	2/27	JR
2. Per the local One Call regulations, list the responsible party (generally the excavation/drilling contractor) for requesting and verifying completion of utility locates below: Trihydro	2/27	JR
3. The property owner and/or business owner has been notified of the excavation schedule.	2/27	JR
4. Each proposed excavation site or "area of interest" has been delineated for utility-line locators using white spray paint and/or wooden stakes/lathes with white flagging.	NA	JR
5. Public-utility locates have been requested by calling One Call at least 48 hours (72 hours in some states) before work is scheduled to begin, and the request includes depths, as available.	2/27	JR
6. Each utility company has been notified of the excavation schedule and invited to review the proposed excavation sites.	2/27	JR
7. On-site meetings have been scheduled with the appropriate representatives of critical utility facilities (e.g., gas/oil pipelines, high-voltage cables, fiber-optic lines).	NA	JR
8. Private-utility locates—including fuel lines; tanks; and water, sewer, gas, electricity, and other utilities—have been requested.	NA	JR
9. The property owner was contacted to determine if he/she knows of privately owned subsurface facilities within 5 feet of the proposed excavation sites. (Review locations with the manager/owner.) Examples of privately owned facilities that are not commonly marked on private property include:	2/27	JR
a) Water and sewer laterals — Sewer North side Water East	2/27	JR
b) Gas lines — North	2/27	JR
c) Power lines (including those for landscape/yard lighting, pool and spa lines, and "out building" lines) — North	2/27	JR
d) Irrigation lines	NA	JR
e) Communication lines (cable, telephone, Internet)	2/27	JR
f) Propane tank lines	NA	JR
10. The proposed excavation sites have been reviewed by the appropriate stakeholders (e.g., owner, tenant, driller, excavator) and the Trihydro project manager.	2/27	JR
11. Proposed excavation sites have been visually inspected, and available plans and aerial photos have been reviewed for evidence of potential utilities.	NA	JR
12. A scaled site plan showing the proposed excavation sites relative to subsurface utilities has been prepared and is available for stakeholder/Management review.	NA	JR
13. The basis for each buried utility line's location and the accuracy of the data defining the utility location are documented on the site plan.	NA	JR
14. The proposed excavation sites are at least 5 feet from subsurface utilities shown on the building plans.	NA	JR
15. The proposed excavation sites are at least 5 feet from subsurface utilities shown on public right-of-way / street-improvement plans. [Note: Work with utility companies to determine if they require a representative present during excavation activities.]	2/27	JR
16. The proposed excavation sites are at least 7 feet from the pad surrounding underground storage tanks (USTs) shown on the building plans.	NA	JR
17. The utility-locate ticket number is available on site. 1800 50605	2/27	JR
18. A traffic-control plan has been prepared if appropriate. Note: If the project area encompasses a public street or right of way, the local and/or state authority must approve the traffic-control plan before fieldwork begins.	NA	JR
19. Arrangements have been made to contact the appropriate personnel if utility-line repairs are needed. (Who must be contacted if a line is unexpectedly damaged?)	2/27	JR
20. Contact information is in place and readily available with the driller, excavator, and other project stakeholders.	2/27	JR
21. The client and other relevant stakeholders (if any) have been notified of the excavation planning/pre-planning steps and results.	NA	JR
22. A detailed work scope was developed by the project team and reviewed by the Project Director and Contracting Team.	2/27	JR
Project Director (excavation-site planning tasks):		

202 S. 30th Street

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
B. Utility-line marking:		
1. Electrical circuits are energized during utility-line marking for subsurface power lines (e.g., circuits on timers or light-sensing switches).	2/27	JR
2. Public-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	2/27	JR
3. Private-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	NA	JR
4. Verify that One Call locators marked their facilities in the designated excavation area or provided notification that they do not have any facilities near the proposed excavation sites.	2/27	JR
5. One Call was contacted to request a "refresh" if utility-locate markings are missing, difficult to see, or more than 14 days old (7 days in some states). "Refresh" markings must be performed by the original marking organization.	NA	JR
Project Director (utility-line marking tasks):		
C. Job walk:		
1. Visual verification that each proposed excavation site does not lie on a line connecting two similar-looking manhole covers (e.g., sanitary sewers or storm drains). (Consider having the line snaked to confirm their locations.)	2/27	JR
2. Visual verification that each proposed excavation site does not lie on a line with any water, gas, electrical meters, utility cleanouts, or other utility boxes in the surrounding areas.	2/27	JR
3. Visual verification that the pavement near each proposed excavation site has not subsided or give the appearance it may be covering a previous excavation (e.g., linear cracks or sagging curbs).	2/27	JR
4. Visual verification that each proposed excavation has adequate overhead clearance for the excavation equipment (e.g., at least 10 feet from overhead-utility lines and/or reasonable distance from canopies).	2/27	JR
5. Fences and fields have been checked for markers, signs, posts, valves, stub outs, etc.	NA	JR
6. Surface structures such as tank batteries, wells, valves, phone pedestals, and electrical junction boxes have been checked for evidence of subsurface utilities.	NA	JR
7. Observed evidence of subsurface utilities has been photographed, sketched, or otherwise documented.	2/27	JR
8. Proposed excavation sites have been "walked"/reviewed by the excavation contractor, Trihydro project manager, and other stakeholders (e.g., client representative, property owner, tenant).	2/27	JR
9. Proposed excavation sites are located at least 5 feet from marked utilities (i.e., the "tolerance zone"), or written approval to excavate within the 5-foot tolerance zone has been obtained from the appropriate utility owner. In no case shall a proposed excavation be located closer than 2 feet from the outside edge of a marked utility. (Note: The tolerance zone is measured from the outside edge of a subsurface structure—not its centerline.)	2/27	JR
10. Verify that the excavation contractor (with help from appropriate utility-line locators, if part of the client-approved work scope) has walked each proposed excavation site to verify all expected utility-line markings are present.	2/27	JR
11. Traffic-control devices, safety barricades, caution tape, and other safety-management devices are in place as needed to protect project personnel.	NA	JR
Project Director (job-walk tasks):		
D. Daylighting / potholing / "soft digging":		
1. The proposed excavation sites located within the "tolerance zone" (and sites located outside the "tolerance zone" when required by the client) have been potholed to a depth below the anticipated utility zone using "minimally intrusive excavation methods" such as vacuum excavation (either air-entrainment or water-jet) and careful hand-tool use.	NA	JR
2. Monitoring and emergency equipment is available on site when hazardous atmospheres are expected to be encountered in the potholing excavations.	↓	↓
3. A list of emergency-contact names/numbers is maintained at the potholing excavation site.		
4. The project health and safety plan addresses potential hazards and safety-performance requirements related to utility-clearance operations.		
5. The location of and directions to the nearest hospital are known by all members of the project team.		
6. Representatives of utility owners that requested to be on site for utility locates are present.		

2022 S. 38th Street

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
7. Pothole excavations have been visually checked with a flashlight by the excavation contractor, Trihydro project manager, or her/his designee.	NA	JR
8. Utilities adjacent to the excavation or that cross the excavation have been daylighted using "minimally intrusive excavation methods."		
9. The areal extent of the excavation-clearance pothole has been verified to extend at least 120% beyond the outside diameter of the largest-diameter down-hole tool to be used in the borehole, or at least 2 feet on each side of daylighted/exposed lines, whichever is greater.		
10. If vacuum excavation (e.g., air knife, air vac, hydro-vac) is not available to daylight utility lines, verify that the non-conductive probe method was used as follows: Scratch the ground no more than 10 inches deep above the utility and then probe the scratched area. If the utility isn't found in the scratched area, repeat the first step until the utility is located. Once the utility is found, its depth must be continually verified with the probe until 2 feet of soil remain above the utility. Carefully hand dig the remaining overburden to expose the utility.		
11. The soil encountered in the excavation-clearance pothole has been verified to be free of bedding material (e.g., clean gravel, clean sand, aggregate base [gravelly sand with ~10% fines], or other non-native-looking material) that could indicate the presence of a previously installed utility line.		
12. Excavation work within 2 feet of an underground utility was "hand dug."		
13. Once the utility lines were exposed and the excavations were safe to enter, the exposed lines (including their protective coating) was examined for damage.		
14. The condition of each utility line exposed during daylighting was documented, and the documentation was forwarded to the Trihydro project manager to place in the project file.		
15. If a utility line was damaged in any way, it was reported to the utility owner and Trihydro project manager and documented in the project file.		
16. Damage to a utility line was documented and repaired before it was reburied. The utility owner signed off on the repairs.		
17. Employees entering the excavation followed the procedures described in the Trihydro "Trenching and Excavation Program" and used the Trihydro "Daily Excavation/Trench Inspection Report" to document excavation condition.		
18. The location of daylighted utilities was documented and photographed after daylighting was completed and before the pothole excavation was backfilled.		
19. Locations for hand digging within the "tolerance zone" were noted.		
Project Director (daylighting/potholing tasks):		
E. Excavation (including drilling):		
1. The appropriate permits have been obtained for the work (e.g., hot-work permits, entry permits).	NA	JR
2. The utility-owner and/or agency representatives that requested to be on site during excavation work are present. (Trihydro Utility Locate Acknowledgement Form)	NA	JR
3. A safety kickoff meeting was conducted with the excavation contractor to review roles/responsibilities, work activities, anticipated hazards, this checklist, and emergency-response procedures before starting excavation work the site. The safety kickoff meeting was documented in the project file.	2/27	JR
4. A daily tailgate safety meeting was conducted and documented in the project file. Verify weather conditions, safety hazards, PPE requirements, job duties, communication, hand signals, etc.	2/27	JR
5. JSAs covering the work to be done are in place and have been reviewed, "marked up" where appropriate, and acknowledged by the excavation project-team members.	2/27	JR
6. Site workers have been reminded to look for hazardous conditions, processes, and activities, and that they are authorized to stop work if they see an unsafe condition.	2/27	JR
7. The emergency-response plan has been reviewed by all excavation project-team members (e.g., contact numbers, evacuation muster points, hospital routes).	2/27	JR
8. The excavation contractor has checked the excavation sites relative to overhead utilities, subsurface-utility locates, and adjacent surface structures.	2/27	JR
9. The excavation contractor has acknowledged the potential location of each subsurface utility marked in the excavation areas.	2/27	JR
10. Proper ~~traffic~~ control and exclusion zones have been established.	NA	JR
11. The excavation equipment (e.g., drill rig, backhoe) has been inspected for proper operation and condition.	2/27	JR
12. Emergency equipment (fire extinguisher, first aid kit, emergency shut-off switch, etc.) has been checked, is readily available, and is in working order.	2/27	JR
13. Excavation project-team members are wearing appropriate PPE per the Trihydro HASP and client/site-specific requirements.	2/27	JR
14. Power in the excavation area has been de-energized, if possible. If power cannot be de-energized, the excavation contractor was advised of the hazard.	NO	JR

202 S. 38th Street

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
Project Director (excavation/drilling tasks):		
F. If an unmarked utility line is discovered:		
1. Verify the One Call utility-locate request was made correctly.	2/27	JR
2. Identify the owner/operator of the unmarked utility line and contact One Call (dial "811") to request a "No Response" ticket. If the owner/operator fails to respond again, seek a third-party locating service to mark the utility before: a) excavation work begins, or b) advancing the excavation further.	NA	JR
3. Contact the owner/operator of non-locatable utilities to request they be taken out of service before excavation begins.	NA	JR
4. If possible, a representative of the unmarked utility line should be on site when the unmarked utility is daylighted.	NA	JR
Project Director (unmarked utility line tasks):		

Note:

-- If an item doesn't apply, please insert an "NA" in the "**Date**" column and provide an explanation in the "**Project Notes**" section below.

Sarah for Andrew Vann	Joel, Sarah, Jake	2/27/18
Project Manager	Field Manager / Team Members	Date Reviewed
MDEQ / Billings PCE / 202 S. 38th Street	Trihydro	
Client / Project Name / Location	Excavator/Driller Name	Date Action Items Completed

Project Notes: [Please cross reference to the appropriate checklist-item number[s] when possible.]

202 S. 38th Street

OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 2/28/18 Filled out by S. Seitz

1. Name: Brenda

   Address:
   202 S 38th St.
   Billings, MT

   Home Phone: _____ Work Phone: _____

2. What is the best time to call to speak with you? — At: Work ☐ or Home ☐ ?

3. Are you the Owner ☑, Renter ☐, Other ☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

4. Total number of occupants/persons at this location? 2 adults
   Number of Children — Ages —

5. How long have you lived at this location? _____

General Home Description

6. Type of Home/Structure (check only one): Single Family Home ☑, Duplex ☐, Apartment ☐, Townhouse ☐ Other _____

7. Home/Structure Description:
   Number of floors: 2 main & second
   Basement ☑
   Crawlspace ☐
   Partial Crawlspace/Basement ☐ % of each _____
   Slab On Grade ☐
   Other ☐ _____

8. Age of Home/Structure: _____ years, Not Sure/Unknown ☐

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood ☑, Brick ☐, Concrete ☐, Cement block ☐, Other ☐ _____
   Garage: ☐ Attached ☐ Detached ☐ None

10. Foundation Construction (check all that apply):
    Concrete Slab ☑
    Fieldstone ☐
    Concrete Block ☐
    Elevated Above Ground/Grade ☐
    Other ☐ _____

11. Do you have Private Well ☐ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____
NO

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? city water city sewer
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☒

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☐ Unfinished ☐ Partially Finished ☒ Partial Crawlspace ☐?

15. If finished, how many rooms are in the basement? 1 Room w/windows & bathroom
What are rooms used for? Bedrooms ☐ Family Room ☐ Storage ☒
Other Bathroom

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☒

17. Is the basement floor (check all that apply) Concrete ☒, Tile ☐, Carpeted ☒, Dirt ☐,
Other ☒ linolem in bathroom

18. Are the basement walls Poured Concrete ☒, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☒

Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☒

21. Does the basement have any of the following? Floor Cracks ☒, Wall Cracks ☐, Sump ☐,
Floor Drain ☒, Other Hole/Opening In Floor ☐
Describe _____
patted concrete, no huge cracks

22. Are any of the following used or stored in the basement (check all that apply):
- ☐ Paint
- ☐ Solvents (degreasers, paint thinner, etc.)
- ☐ Fuels/Oils (gasoline, diesel, used oil)
- ☐ Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- ☐ Pesticides

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☐ No ☒
If yes, specify what was done, where in the home, and what month:

24. Have you installed new carpeting in your home within the last year? Yes ☐ No ☒
If yes, when and where? _____

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
No ☒

26. Does anyone in your home use solvents at work?
Yes ☐ If yes, how many persons?
No ☒ If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes ~~☐~~ N/A No ☐

28. Where is the washer/dryer located?
Basement ☒
Upstairs Utility Room ☐
Kitchen ☐
Garage ☐
Use a Laundromat ☐
Other, please specify ☐ _____

29. If you have a dryer, is it vented to the outdoors? Yes ☒ No ☐

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas ☒, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system:
- Forced Hot Air ☒
- Forced Hot Water ☐
- Steam ☐
- Radiant Floor Heat ☐
- Wood Stove ☐
- Coal Furnace ☐
- Fireplace ☐
- Other ☐ _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? unknown
How is/was the tank filled? likely not
Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☐ No ☐
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☐
Other (please specify) _____

33. Do you use any of the following? Room Fans ☐, Ceiling Fans ☐, Attic Fan ☐

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☐ Unknown ☐
If yes, please specify type of pest controlled _____
And approximate date of service _____

36. Water heater type: Gas ☒, Electric ☐, by Furnace ☐,
Other (please describe) _____

37. Water heater location: Basement ☒, Upstairs Utility Room ☐, Garage ☐,
Other (please specify) _____

38. What type of cooking appliance do you have? Electric ☐, Gas ☐
Other (please describe) _____

39. Is there a stove exhaust hood present? Yes ☐ No ☐
Does it vent to the outdoors? Yes ☐ No ☐

40. Smoking in Home:
None ☒, Rare (only guests) ☐, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐

41. If yes to question 40, what is smoked?
Cigarettes ☐ Cigars ☐ NA
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☐ No ☒

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation: _____
NO

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants } routine cleaning	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

45. Please check weekly household cleaning practices:

- Dusting ☐
- Dry Sweeping ☐
- Vacuuming ☐
- Polishing (furniture, etc.) ☐
- Washing/~~Waxing Floors~~ ☐
- Other (describe) ☐ _____

} regular cleaning

46. Other comments:

_____
_____
_____
_____
_____
_____
_____
_____
_____

47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

VI Sample: 202 S 38th St_Basement

VI Sample: 202 S 38th St_Subslab

VI Sample: 202 S 38th St_Subslab

VI Sample: 202 S 38th St_Basement

202 S 38th St

VI Sample: 202 S 38th St_Main

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Kim Macnamara

Physical Address of property under investigation: 209 Miles Ave, Billings MT

Mailing Address: 209 Miles Ave.

Phone (optional):

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/9/18	Indoor Air Main Floor	20180209-209MILES-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/9/18	Indoor Air Basement	20180209-209MILES-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/9/18	Crawlspace Air	20180209-209MILES-03	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/10/18	Sub slab Vapor	20180210-209MILES-01	VOCs (TO-15), APH, Fixed Gases, Helium

*OTHER (specify analysis) Indoor Air analyses: VOCs (TO-15), Petroleum (APH)

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☐ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

Signature: on behalf DEQ

Printed Name: S. SEITZ (TRIHYDRO)

Telephone #: 406-558-4850

Date: 2/10/18

*Property owner/operator copy = white DEQ copy = yellow

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	209 Miles Ave, Billings MT		
Project Name:	MT DEQ Billing ~~AATPCE~~	PID (model/serial #):	
Sample location:	Basement Subslab	Helium Detector (model/serial #):	
Date:	2/10/18	Weather:	Sunny w/fresh snow
Field Personnel:	ST/MO	Air Temp:	10
Recorded by:	MO	Atmospheric Pressure:	30.3

Slab Data

Surface/slab Type:	Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft =
Surface/slab Thickness (inches):	
Slab/subsurface substrate comments:	
Depth of hole through the slab:	
Length of sampling train (feet):	

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
2/10/18	0951	50	25.2	25.7				
	0952	100	23.9	24.4				
	0952	150	23.3	23.7				
	0953	200	22.5	23.0				
	0953	250	21.9	22.1				

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

	0954	300	21.3	21.7	0 ppm			

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
2/10/18	0955	1033	20180210-209MILES-01	3405	0623		-26.5	-3.5

Comments: 4-gas

O2 20.9

others 0

PID 1003 ppb

Sub-Slab Soil Vapor Sampling Field Data Sheet

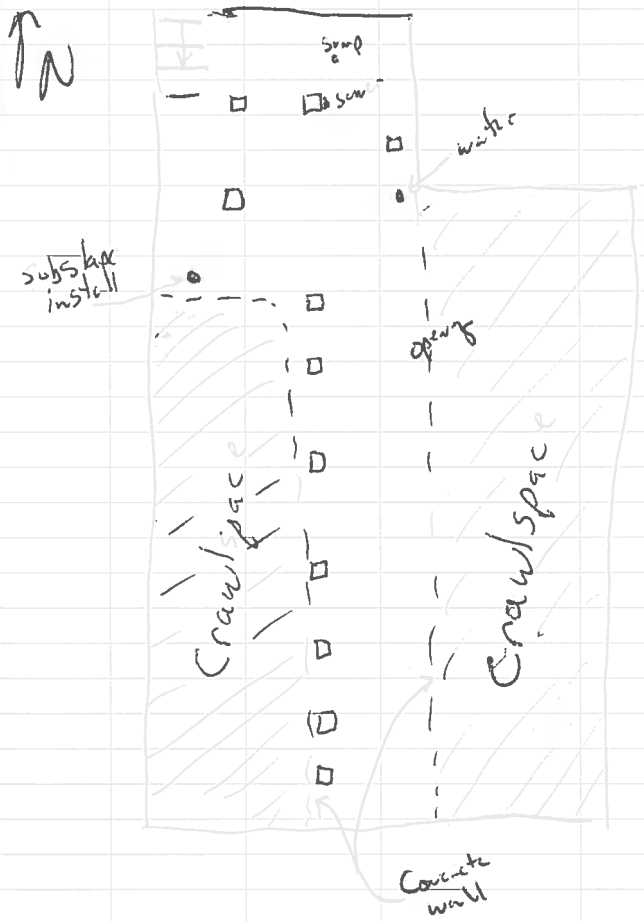
Project Name: MT DEQ Billings PCE Sample Location/ ID: 209 Miles Ave
Date: 02/07/2018

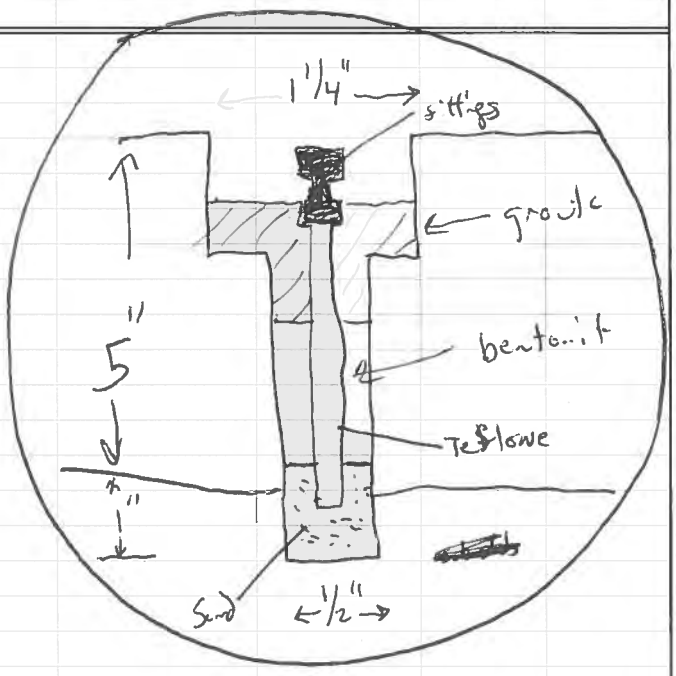
Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

Concrete floor (5" Thick), cracked in multiple locations. Concrete walls and concrete walked area with open crawlspace installed subslab locations directly south of the basement stairs at the base of the concrete wall sorrig the crawl space. No chemicals noted in basement. does have a sump in the northeast corner.

Concrete slab 5" thick, drilled 1/2" down to 6" bgs. Added sand, teflon, hydrated bentonite and capped with grout

Location Sketch:





Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	209 Miles	Start Weather:	Sunny, snow ending
		Start Outdoor Air Temp:	6
Project Name:	DCE Billings	Start Atmospheric Pressure:	30.5
Sample Location:			
Date:	2/9/18	End Weather:	Sunny
Field Personnel:	SS/MO	End Outdoor Air Temp:	-5 °F
Recorded by:	MO	End Atmospheric Pressure:	30.3

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
2/9/18	1028	2/10/18	0938	20180209-209MILES-01	1122	1024		-26.5	-2	68	68
2/9/18	1020	2/10/18	0936	20180209-209MILES-02	2815	0138		-28	-0.5	60	60
2/9/18	1022	2/10/18	0939	20180209-209MILES-03	3423	0210		-27.5	-3.1	60	60

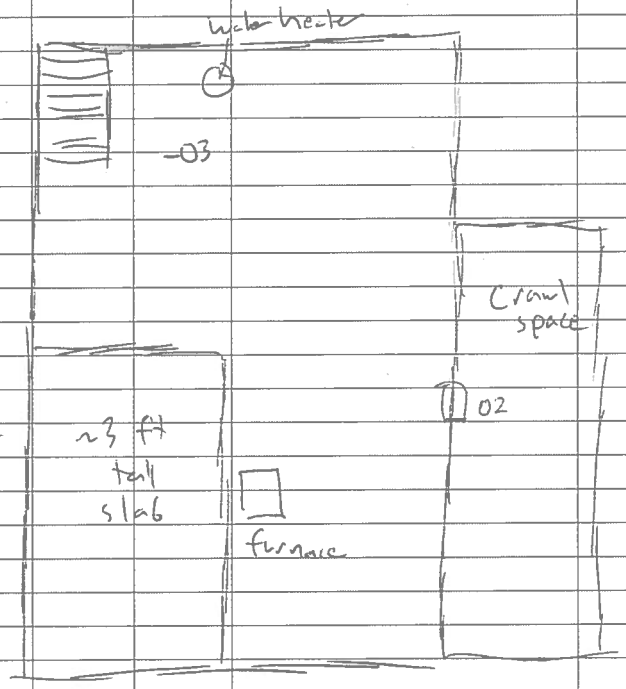
Comments:

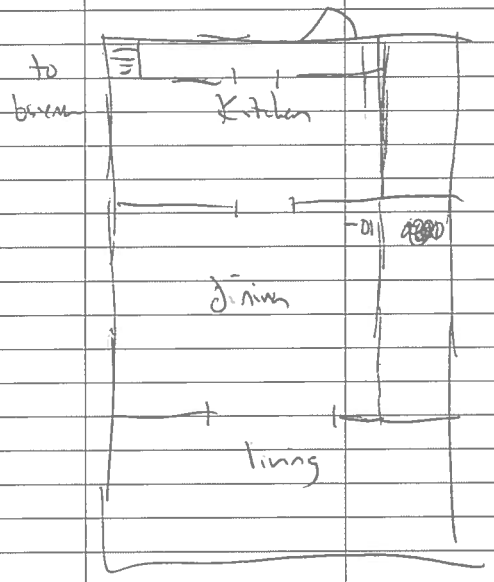
01 - indoor / dining area
02 - crawlspace
03 - basement

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

Location Sketch:





OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 2/2/2018

1. Name: Kim Macnamara

   Address:
   209 Miles
   Billings, MT

   Home Phone: _____ Work Phone: _____

2. What is the best time to call to speak with you? _____ At: Work☐ or Home☐ ?

3. Are you the Owner☑, Renter☐, Other☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

4. Total number of occupants/persons at this location? 1
   Number of Children _____ Ages adult

5. How long have you lived at this location? Since 1999

General Home Description

6. Type of Home/Structure (check only one): Single Family Home☑, Duplex☐, Apartment☐, Townhouse☐ Other _____

7. Home/Structure Description:
   Number of floors: 1 main (basement - former cellar w/ some crawlspace under addition
   Basement☐
   Crawlspace☐
   Partial Crawlspace/Basement☑ % of each _____
   Slab On Grade☐
   Other☐ _____

8. Age of Home/Structure: sometime 1920s years, Not Sure/Unknown☑

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood☑, Brick☐, Concrete☐, Cement block☐, Other☐ _____
   Garage: ☐Attached ☑Detached ☐None

10. Foundation Construction (check all that apply):
    Concrete Slab☑ under basement, some
    Fieldstone☐
    Concrete Block☐
    Elevated Above Ground/Grade☐
    Other☐ _____

11. Do you have Private Well ☑ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____
used to be - dry now - not used

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____ city water | city sewer
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☐

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☐ Unfinished ☐ Partially Finished ☐ Partial Crawlspace ☐?

15. If finished, how many rooms are in the basement? _____
What are rooms used for? Bedrooms ☐ Family Room ☐ Storage ☐
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐

17. Is the basement floor (check all that apply) Concrete ☐, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☐, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☑

Describe the moisture problem used to have problem but fixed w/ new slab concrete away from house

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☑

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐,
Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe _____

22. Are any of the following used or stored in the basement (check all that apply):
☐ Paint N
☐ Solvents (degreasers, paint thinner, etc.) N
☐ Fuels/Oils (gasoline, diesel, used oil) N
☐ Other Cleaners (drain cleaners, laundry spot treatment, other solvents) N
☐ Pesticides N
Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☐ No ☒
If yes, specify what was done, where in the home, and what month:
Some painting on main floor 1½ yrs ago

24. Have you installed new carpeting in your home within the last year? Yes ☐ No ☒
If yes, when and where? _____

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
No ☒

26. Does anyone in your home use solvents at work?
Yes ☐ If yes, how many persons?
No ☒ If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes ☐ No ☐ N/A

28. Where is the washer/dryer located?
Basement ☐
Upstairs Utility Room ☒
Kitchen ☐
Garage ☐
Use a Laundromat ☐
Other, please specify ☐ _____

29. If you have a dryer, is it vented to the outdoors? Yes ☒ No ☐

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas ☒, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system:
Forced Hot Air ☒
Forced Hot Water ☐
Steam ☐
Radiant Floor Heat ☐
Wood Stove ☐
Coal Furnace ☐
Fireplace ☐
Other ☐ _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? NO
How is/was the tank filled?
Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☒ No ☐
Central Air Conditioning ☒
Window Air Conditioning Unit(s) ☐
Other (please specify) Seldom used

33. Do you use any of the following? Room Fans ☐, Ceiling Fans ☒, Attic Fan ☒

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☒

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☒ Unknown ☐
If yes, please specify type of pest controlled
And approximate date of service

36. Water heater type: Gas ☒, Electric ☐, by Furnace ☐,
Other (please describe)

37. Water heater location: Basement ☒, Upstairs Utility Room ☐, Garage ☐,
Other (please specify)

38. What type of cooking appliance do you have? Electric ☐, Gas ☒
Other (please describe)

39. Is there a stove exhaust hood present? Yes ☒ No ☐
Does it vent to the outdoors? Yes ☐ No ☐ unknown

40. Smoking in Home:
None ☒, Rare (only guests) ☐, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐

41. If yes to question 40, what is smoked?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☐ No ☒

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐
NO - refinished much of woodwork in house, years ago

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation:
NO

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
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Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

45. Please check weekly household cleaning practices:

Dusting ☐

Dry Sweeping ☐

Vacuuming ☐

Polishing (furniture, etc.) ☐

Washing/Waxing Floors ☐

Other (describe) ☑ routine cleaning - swifter

46. Other comments:

Cleaning supplies - kept on main floor in laundry room & some @ top of root cellar/basement

47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

Excavation, Drilling, and Utility-Locating Checklist 209 Miles Ave

Task	Date	Initials
A. Excavation-site planning:		
1. The local One Call regulations have been checked for local utility-notification requirements (e.g., 48 hours vs. 72 hours).	02/07/18	JR
2. Per the local One Call regulations, list the responsible party (generally the excavation/drilling contractor) for requesting and verifying completion of utility locates below: Trihydro	02/07/18	JR
3. The property owner and/or business owner has been notified of the excavation schedule.	02/07/18	JR
4. Each proposed excavation site or "area of interest" has been delineated for utility-line locators using white spray paint and/or wooden stakes/lathes with white flagging.	—	—
5. Public-utility locates have been requested by calling One Call at least 48 hours (72 hours in some states) before work is scheduled to begin, and the request includes depths, as available.	02/08/18	JR
6. Each utility company has been notified of the excavation schedule and invited to review the proposed excavation sites.	02/09/18	JR
7. On-site meetings have been scheduled with the appropriate representatives of critical utility facilities (e.g., gas/oil pipelines, high-voltage cables, fiber-optic lines).	—	—
8. Private-utility locates—including fuel lines; tanks; and water, sewer, gas, electricity, and other utilities—have been requested.	—	—
9. The property owner was contacted to determine if he/she knows of privately owned subsurface facilities within 5 feet of the proposed excavation sites. (Review locations with the manager/owner.) Examples of privately owned facilities that are not commonly marked on private property include:	02/07/18	JR
a) Water and sewer laterals — water front / sewer back	02/07/18	JR
b) Gas lines — ~~Back~~ front	02/07/18	JR
c) Power lines (including those for landscape/yard lighting, pool and spa lines, and "out building" lines) — Back	02/07/18	JR
d) Irrigation lines	—	—
e) Communication lines (cable, telephone, Internet) — Back	02/07/18	JR
f) Propane tank lines	—	—
10. The proposed excavation sites have been reviewed by the appropriate stakeholders (e.g., owner, tenant, driller, excavator) and the Trihydro project manager.	02/07/18	JR
11. Proposed excavation sites have been visually inspected, and available plans and aerial photos have been reviewed for evidence of potential utilities.	02/07/18	JR
12. A scaled site plan showing the proposed excavation sites relative to subsurface utilities has been prepared and is available for stakeholder/Management review.	—	—
13. The basis for each buried utility line's location and the accuracy of the data defining the utility location are documented on the site plan.	—	—
14. The proposed excavation sites are at least 5 feet from subsurface utilities shown on the building plans.	~~02/07/18~~	—
15. The proposed excavation sites are at least 5 feet from subsurface utilities shown on public right-of-way / street-improvement plans. [Note: Work with utility companies to determine if they require a representative present during excavation activities.]	—	—
16. The proposed excavation sites are at least 7 feet from the pad surrounding underground storage tanks (USTs) shown on the building plans.	—	—
17. The utility-locate ticket number is available on site.	02/07/18	JR
18. A traffic-control plan has been prepared if appropriate. Note: If the project area encompasses a public street or right of way, the local and/or state authority must approve the traffic-control plan before fieldwork begins.	—	—
19. Arrangements have been made to contact the appropriate personnel if utility-line repairs are needed. (Who must be contacted if a line is unexpectedly damaged?)	02/07/18	JR
20. Contact information is in place and readily available with the driller, excavator, and other project stakeholders.	02/07/18	JR
21. The client and other relevant stakeholders (if any) have been notified of the excavation planning/pre-planning steps and results.	02/07/18	JR
22. A detailed work scope was developed by the project team and reviewed by the Project Director and Contracting Team.	—	—
Project Director (excavation-site planning tasks):		

209 Miles Ave.

209 Miles Ave

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
B. Utility-line marking:		
1. Electrical circuits are energized during utility-line marking for subsurface power lines (e.g., circuits on timers or light-sensing switches).	02/05/18	JR
2. Public-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	02/05/18	JR
3. Private-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	—	—
4. Verify that One Call locators marked their facilities in the designated excavation area or provided notification that they do not have any facilities near the proposed excavation sites.	02/07/18	JR
5. One Call was contacted to request a "refresh" if utility-locate markings are missing, difficult to see, or more than 14 days old (7 days in some states). "Refresh" markings must be performed by the original marking organization.	—	—
Project Director (utility-line marking tasks):		
C. Job walk:		
1. Visual verification that each proposed excavation site does not lie on a line connecting two similar-looking manhole covers (e.g., sanitary sewers or storm drains). (Consider having the line snaked to confirm their locations.)	02/07/18	JR
2. Visual verification that each proposed excavation site does not lie on a line with any water, gas, electrical meters, utility cleanouts, or other utility boxes in the surrounding areas.	02/07/18	JR
3. Visual verification that the pavement near each proposed excavation site has not subsided or give the appearance it may be covering a previous excavation (e.g., linear cracks or sagging curbs).	02/07/18	JR
4. Visual verification that each proposed excavation has adequate overhead clearance for the excavation equipment (e.g., at least 10 feet from overhead-utility lines and/or reasonable distance from canopies).	02/07/18	JR
5. Fences and fields have been checked for markers, signs, posts, valves, stub outs, etc.	02/07/18	JR
6. Surface structures such as tank batteries, wells, valves, phone pedestals, and electrical junction boxes have been checked for evidence of subsurface utilities.	—	—
7. Observed evidence of subsurface utilities has been photographed, sketched, or otherwise documented.	02/07/18	JR
8. Proposed excavation sites have been "walked"/reviewed by the excavation contractor, Trihydro project manager, and other stakeholders (e.g., client representative, property owner, tenant).	02/07/18	JR
9. Proposed excavation sites are located at least 5 feet from marked utilities (i.e., the "tolerance zone"), or written approval to excavate within the 5-foot tolerance zone has been obtained from the appropriate utility owner. In no case shall a proposed excavation be located closer than 2 feet from the outside edge of a marked utility. (Note: The tolerance zone is measured from the outside edge of a subsurface structure—not its centerline.)	02/07/18	JR
10. Verify that the excavation contractor (with help from appropriate utility-line locators, if part of the client-approved work scope) has walked each proposed excavation site to verify all expected utility-line markings are present.	02/07/18	JR
11. Traffic-control devices, safety barricades, caution tape, and other safety-management devices are in place as needed to protect project personnel.	—	—
Project Director (job-walk tasks):		
D. Daylighting / potholing / "soft digging":		
1. The proposed excavation sites located within the "tolerance zone" (and sites located outside the "tolerance zone" when required by the client) have been potholed to a depth below the anticipated utility zone using "minimally intrusive excavation methods" such as vacuum excavation (either air-entrainment or water-jet) and careful hand-tool use.		
2. Monitoring and emergency equipment is available on site when hazardous atmospheres are expected to be encountered in the potholing excavations.		
3. A list of emergency-contact names/numbers is maintained at the potholing excavation site.		
4. The project health and safety plan addresses potential hazards and safety-performance requirements related to utility-clearance operations.		
5. The location of and directions to the nearest hospital are known by all members of the project team.		
6. Representatives of utility owners that requested to be on site for utility locates are present.		

209 Ave

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
7. Pothole excavations have been visually checked with a flashlight by the excavation contractor, Trihydro project manager, or her/his designee.		
8. Utilities adjacent to the excavation or that cross the excavation have been daylighted using "minimally intrusive excavation methods."		
9. The areal extent of the excavation-clearance pothole has been verified to extend at least 120% beyond the outside diameter of the largest-diameter down-hole tool to be used in the borehole, or at least 2 feet on each side of daylighted/exposed lines, whichever is greater.		
10. If vacuum excavation (e.g., air knife, air vac, hydro-vac) is not available to daylight utility lines, verify that the non-conductive probe method was used as follows: Scratch the ground no more than 10 inches deep above the utility and then probe the scratched area. If the utility isn't found in the scratched area, repeat the first step until the utility is located. Once the utility is found, its depth must be continually verified with the probe until 2 feet of soil remain above the utility. Carefully hand dig the remaining overburden to expose the utility.		
11. The soil encountered in the excavation-clearance pothole has been verified to be free of bedding material (e.g., clean gravel, clean sand, aggregate base [gravelly sand with ~10% fines], or other non-native-looking material) that could indicate the presence of a previously installed utility line.		
12. Excavation work within 2 feet of an underground utility was "hand dug."		
13. Once the utility lines were exposed and the excavations were safe to enter, the exposed lines (including their protective coating) was examined for damage.		
14. The condition of each utility line exposed during daylighting was documented, and the documentation was forwarded to the Trihydro project manager to place in the project file.		
15. If a utility line was damaged in any way, it was reported to the utility owner and Trihydro project manager and documented in the project file.		
16. Damage to a utility line was documented and repaired before it was reburied. The utility owner signed off on the repairs.		
17. Employees entering the excavation followed the procedures described in the Trihydro "Trenching and Excavation Program" and used the Trihydro "Daily Excavation/Trench Inspection Report" to document excavation condition.		
18. The location of daylighted utilities was documented and photographed after daylighting was completed and before the pothole excavation was backfilled.		
19. Locations for hand digging within the "tolerance zone" were noted.		
Project Director (daylighting/potholing tasks):		
E. Excavation (including drilling):		
1. The appropriate permits have been obtained for the work (e.g., hot-work permits, entry permits).	—	—
2. The utility-owner and/or agency representatives that requested to be on site during excavation work are present. (Trihydro Utility Locate Acknowledgement Form)	02	—
3. A safety kickoff meeting was conducted with the excavation contractor to review roles/responsibilities, work activities, anticipated hazards, this checklist, and emergency-response procedures before starting excavation work the site. The safety kickoff meeting was documented in the project file.	02/07/18	JR
4. A daily tailgate safety meeting was conducted and documented in the project file. Verify weather conditions, safety hazards, PPE requirements, job duties, communication, hand signals, etc.	02/07/18	JR
5. JSAs covering the work to be done are in place and have been reviewed, "marked up" where appropriate, and acknowledged by the excavation project-team members.	02/07/18	JR
6. Site workers have been reminded to look for hazardous conditions, processes, and activities, and that they are authorized to stop work if they see an unsafe condition.	02/07/18	JR
7. The emergency-response plan has been reviewed by all excavation project-team members (e.g., contact numbers, evacuation muster points, hospital routes).	02/07/18	JR
8. The excavation contractor has checked the excavation sites relative to overhead utilities, subsurface-utility locates, and adjacent surface structures.	02/07/18	JR
9. The excavation contractor has acknowledged the potential location of each subsurface utility marked in the excavation areas.	02/07/18	JR
10. Proper traffic control and exclusion zones have been established.	—	—
11. The excavation equipment (e.g., drill rig, backhoe) has been inspected for proper operation and condition.	02/07/18	JR
12. Emergency equipment (fire extinguisher, first aid kit, emergency shut-off switch, etc.) has been checked, is readily available, and is in working order.	02/07/18	JR
13. Excavation project-team members are wearing appropriate PPE per the Trihydro HASP and client/site-specific requirements.	02/07/18	JR
14. Power in the excavation area has been de-energized, if possible. If power cannot be de-energized, the excavation contractor was advised of the hazard.	—	—

209 Miles Ave

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
Project Director (excavation/drilling tasks):		
F. If an unmarked utility line is discovered:		
1. Verify the ~~One~~ Call utility-locate request was made correctly.	02/07/18	JR
2. Identify the owner/operator of the unmarked utility line and contact One Call (dial "811") to request a "No Response" ticket. If the owner/operator fails to respond again, seek a third-party locating service to mark the utility before: a) excavation work begins, or b) advancing the excavation further.	—	—
3. Contact the owner/operator of non-locatable utilities to request they be taken out of service before excavation begins.	—	—
4. If possible, a representative of the unmarked utility line should be on site when the unmarked utility is daylighted.	—	—
Project Director (unmarked utility line tasks):		

Note:

-- If an item doesn't apply, please insert an "NA" in the "**Date**" column and provide an explanation in the "**Project Notes**" section below.

Andrew Vann	Joel & Cameron	02/07/2018
Project Manager	Field Manager / Team Members	Date Reviewed
MT DEQ / Bill's PCE / 209 Miles Ave	Trihydro	
Client / Project Name / Location	Excavator/Driller Name	Date Action Items Completed

Project Notes: [Please cross reference to the appropriate checklist-item number[s] when possible.]

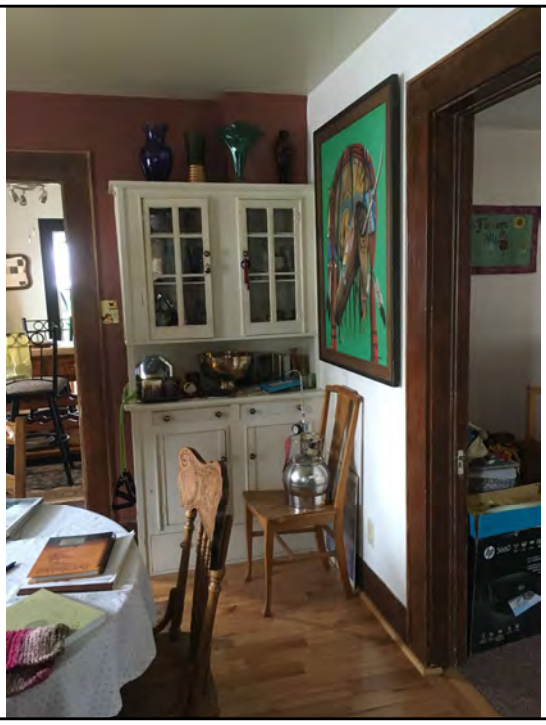
VI Sample: 209 Miles Ave_Subslab

VI Sample: 209 Miles Ave_Subslab

VI Sample: 209 Miles Ave_Subslab

VI Sample: 209 Miles Ave_Subslab

VI Sample: 209 Miles Ave_Subslab

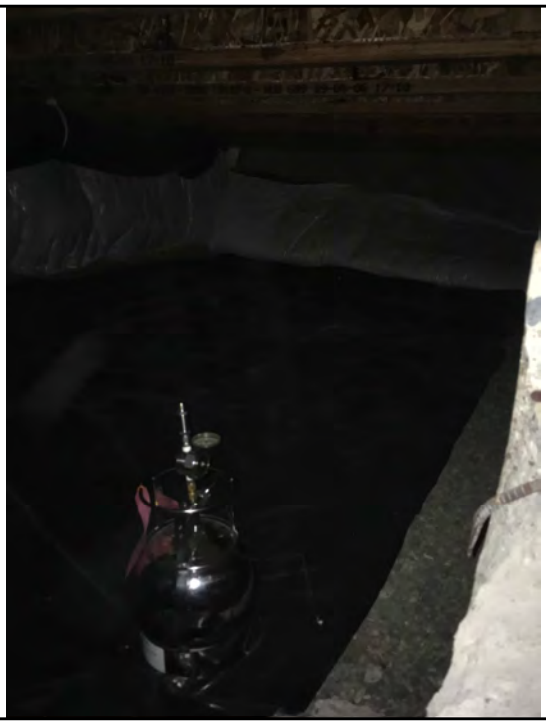


ADDRESS: 209 MILES AVE

NOTES:
INDOOR AIR MAIN FLOOR SAMPLE LOCATION

ADDRESS: 209 MILES AVE

NOTES:
INDOOR AIR BASEMENT SAMPLE LOCATION



ADDRESS: 209 MILES AVE

NOTES:
INDOOR AIR CRAWL SPACE (OPEN TO BASEMENT) SAMPLE LOCATION

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Patricia Crisp

Physical Address of property under investigation: 237 Wyoming

Mailing Address: Same

Phone (optional):

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
02/05/18	Indoor Air	20180205-237 WYOMING-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
02/05/18	Indoor Air	20180205-237 WYOMING-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
02/05/18	Indoor Air	20180205-237 WYOMING-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*

Analyzed

*OTHER (specify analysis) Also 2/5/18 20180205-C (Indoor Air Duplicate) and 2/6/18 20180206-237WYOMING-0 Crawl slab ai (TO-15 VOCs, A Petroleum, Fixe Gases, Hel

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample. NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

S/S on behalf DEQ — Signature

S SEITZ (Tr. Hydro) — Printed Name

Telephone #: 406-558-4850

Date: 2/6/18

Property owner/operator copy = white DEQ copy = yellow

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	Billings PCE GW Facility 776-036-001	Start Weather:	Cold, snowing, snow cover, wind ENE 7 mph
		Start Outdoor Air Temp:	14° F
Project Name:	VI Investigation	Start Atmospheric Pressure:	30.3 in Hg.
Sample Location:	237 Wyoming		
Date:	2/5/18	End Weather:	Cold, light snow, NE 11 mph
Field Personnel:	ST, MO, JK	End Outdoor Air Temp:	28°F
Recorded by:	ST	End Atmospheric Pressure:	30.3 in Hg

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
2/5/18	1442	2/6/18	1410	20180205-237WYOMING-01	PACE 2093	FC0377	—	-26.5	-3.5	68°F	68°F
2/5/18	1444	2/6/18	1412	20180205-237WYOMING-02	PACE 2187	FC0454	—	-27.5	-2	68°F	68°F
2/5/18	1439	2/6/18	1414	20180205-237WYOMING-03	PACE 2679	FC1355	—	-22.5	-0.5	68°F	68°F
2/5/18	1439	2/6/18	1410	20180205-C Duplicate for 20180205-237WYOMING-03	PACE 2653	FC0741	—	-27.5	-0.5	68°F	68°F

Comments:

237WY-01 located in crawlspace - All passed shut-in 2 min
237WY-02 located in basement - "
237WY-03 located on main floor - "
Duplicate passed 2 min shut-in

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	237 WYOMING		
Project Name:	Billings PCE	**PID (model/serial #):**	
Sample location:	Sub slab / closed	**Helium Detector (model/serial #):**	
Date:	2/6/18	**Weather:**	Overcast / snow
Field Personnel:	ST / Mo	**Air Temp:**	
Recorded by:	Mo	**Atmospheric Pressure:**	

Slab Data

Surface/slab Type:	Concrete	Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft =
Surface/slab Thickness (inches):	~~Unknown~~ 4 1/4"	
Slab/subsurface substrate comments:		
Depth of hole through the slab:	?	
Length of sampling train (feet):	5' (assumed) ~ 150 mL	

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	**Time**	**Cumulative volume purged (ml)**	**Helium Beneath Shroud (%) min**	**Helium Beneath Shroud (%) max**	**Helium in Probe (ppm or %)**	**PID reading in probe (ppb)**	**Helium Beneath Shroud (%) min**	**Helium Beneath Shroud (%) max**
2/6/18	15:35	50	22.8	23.0				
	:36	100	~~22.8~~ 22.6	22.7				
	:36	150	22.3	22.5				
	:37	200	21.7	22.0				
	:37	250	21.1	21.5				
	15:38	300	20.4	20.8	0			

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
2/6/18	1540	1620	20180206-237 WYOMING-01	2805	FC1182		27.5	3.9

Comments:

PID 0

4-gas O_2 = 19.9

other 0

2805

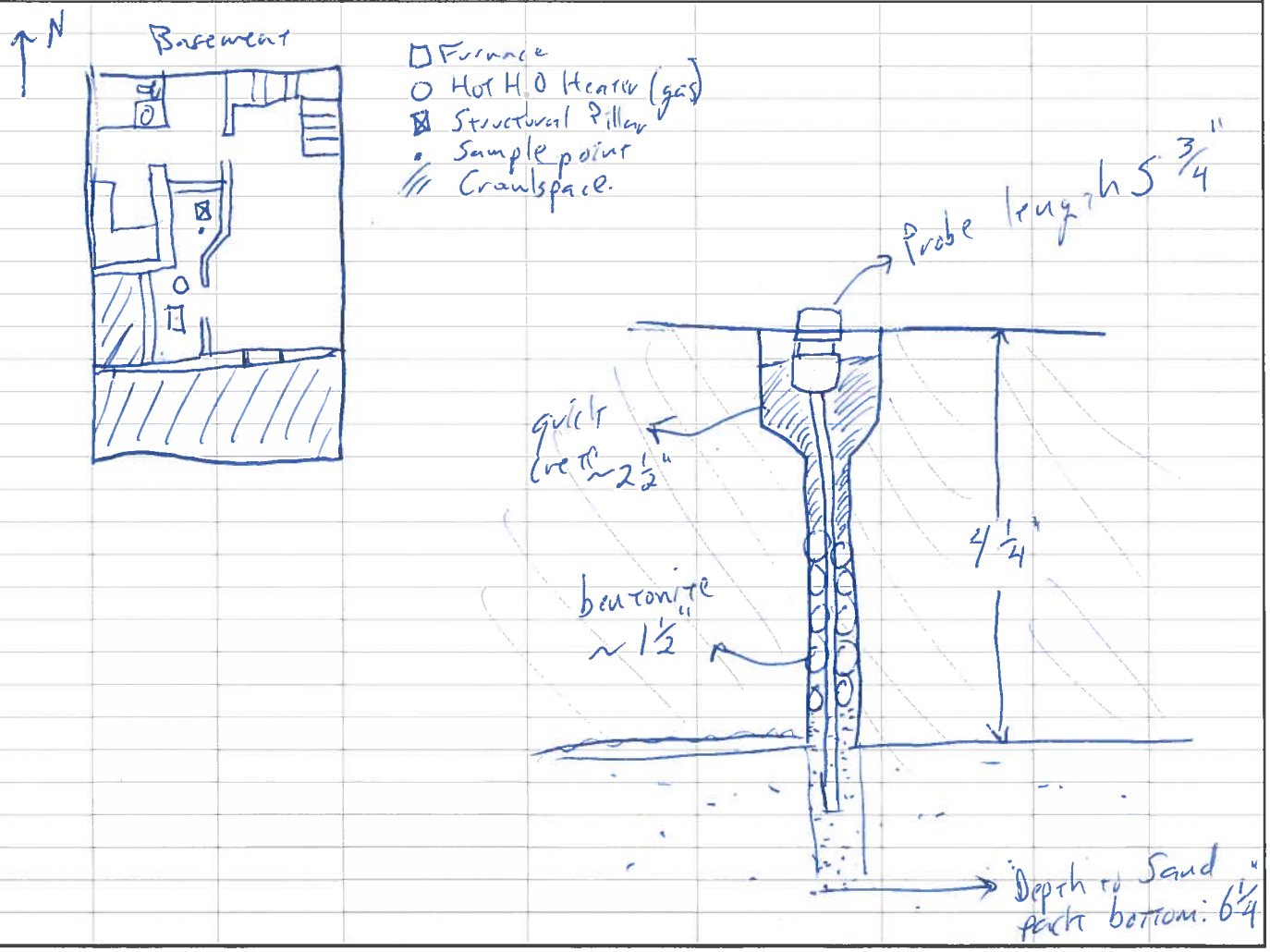
~~#1177~~ Shut-in test 27.5 / 27.5 pass

Sub-Slab Soil Vapor Sampling Field Data Sheet

Project Name:	Sample Location/ ID:
Date:	

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

Location Sketch:



OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: Feb 2018

1. Name: Pat Crisp (Patricia)

   Address:
   237 Wyoming Ave.
   Billings, MT

   Home Phone: 406-698-0792 Work Phone: _____

2. What is the best time to call to speak with you? _____ At: Work☐ or Home☐ ?

3. Are you the Owner☑, Renter☐, Other☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

   _____

   _____

   _____

4. Total number of occupants/persons at this location? 2
   Number of Children _____ Ages adults

5. How long have you lived at this location? 25-24 yrs

General Home Description

6. Type of Home/Structure (check only one): Single Family Home☑, Duplex☐, Apartment☐, Townhouse☐ Other _____

7. Home/Structure Description:
   Number of floors: basement, story & half
   Basement☐
   Crawlspace☐
   Partial Crawlspace/Basement☑ % of each _____
   Slab On Grade☐
   Other☐ _____

   front finished
   back crawlspace - door
   attic has living space

8. Age of Home/Structure: 98 years, Not Sure/Unknown☐

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood☑, Brick☐, Concrete☐, Cement block☐, Other☐ _____
   Garage: ☐Attached ☐Detached ☐None

10. Foundation Construction (check all that apply):
    Concrete Slab☐
    Fieldstone☐
    Concrete Block☑ concrete
    Elevated Above Ground/Grade☐
    Other☐ _____

11. Do you have Private Well ☐ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition no

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? city water & sewer
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☐

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☒ Unfinished ☐ Partially Finished ☐ Partial Crawlspace ☐?

15. If finished, how many rooms are in the basement? _____
What are rooms used for? Bedrooms ☐ Family Room ☐ Storage ☒
Other bathroom, laundry, open-family

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☒

17. Is the basement floor (check all that apply) Concrete ☒, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ sealed

18. Are the basement walls Poured Concrete ☐, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☒

Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☒
No ☐

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐,
Floor Drain ☒, Other Hole/Opening In Floor ☐
Describe _____

22. Are any of the following used or stored in the basement (check all that apply):
- [x] Paint – paint buckets, wood flooring
- [ ] Solvents (degreasers, paint thinner, etc.)
- [ ] Fuels/Oils (gasoline, diesel, used oil)
- [x] Other Cleaners (drain cleaners, laundry spot treatment, other solvents) very few
- [ ] Pesticides

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes [x] No [ ]
If yes, specify what was done, where in the home, and what month:
Remodeled kitchen – new flooring hardwood

24. Have you installed new carpeting in your home within the last year? Yes [ ] No [x]
If yes, when and where? _____

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) [ ]
Yes, use dry-cleaning infrequently (monthly or less) [ ]
Yes, work at a dry cleaning service [ ]
No [x] very rarely – 1, 2 times per year

26. Does anyone in your home use solvents at work?
Yes [ ] If yes, how many persons?
No [x] If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes [ ] No [ ] NA

28. Where is the washer/dryer located?
Basement [x]
Upstairs Utility Room [ ]
Kitchen [ ]
Garage [ ]
Use a Laundromat [ ]
Other, please specify [ ] _____

29. If you have a dryer, is it vented to the outdoors? Yes [x] No [ ]

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas [x], Oil [ ], Electric [ ], Wood [ ], Coal [ ],
Other [ ] _____

Heat conveyance system:
- Forced Hot Air [x]
- Forced Hot Water [ ]
- Steam [ ]
- Radiant Floor Heat [ ]
- Wood Stove [ ]
- Coal Furnace [ ]
- Fireplace [ ]
- Other [ ] _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? unknown
maybe coal or wood
How is/was the tank filled?
Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☒ No ☐
Central Air Conditioning ☒
Window Air Conditioning Unit(s) ☐
Other (please specify)

33. Do you use any of the following? Room Fans ☐, Ceiling Fans ☒, Attic Fan ☐

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☒ heat or AC

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☐ Unknown ☐
If yes, please specify type of pest controlled
And approximate date of service

36. Water heater type: Gas ☒, Electric ☐, by Furnace ☐,
Other (please describe)

37. Water heater location: Basement ☐, Upstairs Utility Room ☐, Garage ☐,
Other (please specify)

38. What type of cooking appliance do you have? Electric ☒, Gas ☒
Other (please describe)

39. Is there a stove exhaust hood present? Yes ☒ No ☐
Does it vent to the outdoors? Yes ☐ No ☒

40. Smoking in Home:
None ☒, Rare (only guests) ☐, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐

41. If yes to question 40, what is smoked?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐ NA

42. Do you regularly use air fresheners? Yes ☐ No ☒ not regularly

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐, NO!
Spray Paint ☐, Wood Finishing ☐, Other ☐

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation:

~~No radon system~~
~~Radon system under~~
"Radon detector" will check.

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

45. Please check weekly household cleaning practices:

Dusting ☐

Dry Sweeping ☐

Vacuuming ☐

Polishing (furniture, etc.) ☐

Washing/Waxing Floors ☐

Other (describe) ☐ _____

46. Other comments:

_____

_____

_____

_____

_____

_____

_____

_____

_____

47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

Excavation, Drilling, and Utility-Locating Checklist

237 Wyoming Ave (Crisp)

Task	Date	Initials
A. Excavation-site planning:		
1. The local One Call regulations have been checked for local utility-notification requirements (e.g., 48 hours vs. 72 hours).	02/02/18	JR
2. Per the local One Call regulations, list the responsible party (generally the excavation/drilling contractor) for requesting and verifying completion of utility locates below: Trihydro Corporation	02/02/18	JR
3. The property owner and/or business owner has been notified of the excavation schedule.	02/02/18	JR
4. Each proposed excavation site or "area of interest" has been delineated for utility-line locators using white spray paint and/or wooden stakes/lathes with white flagging.	—	—
5. Public-utility locates have been requested by calling One Call at least 48 hours (72 hours in some states) before work is scheduled to begin, and the request includes depths, as available.	01/31/18	SS
6. Each utility company has been notified of the excavation schedule and invited to review the proposed excavation sites.	01/31/18	SS
7. On-site meetings have been scheduled with the appropriate representatives of critical utility facilities (e.g., gas/oil pipelines, high-voltage cables, fiber-optic lines).	—	—
8. Private-utility locates—including fuel lines; tanks; and water, sewer, gas, electricity, and other utilities—have been requested.	—	—
9. The property owner was contacted to determine if he/she knows of privately owned subsurface facilities within 5 feet of the proposed excavation sites. (Review locations with the manager/owner.) Examples of privately owned facilities that are not commonly marked on private property include:	02/02/18	JR
a) Water and sewer laterals	02/02/18	JR
b) Gas lines	02/02/18	JR
c) Power ~~lines~~ (including those for landscape/yard lighting, pool and spa lines, and "out building" lines)	02/02/18	JR
d) Irrigation lines	—	—
e) Communication lines (cable, telephone, Internet)	02/02/18	JR
f) Propane tank lines	—	—
10. The proposed excavation sites have been reviewed by the appropriate stakeholders (e.g., owner, tenant, driller, excavator) and the Trihydro project manager.	02/02/18	JR
11. Proposed excavation sites have been visually inspected, and available plans and aerial photos have been reviewed for evidence of potential utilities.	—	—
12. A scaled site plan showing the proposed excavation sites relative to subsurface utilities has been prepared and is available for stakeholder/Management review.	—	—
13. The basis for each buried utility line's location and the accuracy of the data defining the utility location are documented on the site plan.	—	—
14. The proposed excavation sites are at least 5 feet from subsurface utilities shown on the building plans.	02/02/18	JR
15. The proposed excavation sites are at least 5 feet from subsurface utilities shown on public right-of-way / street-improvement plans. [Note: Work with utility companies to determine if they require a representative present during excavation activities.]	02/02/18	JR
16. The proposed excavation sites are at least 7 feet from the pad surrounding underground storage tanks (USTs) shown on the building plans.	—	—
17. The utility-locate ticket number is available on site.	02/02/18	JR
18. A traffic-control plan has been prepared if appropriate. Note: If the project area encompasses a public street or right of way, the local and/or state authority must approve the traffic-control plan before fieldwork begins.	—	—
19. Arrangements have been made to contact the appropriate personnel if utility-line repairs are needed. (Who must be contacted if a line is unexpectedly damaged?)	02/02/18	JR
20. Contact information is in place and readily available with the driller, excavator, and other project stakeholders.	02/02/18	JR
21. The client and other relevant stakeholders (if any) have been notified of the excavation planning/pre-planning steps and results.	—	—
22. A detailed work scope was developed by the project team and reviewed by the Project Director and Contracting Team.	—	—
Project Director (excavation-site planning tasks):		

237 Wyoming

Excavation, Drilling, and Utility-Locating Checklist

237 Wyoming Ave (Crisse)

Task	Date	Initials
B. Utility-line marking:		
1. Electrical circuits are energized during utility-line marking for subsurface power lines (e.g., circuits on timers or light-sensing switches).	02/02/18	JR
2. Public-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	02/02/18	JR
3. Private-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	—	—
4. Verify that One Call locators marked their facilities in the designated excavation area or provided notification that they do not have any facilities near the proposed excavation sites.	02/02/18	JR
5. One Call was contacted to request a "refresh" if utility-locate markings are missing, difficult to see, or more than 14 days old (7 days in some states). "Refresh" markings must be performed by the original marking organization.	—	—
Project Director (utility-line marking tasks):		
C. Job walk:		
1. Visual verification that each proposed excavation site does not lie on a line connecting two similar-looking manhole covers (e.g., sanitary sewers or storm drains). (Consider having the line snaked to confirm their locations.)	02/02/18	JR
2. Visual verification that each proposed excavation site does not lie on a line with any water, gas, electrical meters, utility cleanouts, or other utility boxes in the surrounding areas.	02/02/18	JR
3. Visual verification that the pavement near each proposed excavation site has not subsided or give the appearance it may be covering a previous excavation (e.g., linear cracks or sagging curbs).	02/02/18	JR
4. Visual verification that each proposed excavation has adequate overhead clearance for the excavation equipment (e.g., at least 10 feet from overhead-utility lines and/or reasonable distance from canopies).	02/02/18	JR
5. Fences and fields have been checked for markers, signs, posts, valves, stub outs, etc.	—	—
6. Surface structures such as tank batteries, wells, valves, phone pedestals, and electrical junction boxes have been checked for evidence of subsurface utilities.	—	—
7. Observed evidence of subsurface utilities has been photographed, sketched, or otherwise documented.	02/02/18	JR
8. Proposed excavation sites have been "walked"/reviewed by the excavation contractor, Trihydro project manager, and other stakeholders (e.g., client representative, property owner, tenant).	02/02/18	JR
9. Proposed excavation sites are located at least 5 feet from marked utilities (i.e., the "tolerance zone"), or written approval to excavate within the 5-foot tolerance zone has been obtained from the appropriate utility owner. In no case shall a proposed excavation be located closer than 2 feet from the outside edge of a marked utility. (Note: The tolerance zone is measured from the outside edge of a subsurface structure—not its centerline.)	02/02/18	JR
10. Verify that the excavation contractor (with help from appropriate utility-line locators, if part of the client-approved work scope) has walked each proposed excavation site to verify all expected utility-line markings are present.	02/02/18	JR
11. Traffic-control devices, safety barricades, caution tape, and other safety-management devices are in place as needed to protect project personnel.	—	—
Project Director (job-walk tasks):		
D. Daylighting / potholing / "soft digging":		
1. The proposed excavation sites located within the "tolerance zone" (and sites located outside the "tolerance zone" when required by the client) have been potholed to a depth below the anticipated utility zone using "minimally intrusive excavation methods" such as vacuum excavation (either air-entrainment or water-jet) and careful hand-tool use.		
2. Monitoring and emergency equipment is available on site when hazardous atmospheres are expected to be encountered in the potholing excavations.		
3. A list of emergency-contact names/numbers is maintained at the potholing excavation site.		
4. The project health and safety plan addresses potential hazards and safety-performance requirements related to utility-clearance operations.		
5. The location of and directions to the nearest hospital are known by all members of the project team.		
6. Representatives of utility owners that requested to be on site for utility locates are present.		

Excavation, Drilling, and Utility-Locating Checklist

237 Wyoming Ave
Crisp

Task	Date	Initials
7. Pothole excavations have been visually checked with a flashlight by the excavation contractor, Trihydro project manager, or her/his designee.		
8. Utilities adjacent to the excavation or that cross the excavation have been daylighted using "minimally intrusive excavation methods."		
9. The areal extent of the excavation-clearance pothole has been verified to extend at least 120% beyond the outside diameter of the largest-diameter down-hole tool to be used in the borehole, or at least 2 feet on each side of daylighted/exposed lines, whichever is greater.		
10. If vacuum excavation (e.g., air knife, air vac, hydro-vac) is not available to daylight utility lines, verify that the non-conductive probe method was used as follows: Scratch the ground no more than 10 inches deep above the utility and then probe the scratched area. If the utility isn't found in the scratched area, repeat the first step until the utility is located. Once the utility is found, its depth must be continually verified with the probe until 2 feet of soil remain above the utility. Carefully hand dig the remaining overburden to expose the utility.		
11. The soil encountered in the excavation-clearance pothole has been verified to be free of bedding material (e.g., clean gravel, clean sand, aggregate base [gravelly sand with ~10% fines], or other non-native-looking material) that could indicate the presence of a previously installed utility line.		
12. Excavation work within 2 feet of an underground utility was "hand dug."		
13. Once the utility lines were exposed and the excavations were safe to enter, the exposed lines (including their protective coating) was examined for damage.		
14. The condition of each utility line exposed during daylighting was documented, and the documentation was forwarded to the Trihydro project manager to place in the project file.		
15. If a utility line was damaged in any way, it was reported to the utility owner and Trihydro project manager and documented in the project file.		
16. Damage to a utility line was documented and repaired before it was reburied. The utility owner signed off on the repairs.		
17. Employees entering the excavation followed the procedures described in the Trihydro "Trenching and Excavation Program" and used the Trihydro "Daily Excavation/Trench Inspection Report" to document excavation condition.		
18. The location of daylighted utilities was documented and photographed after daylighting was completed and before the pothole excavation was backfilled.		
19. Locations for hand digging within the "tolerance zone" were noted.		
Project Director (daylighting/potholing tasks):		
E. Excavation (including drilling):		
1. The appropriate permits have been obtained for the work (e.g., hot-work permits, entry permits).	—	—
2. The utility-owner and/or agency representatives that requested to be on site during excavation work are present. (Trihydro Utility Locate Acknowledgement Form)	—	—
3. A safety kickoff meeting was conducted with the excavation contractor to review roles/responsibilities, work activities, anticipated hazards, this checklist, and emergency-response procedures before starting excavation work the site. The safety kickoff meeting was documented in the project file.	02/02/18	JR
4. A daily tailgate safety meeting was conducted and documented in the project file. Verify weather conditions, safety hazards, PPE requirements, job duties, communication, hand signals, etc.	02/02/18	JR
5. JSAs covering the work to be done are in place and have been reviewed, "marked up" where appropriate, and acknowledged by the excavation project-team members.	02/02/18	JR
6. Site workers have been reminded to look for hazardous conditions, processes, and activities, and that they are authorized to stop work if they see an unsafe condition.	02/02/18	JR
7. The emergency-response plan has been reviewed by all excavation project-team members (e.g., contact numbers, evacuation muster points, hospital routes).	02/02/18	JR
8. The excavation contractor has checked the excavation sites relative to overhead utilities, subsurface-utility locates, and adjacent surface structures.	02/02/18	JR
9. The excavation contractor has acknowledged the potential location of each subsurface utility marked in the excavation areas.	02/02/18	JR
10. Proper traffic control and exclusion zones have been established.	—	—
11. The excavation equipment (e.g., drill rig, backhoe) has been inspected for proper operation and condition.	02/02/18	JR
12. Emergency equipment (fire extinguisher, first aid kit, emergency shut-off switch, etc.) has been checked, is readily available, and is in working order.	02/02/18	JR
13. Excavation project-team members are wearing appropriate PPE per the Trihydro HASP and client/site-specific requirements.	02/02/18	JR
14. Power in the excavation area has been de-energized, if possible. If power cannot be de-energized, the excavation contractor was advised of the hazard.	—	—

237 Wyoming Ave (Crisp)

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
Project Director (excavation/drilling tasks):		
F. If an unmarked utility line is discovered:		
1. Verify the One Call utility-locate request was made correctly.	02/02/18	JR
2. Identify the owner/operator of the unmarked utility line and contact One Call (dial "811") to request a "No Response" ticket. If the owner/operator fails to respond again, seek a third-party locating service to mark the utility before: a) excavation work begins, or b) advancing the excavation further.	—	—
3. Contact the owner/operator of non-locatable utilities to request they be taken out of service before excavation begins.	—	—
4. If possible, a representative of the unmarked utility line should be on site when the unmarked utility is daylighted.	—	—
Project Director (unmarked utility line tasks):		

Note:

-- If an item doesn't apply, please insert an "NA" in the "**Date**" column and provide an explanation in the "**Project Notes**" section below.

Andrew Vann	Syrii & Joel	02/02/2018
Project Manager	Field Manager / Team Members	Date Reviewed
MDEQ PCE Billing / 237 Wyoming Ave (Crisp Residents)	Trihydro	
Client / Project Name / Location	Excavator/Driller Name	Date Action Items Completed

Project Notes: [Please cross reference to the appropriate checklist-item number[s] when possible.]

VI Sample: 237 Wyoming Ave_Subslab

VI Sample: 237 Wyoming Ave_Subslab

VI Sample: 237 Wyoming Ave_Crawlspace

VI Sample: 237 Wyoming Ave_Basement

VI Sample: 237 Wyoming Ave_Main

237 Wyoming Ave Structure

237 Wyoming Ave Utility Locate

237 Wyoming Ave Utility Locate

237 Wyoming Ave Utility Locate

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID: 306 N 30th St

Project Name:	BPCE	**PID (model/serial #):**	ppb RAE 3000 / 12875
Sample location:	Subslab	**Helium Detector (model/serial #):**	Dielectric / RUI 89
Date:	3/9/18	**Weather:**	
Field Personnel:	LD	**Air Temp:**	
Recorded by:	LD	**Atmospheric Pressure:**	

Slab Data

Surface/slab Type: Concrete
Surface/slab Thickness (inches): 5 1/4"
Slab/subsurface substrate comments: gravel + sand.
Depth of hole through the slab: 6 1/4"
Length of sampling train (feet): ~39" + 6 1/4" ≈ 4ft.

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 120

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	**Time**	**Cumulative volume purged (ml)**	**Helium Beneath Shroud (%) min**	**Helium Beneath Shroud (%) max**	**Helium in Probe (ppm or %)**	**PID reading in probe (ppb)**	**Helium Beneath Shroud (%) min**	**Helium Beneath Shroud (%) max**
3/9/18		50						
	1558	100	32.8	34.8	0		18.8	23.6%
		150						
		200						
		250						
		300						

Conversion: 1.0% = 10,000 ppm
At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
3/9/18	1555	1628	20180309-306N30THST-01	0625	1173		26	5

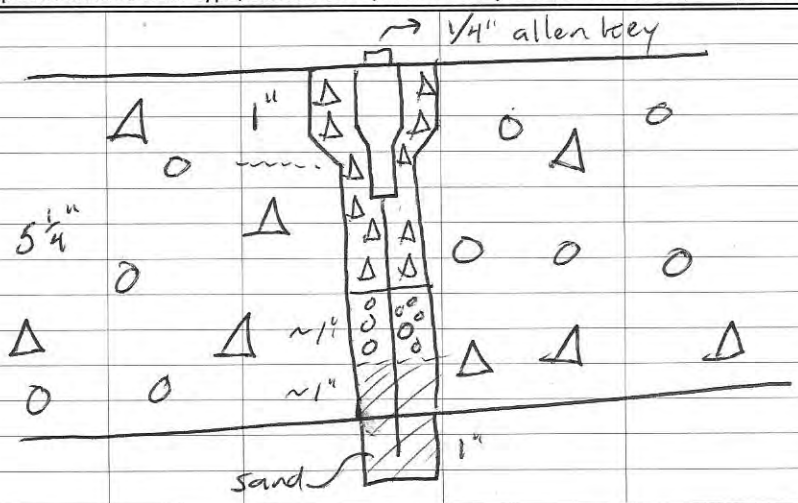
Comments:

PID: indoor 0 subslab 237 ppb
O_2: 20.9%
CO: 0 ppm
LEL: 0%
H_2S: 0.0

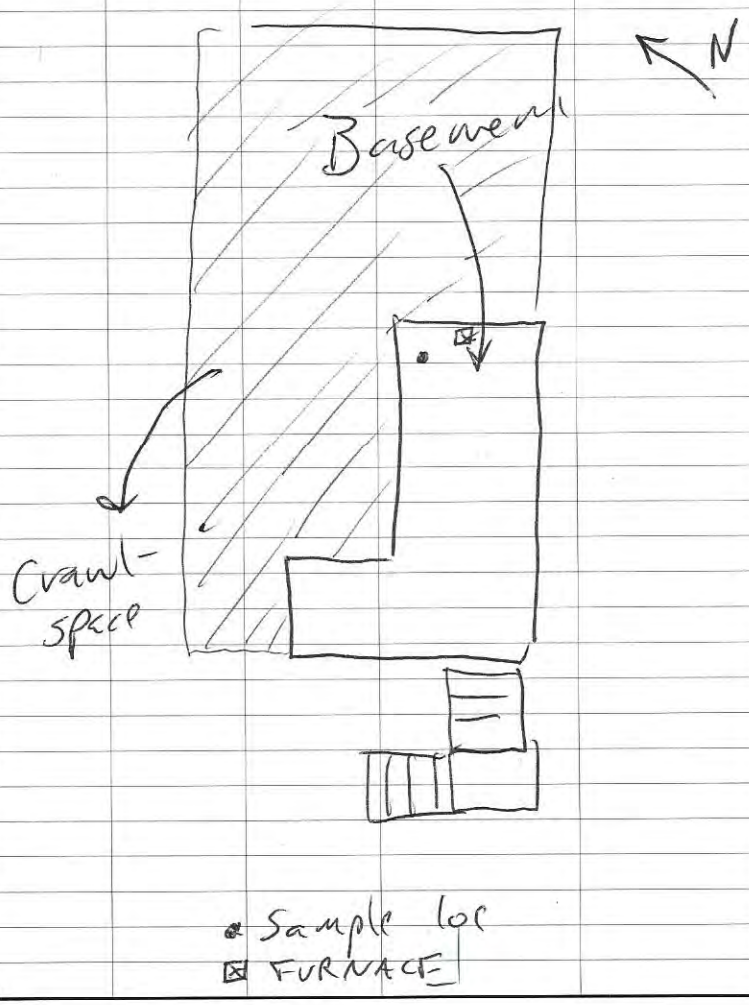
Sub-Slab Soil Vapor Sampling Field Data Sheet

Project Name:				Sample Location/ ID:				
Date:								

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.



Location Sketch:



Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	306 N. 30th St.	Start Weather:	cloudy W. 5 mph WNW
		Start Outdoor Air Temp:	30
Project Name:	BPCE	Start Atmospheric Pressure:	29.87
Sample Location:	Indoor AIR		
Date:	3/8/18	End Weather:	
Field Personnel:	LD	End Outdoor Air Temp:	
Recorded by:	LD	End Atmospheric Pressure:	

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
3/8/18	1544	3/9/18	1536	20180308-306N30THST-01	0948	0513		-26	9.5		
3/8/18	1547	3/9/18	1538	20180308-306N30THST-02	2832	1446		-26.5	3		
3/8/18	1549	3/9/18	1537	20180308-306N30THST-03	2330	1363		-26.5	2		

Comments:

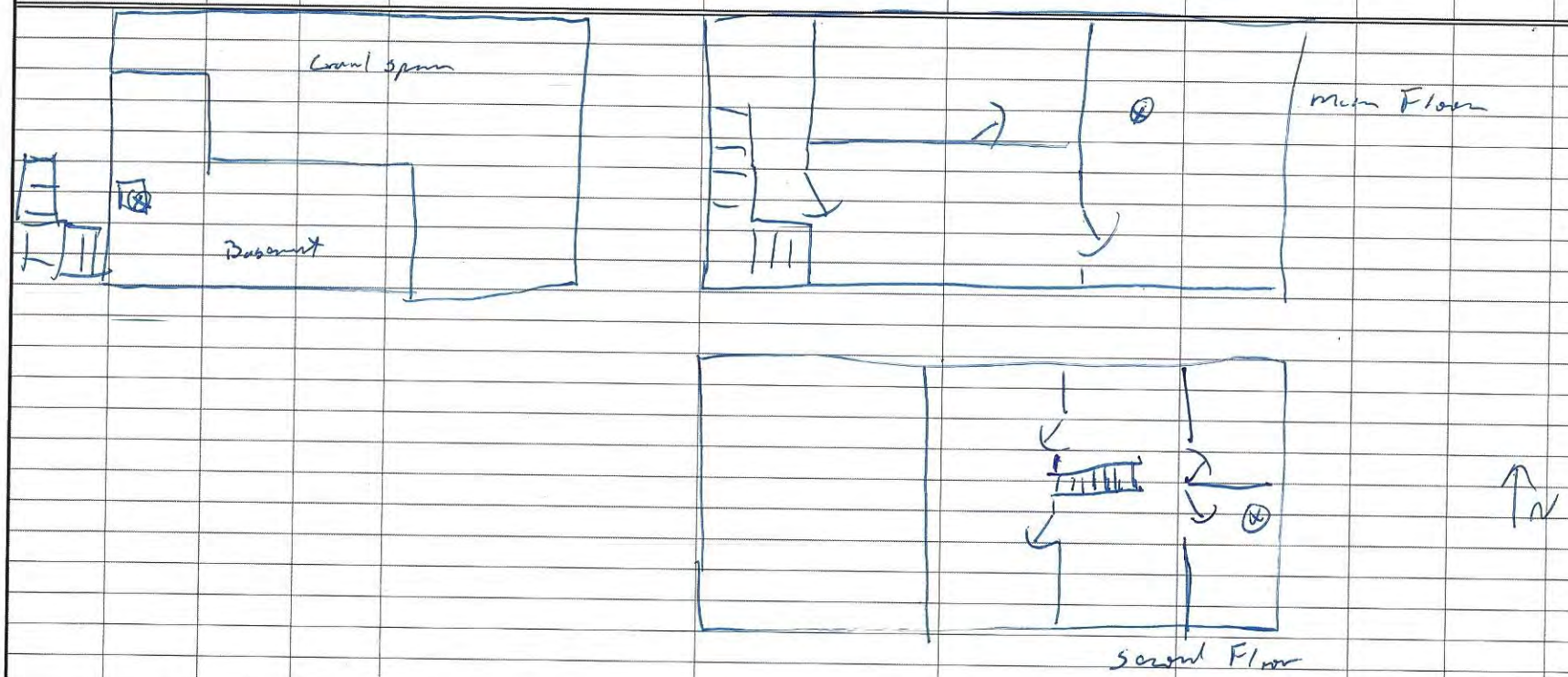
01- Basement air
02- ~~Main Floor~~ 2nd Flr.
03- ~~2nd Floor~~ Main Floor

406 861 4448

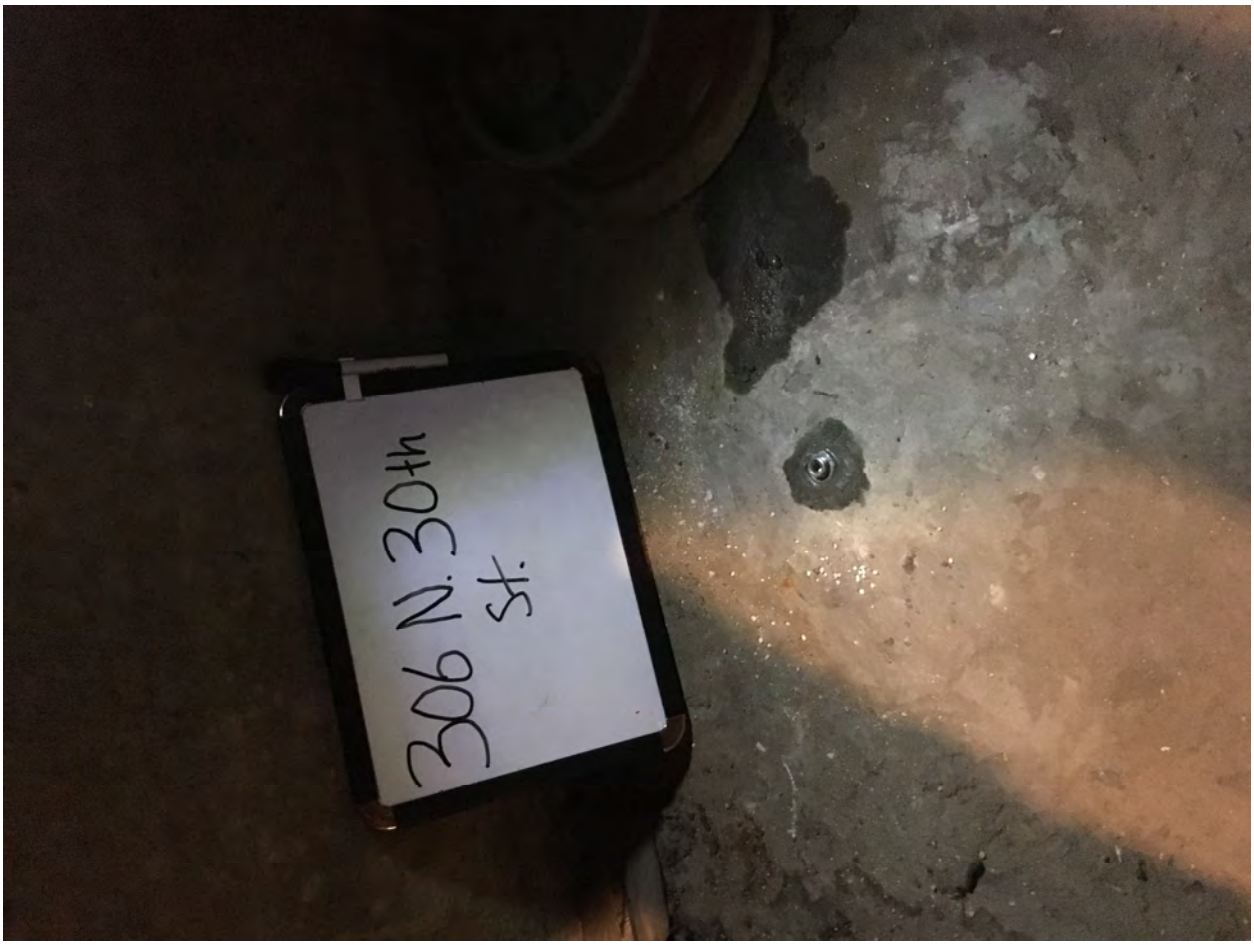
Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

Location Sketch:



VI Sample: 306 N 30th St_Subslab



Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Janet Arney c/o tennant/son

Physical Address of property under investigation: 308 Miles Ave, Billings MT

Mailing Address: same

Phone (optional):

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
02/05/18	Indoor Air	20180205-308MILES-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
02/05/18	Indoor Air	20180205-308MILES-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
02/06/18	Sub-slab vapor	20180206-308MILES-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*

*OTHER (specify analysis) Indoor Air: VOCs (TO-15), Pet. (APH); Sub-slab: VOCS (TO-15) Pet (APH), Fixed Gases, Helium

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample. NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

Signature: on behalf DEQ

Printed Name: S. SEITZ (Trihydro)

Telephone #: 406-558-4850

Date: 02/06/18

Property owner/operator copy = white DEQ copy = yellow

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	308 Miles		
Project Name:	Billings PCE	**PID (model/serial #):**	
Sample location:	Sub slab	**Helium Detector (model/serial #):**	
Date:	2/6/18	**Weather:**	Overcast / snowy
Field Personnel:	ST / MO	**Air Temp:**	25
Recorded by:	MO	**Atmospheric Pressure:**	1025 mb steady

Slab Data

Surface/slab Type:	Concrete
Surface/slab Thickness (inches):	Unknown
Slab/subsurface substrate comments:	Unk.
Depth of hole through the slab:	Unk. Assume 1 ft.
Length of sampling train (feet):	~5 ft = 150 ml.

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft =

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	**Time**	**Cumulative volume purged (ml)**	**Helium Beneath Shroud (%) min**	**Helium Beneath Shroud (%) max**	**Helium in Probe (ppm or %)**	**PID reading in probe (ppb)**	**Helium Beneath Shroud (%) min**	**Helium Beneath Shroud (%) max**
	1348	50		23.9				
	1349	100	23.6	23.9				
	1349	150	22.8	23.6				
	1350	200	22.0	22.8				
	1351	250	20.9	22.0				
		300	20.5	~~20.5~~ 20.9	8375			

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
2/6/18	1358	1439	~~2335~~ 20180206-308MILES-01	~~FC1609~~ 2335	FC 1609		-26.0	-3.0

Comments:

PID 0 ppb
4-gas 19.9 O2
– other

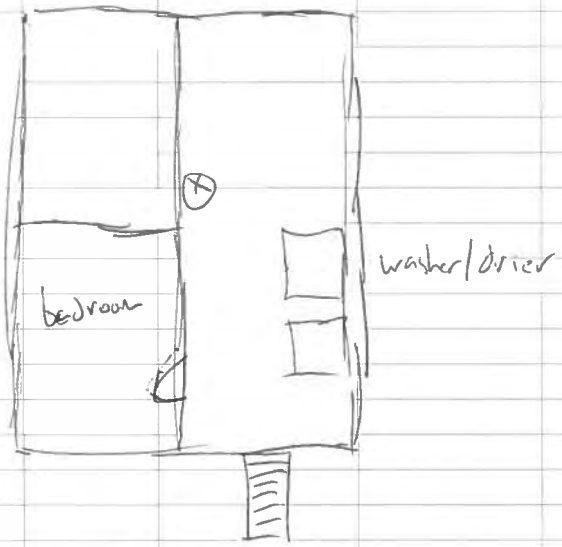
Shut in test
#2335 25.8/25.8 pass

Sub-Slab Soil Vapor Sampling Field Data Sheet

Project Name:	Sample Location/ ID:
Date:	

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

Location Sketch:



1:30 Casey

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	308 Miles	Start Weather:	Cold / overcast
		Start Outdoor Air Temp:	15°
Project Name:	Billings PCE	Start Atmospheric Pressure:	30.3
Sample Location:	Indoor & basement air		
Date:	2/5/18	End Weather:	~~22°F~~ Cloudy, Snowing
Field Personnel:	ST / MO	End Outdoor Air Temp:	22°F
Recorded by:	ST / MO	End Atmospheric Pressure:	30.0

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
2/5/18	1352	2/6/18	1335	2018 0205 - 308 MILES-01	1041	1400		-28.0	-3.0	70.	70
2/5/18	1355	2/6/18	1337	2018 0205 - 308 MILES-02	1689	00041		-27.5	-3.0	70	70

Comments:

Shut in times:

Canister	Start Inlly	End	Time
1041	-28.0	-28	2:06
1689	-27.5	-27.5	2:16

01 upstairs bedroom
02 basement

Occupants' son Casey is coordinating

Indoor Air Sampling Field Data Sheet

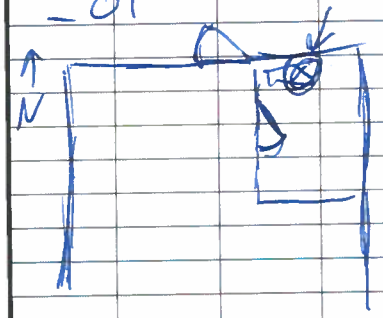
Description of Sample Locations (s):

Canister _01 Indoor air, on dresser, North bedroom photo on MO phone

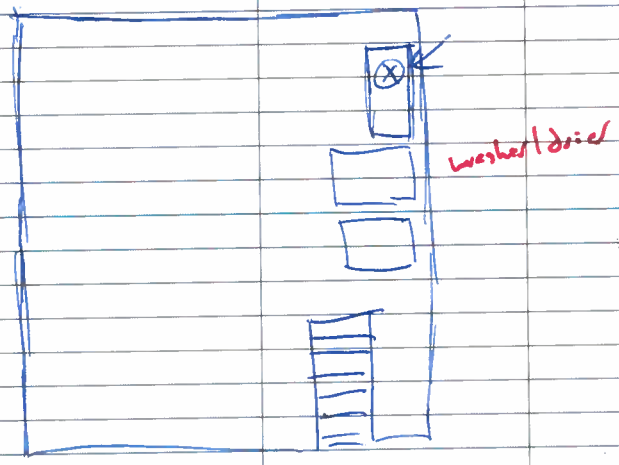
Canister _02 Basement air on shelf (~7 ft off ground) photo on MO phone

Location Sketch:

_01



_02 (basement)



OCCUPIED DWELLING QUESTIONNAIRE

Filled out by S. Trahan after site visit + conversat w/ owner.

Indoor Air Assessment Survey

Date: 2/13/18

1. Name: Janet Arney

   Address:
   308 miles Avenue
   Billings, MT 59102

   Home Phone: _____ Work Phone: _____

2. What is the best time to call to speak with you? _____ At: Work ☐ or Home ☒ ?

3. Are you the Owner ☒, Renter ☐, Other ☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

   _____

   _____

   _____

4. Total number of occupants/persons at this location? 5
   Number of Children 2 Ages 5, 3

5. How long have you lived at this location? Unk.

General Home Description

6. Type of Home/Structure (check only one): Single Family Home ☒, Duplex ☐, Apartment ☐, Townhouse ☐ Other _____

7. Home/Structure Description:
   Number of floors: 1
   Basement ☒
   Crawlspace ☐
   Partial Crawlspace/Basement ☐ % of each _____
   Slab On Grade ☐
   Other ☐ _____

8. Age of Home/Structure: _____ years, Not Sure/Unknown ☒

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood ☒, Brick ☐, Concrete ☐, Cement block ☐, Other ☐ _____
   Garage: ☐ Attached ☐ Detached ☐ None

10. Foundation Construction (check all that apply):
    Concrete Slab ☒
    Fieldstone ☐
    Concrete Block ☐
    Elevated Above Ground/Grade ☐
    Other ☐ _____

11. Do you have Private Well ☐ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____
N/A

12. Do you have a Septic System? Yes ☐ No ☒ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☒

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☐ Unfinished ☐ Partially Finished ☒ Partial Crawlspace ☐?

15. If finished, how many rooms are in the basement? 1
What are rooms used for? Bedrooms ☒ Family Room ☐ Storage ☐
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐ unk.

17. Is the basement floor (check all that apply) Concrete ☒, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☐, Cement Block ☒, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐
Unk.
Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐
Unk

21. Does the basement have any of the following? Floor Cracks ☒, Wall Cracks ☒, Sump ☐,
Floor Drain ☒, Other Hole/Opening In Floor ☐
Describe _____

22. Are any of the following used or stored in the basement (check all that apply):
- [x] Paint
- [ ] Solvents (degreasers, paint thinner, etc.)
- [ ] Fuels/Oils (gasoline, diesel, used oil)
- [ ] Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- [x] Pesticides

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☐ No ☒
If yes, specify what was done, where in the home, and what month:

24. Have you installed new carpeting in your home within the last year? Yes ☐ No ☒
If yes, when and where? _____

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
No ☐
Unk.

26. Does anyone in your home use solvents at work?
Yes ☐ If yes, how many persons?
No ☐ If no, go to question 28
Unk.

27. If yes for question 26, are the work clothes washed at home? Yes ☐ No ☐

28. Where is the washer/dryer located?
Basement ☒
Upstairs Utility Room ☐
Kitchen ☐
Garage ☐
Use a Laundromat ☐
Other, please specify ☐ _____

29. If you have a dryer, is it vented to the outdoors? Yes ☒ No ☐

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas ☒, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system:
- Forced Hot Air ☒
- Forced Hot Water ☐
- Steam ☐
- Radiant Floor Heat ☐
- Wood Stove ☐
- Coal Furnace ☐
- Fireplace ☐
- Other ☐ _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? _____

How is/was the tank filled? _____

Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☐ No ☐
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☐
Other (please specify) _____

33. Do you use any of the following? Room Fans ☐, Ceiling Fans ☒, Attic Fan ☐

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☐ Unknown ☒
If yes, please specify type of pest controlled _____
And approximate date of service _____

36. Water heater type: Gas ☒, Electric ☐, by Furnace ☐,
Other (please describe)_____

37. Water heater location: Basement ☒, Upstairs Utility Room ☐, Garage ☐,
Other (please specify) _____

38. What type of cooking appliance do you have? Electric ☒, Gas ☐
Other (please describe) _____

39. Is there a stove exhaust hood present? Yes ☐ No ☒
Does it vent to the outdoors? Yes ☐ No ☐

40. Smoking in Home:
None ☐, Rare (only guests) ☐, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☒

41. If yes to question 40, what is smoked?
Cigarettes ☒ Cigars ☐
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☐ No ☒

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation: _____

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

NA
Not Filled OUT

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

45. Please check weekly household cleaning practices:

Dusting ☐
Dry Sweeping ☐
Vacuuming ☐
Polishing (furniture, etc.) ☐
Washing/Waxing Floors ☐
Other (describe) ☐ _____

None

46. Other comments:

_____
_____
_____
_____
_____
_____
_____
_____
_____

47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

VI Sample: 308 Miles Ave_Basement

VI Sample: 308 Miles Ave_Subslab

VI Sample: 308 Miles Ave_Main

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Jonathan Copple

Physical Address of property under investigation: 311 Howard, Billings, MT

Mailing Address: Same

Phone (optional): 406-876-5662

The following samples have been collected from this property:

Date	Media SAMPLE ID	~~Sample ID Number~~ MEDIA	Analysis to be performed
2/28/18	20180228-311HOWARD-01	AIR	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15, APH
2/28/18	20180228-311HOWARD-02	AIR	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15, APH
3/1/18	20180301-311HOWARD-01	AIR	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15, APH, FIXED CH_4

*OTHER (specify analysis) _____

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.
- ☒ NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason: _____

DEQ representative:

Signature _____ Printed Name Sivis Trahan

Telephone #: 307-745-7474 Date: 3/6/18

Property owner/operator copy = white DEQ copy = yellow

OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 3/1/18

1. Name: Johnathan Copple / Lucy Elliston

   Address: 311 HOWARD

   Home Phone: 876-5662 Work Phone: 855-7435

2. What is the best time to call to speak with you? _____ At: Work ☐ or Home ☐ ?

3. Are you the Owner ☒, Renter ☐, Other ☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

4. Total number of occupants/persons at this location? 4
   Number of Children 2 Ages 15, 10

5. How long have you lived at this location? 15 yrs.

General Home Description

6. Type of Home/Structure (check only one): Single Family Home ☒, Duplex ☐, Apartment ☐, Townhouse ☐ Other _____

7. Home/Structure Description:
   Number of floors: 1
   Basement ☒
   Crawlspace ☐
   Partial Crawlspace/Basement ☐ % of each _____
   Slab On Grade ☐
   Other ☐ _____

8. Age of Home/Structure: ~100 years, Not Sure/Unknown ☐

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood ☒, Brick ☐, Concrete ☐, Cement block ☐, Other ☐ _____
   Garage: ☐ Attached ☐ Detached ☐ None

10. Foundation Construction (check all that apply):
    Concrete Slab ☒
    Fieldstone ☐
    Concrete Block ☐
    Elevated Above Ground/Grade ☐
    Other ☐ _____

11. Do you have Private Well ☒ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition Irrigation

12. Do you have a Septic System? Yes ☐ No ☒ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☒

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☐ Unfinished ☐ Partially Finished ☒ Partial Crawlspace ☐?

15. If finished, how many rooms are in the basement? 2
What are rooms used for? Bedrooms ☒ Family Room ☐ Storage ☐
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☒ No ☐ Bathroom Flood

17. Is the basement floor (check all that apply) Concrete ☒, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☒, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☒

Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☒

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐,
Floor Drain ☒, Other Hole/Opening In Floor ☐
Describe sump pump, some cracks

22. Are any of the following used or stored in the basement (check all that apply):
- [x] Paint
- [ ] Solvents (degreasers, paint thinner, etc.)
- [ ] Fuels/Oils (gasoline, diesel, used oil)
- [ ] Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- [ ] Pesticides

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☐ No ☒
If yes, specify what was done, where in the home, and what month:

24. Have you installed new carpeting in your home within the last year? Yes ☐ No ☒
If yes, when and where? _____

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
No ☒

26. Does anyone in your home use solvents at work?
Yes ☐ If yes, how many persons?
No ☒ If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes ☐ No ☐

28. Where is the washer/dryer located?
Basement ☐
Upstairs Utility Room ☒
Kitchen ☐
Garage ☐
Use a Laundromat ☐
Other, please specify ☐ _____

29. If you have a dryer, is it vented to the outdoors? Yes ☒ No ☐

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas ☒, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system:
- Forced Hot Air ☒
- Forced Hot Water ☐
- Steam ☐
- Radiant Floor Heat ☐
- Wood Stove ☐
- Coal Furnace ☐
- Fireplace ☐
- Other ☐ _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? _____

How is/was the tank filled? _____

Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☐ No ☒
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☐
Other (please specify) _____

33. Do you use any of the following? Room Fans ☐, Ceiling Fans ☒, Attic Fan ☐

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☒

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☒ Unknown ☐
If yes, please specify type of pest controlled _____
And approximate date of service _____

36. Water heater type: Gas ☒, Electric ☐, by Furnace ☐,
Other (please describe) _____

37. Water heater location: Basement ☒, Upstairs Utility Room ☐, Garage ☐,
Other (please specify) _____

38. What type of cooking appliance do you have? Electric ☒, Gas ☐
Other (please describe) _____

39. Is there a stove exhaust hood present? Yes ☒ No ☒
Does it vent to the outdoors? Yes ☐ No ☒

40. Smoking in Home:
None ☒, Rare (only guests) ☐, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐

41. If yes to question 40, what is smoked?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☒ No ☐

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☒, Paints ☒,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation: yes
Mitigation from EPA

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

45. Please check weekly household cleaning practices:

Dusting ☐

Dry Sweeping ☐

Vacuuming ☐

Polishing (furniture, etc.) ☐

Washing/Waxing Floors ☐

Other (describe) ☐ _____

46. Other comments:

_____

_____

_____

_____

_____

_____

_____

_____

_____

47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	311 HOWARD	Start Weather:	32°F
		Start Outdoor Air Temp:	<5 mph SE
Project Name:	BPCE	Start Atmospheric Pressure:	30.01
Sample Location:	Indoor Air		
Date:	2/28/18	End Weather:	<5 mph ENE
Field Personnel:	ST/BS	End Outdoor Air Temp:	29°F
Recorded by:	ST	End Atmospheric Pressure:	29.98

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
2/28	1835	3/1/18	1843	20180228-311HOWARD-01	2741	1399		27	2.5	70°F	70°F
2/28	1838	3/1/18	1844	20180228-311 HOWARD-02	352	1458		27.5	2.0	70°F	70°F

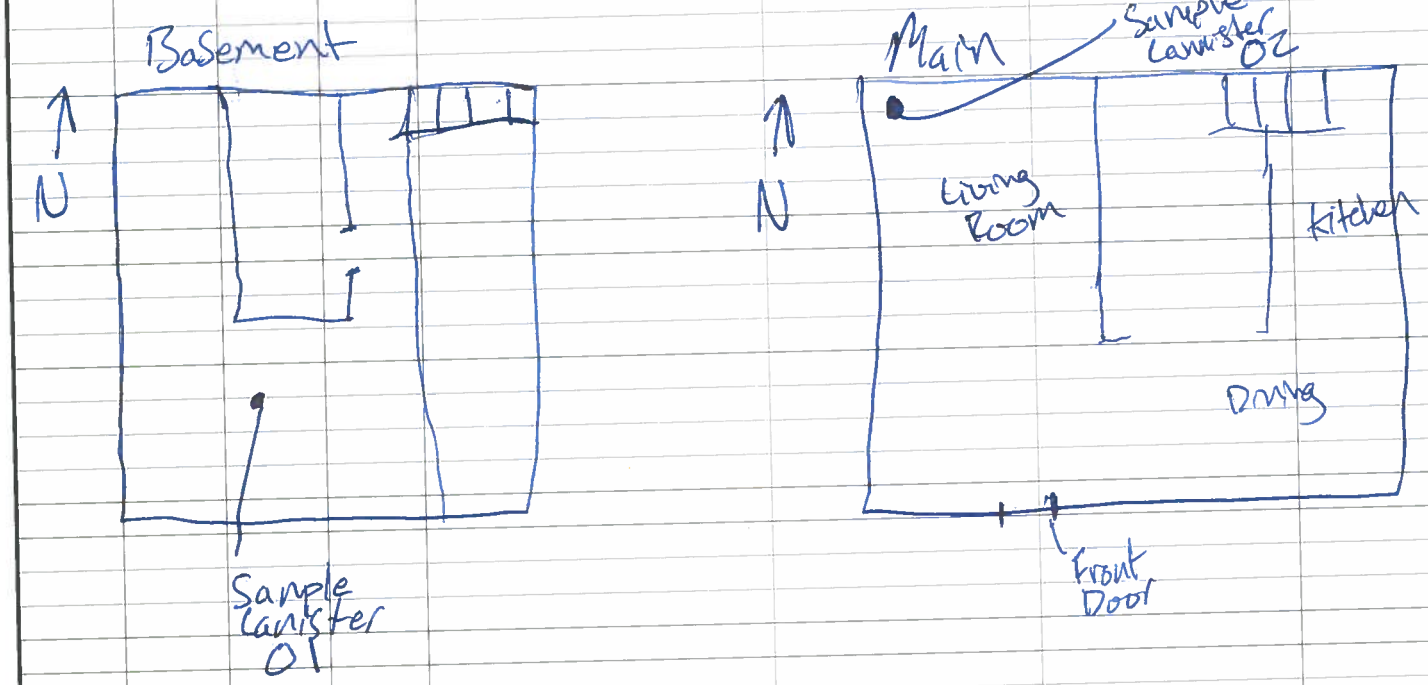
Comments:

01- Basement
02- LIVING ROOM

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

Location Sketch:



Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID: Billings PCE GW Facility

Project Name: VI Investigation
Sample location: 311 Howard
Date: 3/1/18
Field Personnel: ST, BS
Recorded by: BS

PID (model/serial #): PPB RAE 3000/ 127825
Helium Detector (model/serial #): MGD2002/ 041559
Weather: 0 mph E
Air Temp: 28°F
Atmospheric Pressure: 30.00"

Slab Data – installed by EPA

Surface/slab Type:
Surface/slab Thickness (inches):
Slab/subsurface substrate comments:
Depth of hole through the slab: assume 12"
Length of sampling train (feet):

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 120

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %) Min	PID reading in probe (ppb) Max	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
3/1/18	1906	50	57/9 BS	58/1 BS	55.4	55.4		
	1906	100	5	57/4	55.4	55.6		
	1907	150			55.0	55.3		
	1907	200			53.8	54.5		
	1907	250			52.3	53.0		47.2
					50.8	51.8		
	1908	300			5,825 ppm in Tedlar			

Conversion: 1.0% = 10,000 ppm
At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
3/1/18	1914	1952	20180301-311 Howard -01	3477	0779		27	3"

Ambient Air – 870 ppb max

subslab – 17.58 ppm peak
H_2S, LEL, CO – all Ø
O_2 @ 20.9

Comments:
- Sample train 3' above ground, approx 1' port. Assume 4' total length
- Significant cracking & water damage around sub-slab port
- Sealed port w/ clay.

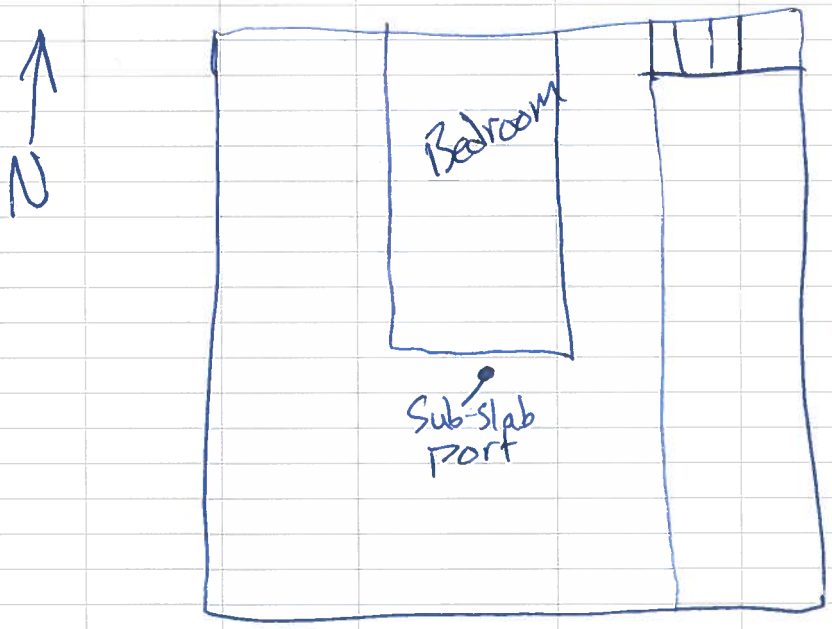
Sub-Slab Soil Vapor Sampling Field Data Sheet

Project Name: VI Investigation
Sample Location/ ID: 311 Howard
Date:

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

unknown install details - installed by EPA

Location Sketch:



Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: John Mammenga (Renter) Dennis Tussler (Owner)

Physical Address of property under investigation: 312 N 33rd St, Billings MT

Mailing Address: ~~[illegible]~~ 1210 2nd St W Billings MT

Phone (optional):

The following samples have been collected from this property:

Date	~~Media~~ SAMPLE ID	~~Sample ID Number~~ MEDIA	Analysis to be performed
2/28/18	[illegible]	AIR	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO 3 APH
2/28/18	20180228-312 N33rd-02	AIR	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO 5 APH
2/28/18	20180228-312 N33rd-03	AIR	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO 15, APH
3/1/18	20180301-312 N33rd-01	AIR	TO 5 APH FIXED GAS

*OTHER (specify analysis)

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☒ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.
- ☒ NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☒ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

Signature

Printed Name: Sylvia Trahan

Telephone #: 307-715-7474

Date: 3/6/18

Property owner/operator copy = white DEQ copy = yellow

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	~~323 Miles Ave~~ 312 N 33rd Street	Start Weather:	
		Start Outdoor Air Temp:	
Project Name:	MDEQ Billings PCE	Start Atmospheric Pressure:	
Sample Location:	Basement / Basement Crawlspace / Main Floor		
Date:	02/28/2018 – 03/01/2018	End Weather:	Mostly Cloudy; NNE 5mph
Field Personnel:	Joel Riebli & Jake Scott	End Outdoor Air Temp:	34°F
Recorded by:	Joel Riebli	End Atmospheric Pressure:	29.93 in

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
02/28/18	1515	03/01/18	1515	20180228-312N33ST-01	Ø262	FC1398	— 8/5	-28 ~~-25.6~~	-2.7		~70°F
02/28/18	1516	03/01/18	1516	20180228-312N33ST-02	Ø684	FCØ2Ø4	— 8/3	-30 ~~-25.2~~	-3.8		~60°F
02/28/18	1520	03/01/18	1520	20180228-312N33ST-03	21Ø6	FCØ861	— 8/5	-28 ~~-26.5~~	-3.8		~70°F

Comments:

-01 Basement Indoor Air Just east of hot water heater

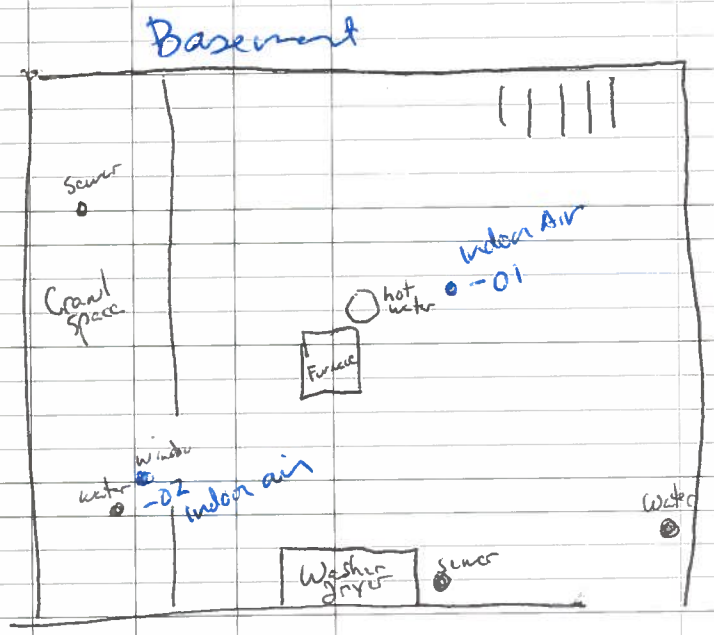
-02 Crawlspace - Right inside on ground of crawl ≅18" inside (Crawlspace is on west of basement)

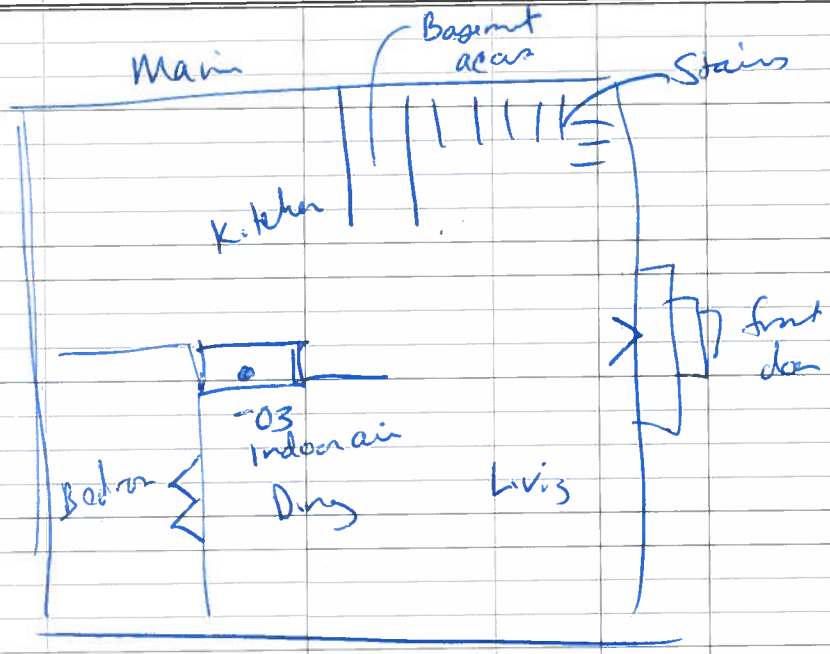
-03 Indoor air main floor living room buffet

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s): MDEQ Billings PCE 312 N 33rd Street

Location Sketch:





Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	312 N 33rd St.	4 Gas :	QRAE2 / 152-M1984
Project Name:	BPCE	PID (model/serial #):	ppbRAE3000 / 12875
Sample location:	Basement Subslab	Helium Detector (model/serial #):	Dialectric / 041554
Date:	03/01/2018	Weather:	mostly Cloudy; NNE 5mph
Field Personnel:	BS, ST, JR, JS, SS	Air Temp:	33°F
Recorded by:	BS Joel Riebli	Atmospheric Pressure:	29.93 in

Slab Data

Surface/slab Type:	Concrete
Surface/slab Thickness (inches):	7 1/4"
Slab/subsurface substrate comments:	unknown substrate below concrete pad
Depth of hole through the slab:	7 1/2"
Length of sampling train (feet):	4'

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 120mL

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
03/01/18	1525	100	21.8	23.2				
	1526	200	20.0	21.8				
	1526	300	21.7	22.4				
	1527	400	20.9	21.7				
	1527	500	20.1	20.9	150 ppm	12 ppb		

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
03/01/18	1529	1608	20180301-312N33ST-01	3471	FC 1170	—	-27.2	-4.4

Comments:

		initial	Final	
Leak Test (2 min)	#3471	-27.2 in	-27.2 in	Pass

CO = 0 ppm H_2S = 0.0 ppm Oxy = 20.9 LEL = 0 %

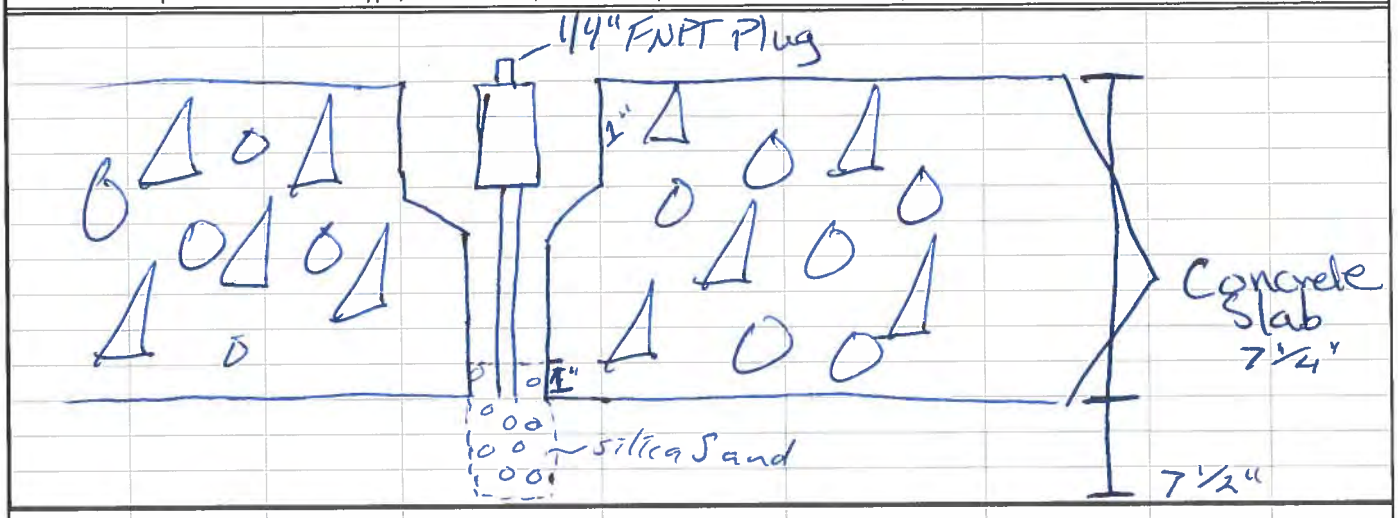
Highest He concentration in the shroud = 38.2 %

Sub-Slab Soil Vapor Sampling Field Data Sheet

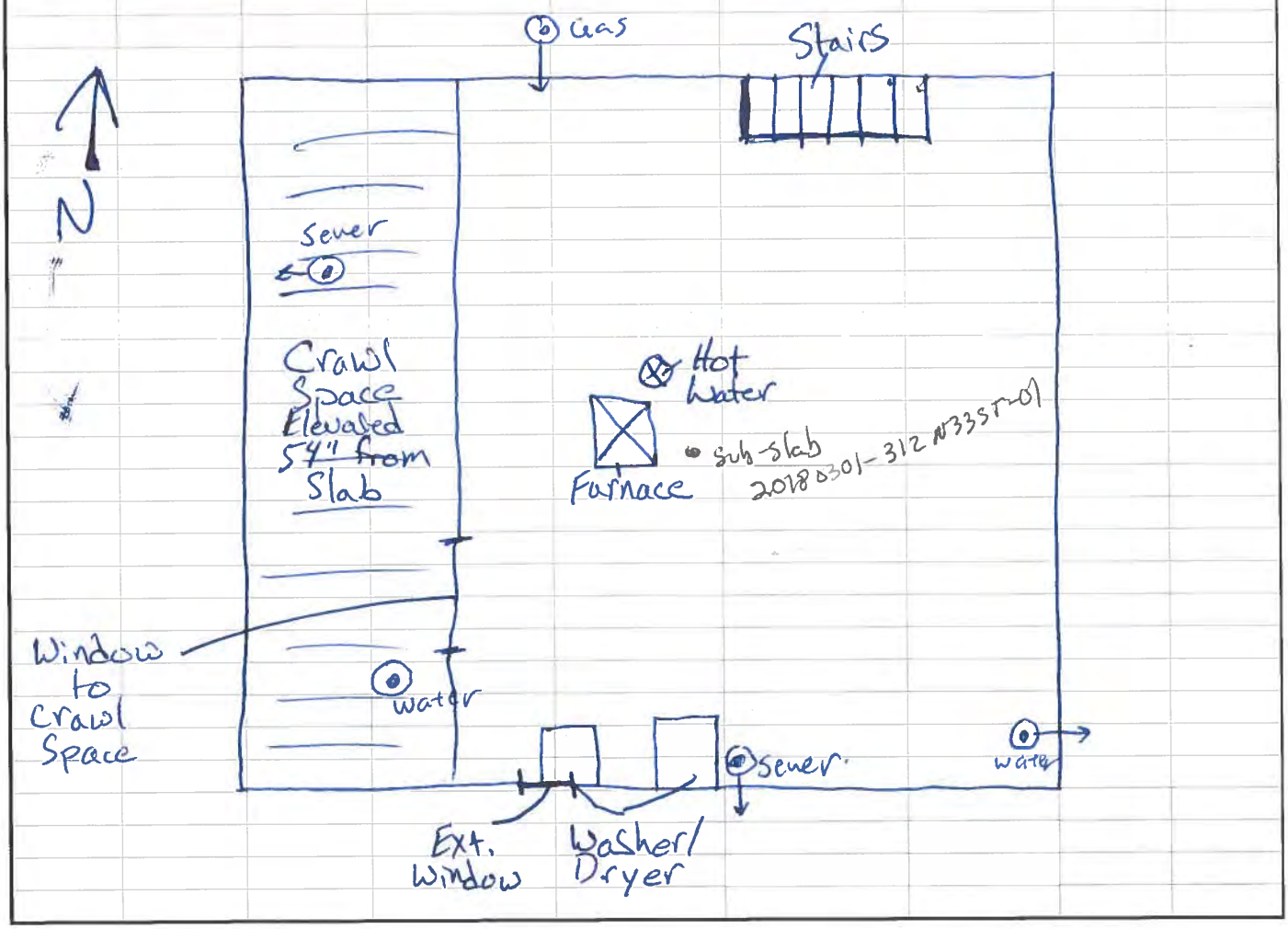
Project Name: ~~PCE~~ BPCE
Date: 2/26/18

Sample Location/ ID: 312 N 33rd St.

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.



Location Sketch: Basement



OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Filled out by S. SEITZ

Date: 2/24/18

1. Name: John Mammenga

   Address: 312 N 33rd St.

   Home Phone: _____ Work Phone: _____

2. What is the best time to call to speak with you? _____ At: Work ☐ or Home ☐ ?

3. Are you the Owner ☐, Renter ☑, Other ☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

   ~~Dennis Tresidder~~ From cadastral for 310 N 33rd St.
   ~~1210 2nd St W~~ S/S Dennis Tresidder
   ~~Billings, MT 59101~~ 1210 2nd St W, Billings MT 59101

4. Total number of occupants/persons at this location? 2 adults
   Number of Children — Ages —

5. How long have you lived at this location? 2 years

General Home Description

6. Type of Home/Structure (check only one): Single Family Home ☑, Duplex ☐, Apartment ☐, Townhouse ☐ Other _____

7. Home/Structure Description:
   Number of floors: 2 floors
   Basement ☑
   Crawlspace ☑
   Partial Crawlspace/Basement ☑ % of each 50/50
   Slab On Grade ☐
   Other ☐ _____

8. Age of Home/Structure: _____ years, Not Sure/Unknown ☐ cadastral

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood ☑, Brick ☐, Concrete ☐, Cement block ☐, Other ☐ _____
   Garage: ☐ Attached ☐ Detached ☐ None

10. Foundation Construction (check all that apply):
    Concrete Slab ☑
    Fieldstone ☐
    Concrete Block ☐
    Elevated Above Ground/Grade ☐
    Other ☐ _____

11. Do you have Private Well ☐ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____
_____ no well
_____

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____ city water city sewer
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☐

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☐ Unfinished ☑ Partially Finished ☐ Partial Crawlspace ☐?

15. If finished, how many rooms are in the basement? _____
What are rooms used for? Bedrooms ☐ Family Room ☐ Storage ☐
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐

17. Is the basement floor (check all that apply) Concrete ☐, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☐, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

Describe the moisture problem _____
_____
_____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☑

21. Does the basement have any of the following? Floor Cracks ☑, Wall Cracks ☐, Sump ☐,
Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe_____

Slab not one full pour
partial crawlspace
plastic

22. Are any of the following used or stored in the basement (check all that apply):
- ☒ Paint
- ☐ Solvents (degreasers, paint thinner, etc.)
- ☐ Fuels/Oils (gasoline, diesel, used oil)
- ☐ Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- ☐ Pesticides

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☐ No ☒
If yes, specify what was done, where in the home, and what month:

24. Have you installed new carpeting in your home within the last year? Yes ☐ No ☒
If yes, when and where? _____

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
No ☒

26. Does anyone in your home use solvents at work?
Yes ☐ If yes, how many persons?
No ☒ If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes ☐ No ☐

28. Where is the washer/dryer located?
Basement ☒
Upstairs Utility Room ☐
Kitchen ☐
Garage ☐
Use a Laundromat ☐
Other, please specify ☐ _____

29. If you have a dryer, is it vented to the outdoors? Yes ☒ No ☐

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas ☒, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system:
- Forced Hot Air ☐
- Forced Hot Water ☒
- Steam ☐
- Radiant Floor Heat ☐
- Wood Stove ☐
- Coal Furnace ☐
- Fireplace ☐
- Other ☐ _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? _____
_____
How is/was the tank filled? NO unknown of past
_____
Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☒ No ☐
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☒
Other (please specify) _____

33. Do you use any of the following? Room Fans ☐, Ceiling Fans ☐, Attic Fan ☐ NO

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☒

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☒ Unknown ☐
If yes, please specify type of pest controlled _____
And approximate date of service _____

36. Water heater type: Gas ☒, Electric ☐, by Furnace ☐,
Other (please describe) _____

37. Water heater location: Basement ☒, Upstairs Utility Room ☐, Garage ☐,
Other (please specify) _____

38. What type of cooking appliance do you have? Electric ☐, Gas ☒
Other (please describe) _____

39. Is there a stove exhaust hood present? Yes ☐ No ☒
Does it vent to the outdoors? Yes ☐ No ☐

40. Smoking in Home:
None ☒, Rare (only guests) ☐, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐

41. If yes to question 40, what is smoked?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☐ No ☒

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____
_____
NO
_____

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation: _____
_____
NO
_____

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants routine	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

45. Please check weekly household cleaning practices:

- Dusting ☐
- Dry Sweeping ☐
- Vacuuming ☐
- Polishing (furniture, etc.) ☐
- Washing/Waxing Floors ☐
- Other (describe) ☐ _____

routine

46. Other comments:

_____

_____

_____

_____

_____

_____

_____

_____

_____

47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

Excavation, Drilling, and Utility-Locating Checklist

Task: Sub-slab installation	Date	Initials
A. Excavation-site planning:		
1. The local One Call regulations have been checked for local utility-notification requirements (e.g., 48 hours vs. 72 hours).	2/26	JR
2. Per the local One Call regulations, list the responsible party (generally the excavation/drilling contractor) for requesting and verifying completion of utility locates below: Trihydro	2/26	JR
3. The property owner and/or business owner has been notified of the excavation schedule.	2/26	JR
4. Each proposed excavation site or "area of interest" has been delineated for utility-line locators using white spray paint and/or wooden stakes/lathes with white flagging.	NA	JR
5. Public-utility locates have been requested by calling One Call at least 48 hours (72 hours in some states) before work is scheduled to begin, and the request includes depths, as available.	2/26	JR
6. Each utility company has been notified of the excavation schedule and invited to review the proposed excavation sites.	2/26	JR
7. On-site meetings have been scheduled with the appropriate representatives of critical utility facilities (e.g., gas/oil pipelines, high-voltage cables, fiber-optic lines).	NA	JR
8. Private-utility locates—including fuel lines; tanks; and water, sewer, gas, electricity, and other utilities—have been requested.	NA	JR
9. The property owner was contacted to determine if he/she knows of privately owned subsurface facilities within 5 feet of the proposed excavation sites. (Review locations with the manager/owner.) Examples of privately owned facilities that are not commonly marked on private property include:	2/26	JR
a) Water and sewer laterals 2 sewers & 2 water lines	2/26	JR
b) Gas lines	2/26	JR
c) Power lines (including those for landscape/yard lighting, pool and spa lines, and "out building" lines)	2/26	JR
d) Irrigation lines	NA	JR
e) Communication lines (cable, telephone, Internet)	2/26	JR
f) Propane tank lines	NA	JR
10. The proposed excavation sites have been reviewed by the appropriate stakeholders (e.g., owner, tenant, driller, excavator) and the Trihydro project manager.	2/26	JR
11. Proposed excavation sites have been visually inspected, and available plans and aerial photos have been reviewed for evidence of potential utilities.	2/26	JR
12. A scaled site plan showing the proposed excavation sites relative to subsurface utilities has been prepared and is available for stakeholder/Management review.	NA	JR
13. The basis for each buried utility line's location and the accuracy of the data defining the utility location are documented on the site plan.	NA	JR
14. The proposed excavation sites are at least 5 feet from subsurface utilities shown on the building plans.	NA	JR
15. The proposed excavation sites are at least 5 feet from subsurface utilities shown on public right-of-way / street-improvement plans. [Note: Work with utility companies to determine if they require a representative present during excavation activities.]	2/26	JR
16. The proposed excavation sites are at least 7 feet from the pad surrounding underground storage tanks (USTs) shown on the building plans.	2/26	JR
17. The utility-locate ticket number is available on site. 18004863 2/24/18	2/26	JR
18. A traffic-control plan has been prepared if appropriate. Note: If the project area encompasses a public street or right of way, the local and/or state authority must approve the traffic-control plan before fieldwork begins.	NA	JR
19. Arrangements have been made to contact the appropriate personnel if utility-line repairs are needed. (Who must be contacted if a line is unexpectedly damaged?)	2/26	JR
20. Contact information is in place and readily available with the driller, excavator, and other project stakeholders.	2/26	JR
21. The client and other relevant stakeholders (if any) have been notified of the excavation planning/pre-planning steps and results.	NA	JR
22. A detailed work scope was developed by the project team and reviewed by the Project Director and Contracting Team.	NA	JR
Project Director (excavation-site planning tasks):		

312 N. 33rd Street

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
B. Utility-line marking:		
1. Electrical circuits are energized during utility-line marking for subsurface power lines (e.g., circuits on timers or light-sensing switches).	2/26	JR
2. Public-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	2/26	JR
3. Private-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	NA	JR
4. Verify that One Call locators marked their facilities in the designated excavation area or provided notification that they do not have any facilities near the proposed excavation sites.	2/26	JR
5. One Call was contacted to request a "refresh" if utility-locate markings are missing, difficult to see, or more than 14 days old (7 days in some states). "Refresh" markings must be performed by the original marking organization.	NA	JR
Project Director (utility-line marking tasks):		
C. Job walk:		
1. Visual verification that each proposed excavation site does not lie on a line connecting two similar-looking manhole covers (e.g., sanitary sewers or storm drains). (Consider having the line snaked to confirm their locations.)	2/26	JR
2. Visual verification that each proposed excavation site does not lie on a line with any water, gas, electrical meters, utility cleanouts, or other utility boxes in the surrounding areas.	2/26	JR
3. Visual verification that the pavement near each proposed excavation site has not subsided or give the appearance it may be covering a previous excavation (e.g., linear cracks or sagging curbs).	2/26	JR
4. Visual verification that each proposed excavation has adequate overhead clearance for the excavation equipment (e.g., at least 10 feet from overhead-utility lines and/or reasonable distance from canopies).	2/26	JR
5. Fences and fields have been checked for markers, signs, posts, valves, stub outs, etc.	NA	JR
6. Surface structures such as tank batteries, wells, valves, phone pedestals, and electrical junction boxes have been checked for evidence of subsurface utilities.	NA	JR
7. Observed evidence of subsurface utilities has been photographed, sketched, or otherwise documented.	2/26	JR
8. Proposed excavation sites have been "walked"/reviewed by the excavation contractor, Trihydro project manager, and other stakeholders (e.g., client representative, property owner, tenant).	2/26	JR
9. Proposed excavation sites are located at least 5 feet from marked utilities (i.e., the "tolerance zone"), or written approval to excavate within the 5-foot tolerance zone has been obtained from the appropriate utility owner. In no case shall a proposed excavation be located closer than 2 feet from the outside edge of a marked utility. (Note: The tolerance zone is measured from the outside edge of a subsurface structure—not its centerline.)	2/26	JR
10. Verify that the excavation contractor (with help from appropriate utility-line locators, if part of the client-approved work scope) has walked each proposed excavation site to verify all expected utility-line markings are present.	2/26	JR
11. Traffic-control devices, safety barricades, caution tape, and other safety-management devices are in place as needed to protect project personnel.	NA	JR
Project Director (job-walk tasks):		
D. Daylighting / potholing / "soft digging":		
1. The proposed excavation sites located within the "tolerance zone" (and sites located outside the "tolerance zone" when required by the client) have been potholed to a depth below the anticipated utility zone using "minimally intrusive excavation methods" such as vacuum excavation (either air-entrainment or water-jet) and careful hand-tool use.	NA	JR
2. Monitoring and emergency equipment is available on site when hazardous atmospheres are expected to be encountered in the potholing excavations.	↓	↓
3. A list of emergency-contact names/numbers is maintained at the potholing excavation site.		
4. The project health and safety plan addresses potential hazards and safety-performance requirements related to utility-clearance operations.		
5. The location of and directions to the nearest hospital are known by all members of the project team.		
6. Representatives of utility owners that requested to be on site for utility locates are present.		

312 N. 33rd Street

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
7. Pothole excavations have been visually checked with a flashlight by the excavation contractor, Trihydro project manager, or her/his designee.	NA	JR
8. Utilities adjacent to the excavation or that cross the excavation have been daylighted using "minimally intrusive excavation methods."		
9. The areal extent of the excavation-clearance pothole has been verified to extend at least 120% beyond the outside diameter of the largest-diameter down-hole tool to be used in the borehole, or at least 2 feet on each side of daylighted/exposed lines, whichever is greater.		
10. If vacuum excavation (e.g., air knife, air vac, hydro-vac) is not available to daylight utility lines, verify that the non-conductive probe method was used as follows: Scratch the ground no more than 10 inches deep above the utility and then probe the scratched area. If the utility isn't found in the scratched area, repeat the first step until the utility is located. Once the utility is found, its depth must be continually verified with the probe until 2 feet of soil remain above the utility. Carefully hand dig the remaining overburden to expose the utility.		
11. The soil encountered in the excavation-clearance pothole has been verified to be free of bedding material (e.g., clean gravel, clean sand, aggregate base [gravelly sand with ~10% fines], or other non-native-looking material) that could indicate the presence of a previously installed utility line.		
12. Excavation work within 2 feet of an underground utility was "hand dug."		
13. Once the utility lines were exposed and the excavations were safe to enter, the exposed lines (including their protective coating) was examined for damage.		
14. The condition of each utility line exposed during daylighting was documented, and the documentation was forwarded to the Trihydro project manager to place in the project file.		
15. If a utility line was damaged in any way, it was reported to the utility owner and Trihydro project manager and documented in the project file.		
16. Damage to a utility line was documented and repaired before it was reburied. The utility owner signed off on the repairs.		
17. Employees entering the excavation followed the procedures described in the Trihydro "Trenching and Excavation Program" and used the Trihydro "Daily Excavation/Trench Inspection Report" to document excavation condition.		
18. The location of daylighted utilities was documented and photographed after daylighting was completed and before the pothole excavation was backfilled.		
19. Locations for hand digging within the "tolerance zone" were noted.		
Project Director (daylighting/potholing tasks):		
E. Excavation (including drilling):		
1. The appropriate permits have been obtained for the work (e.g., hot-work permits, entry permits).	NA	JR
2. The utility-owner and/or agency representatives that requested to be on site during excavation work are present. (Trihydro Utility Locate Acknowledgement Form)	NA	JR
3. A safety kickoff meeting was conducted with the excavation contractor to review roles/responsibilities, work activities, anticipated hazards, this checklist, and emergency-response procedures before starting excavation work the site. The safety kickoff meeting was documented in the project file.	2/26	JR
4. A daily tailgate safety meeting was conducted and documented in the project file. Verify weather conditions, safety hazards, PPE requirements, job duties, communication, hand signals, etc.	2/26	JR
5. JSAs covering the work to be done are in place and have been reviewed, "marked up" where appropriate, and acknowledged by the excavation project-team members.	2/26	JR
6. Site workers have been reminded to look for hazardous conditions, processes, and activities, and that they are authorized to stop work if they see an unsafe condition.	2/26	JR
7. The emergency-response plan has been reviewed by all excavation project-team members (e.g., contact numbers, evacuation muster points, hospital routes).	2/26	JR
8. The excavation contractor has checked the excavation sites relative to overhead utilities, subsurface-utility locates, and adjacent surface structures.	2/26	JR
9. The excavation contractor has acknowledged the potential location of each subsurface utility marked in the excavation areas.	2/26	JR
10. Proper traffic control and exclusion zones have been established.	NA	JR
11. The excavation equipment (e.g., drill rig, backhoe) has been inspected for proper operation and condition.	2/26	JR
12. Emergency equipment (fire extinguisher, first aid kit, emergency shut-off switch, etc.) has been checked, is readily available, and is in working order.	2/26	JR
13. Excavation project-team members are wearing appropriate PPE per the Trihydro HASP and client/site-specific requirements.	2/26	JR
14. Power in the excavation area has been de-energized, if possible. If power cannot be de-energized, the excavation contractor was advised of the hazard.	NO	JR

312 N. 33rd Street

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
Project Director (excavation/drilling tasks):		
F. If an unmarked utility line is discovered:		
1. Verify the One Call utility-locate request was made correctly.	2/26	JR
2. Identify the owner/operator of the unmarked utility line and contact One Call (dial "811") to request a "No Response" ticket. If the owner/operator fails to respond again, seek a third-party locating service to mark the utility before: a) excavation work begins, or b) advancing the excavation further.	2/26	JR
3. Contact the owner/operator of non-locatable utilities to request they be taken out of service before excavation begins.	2/26	JR
4. If possible, a representative of the unmarked utility line should be on site when the unmarked utility is daylighted.	NA	JR
Project Director (unmarked utility line tasks):		

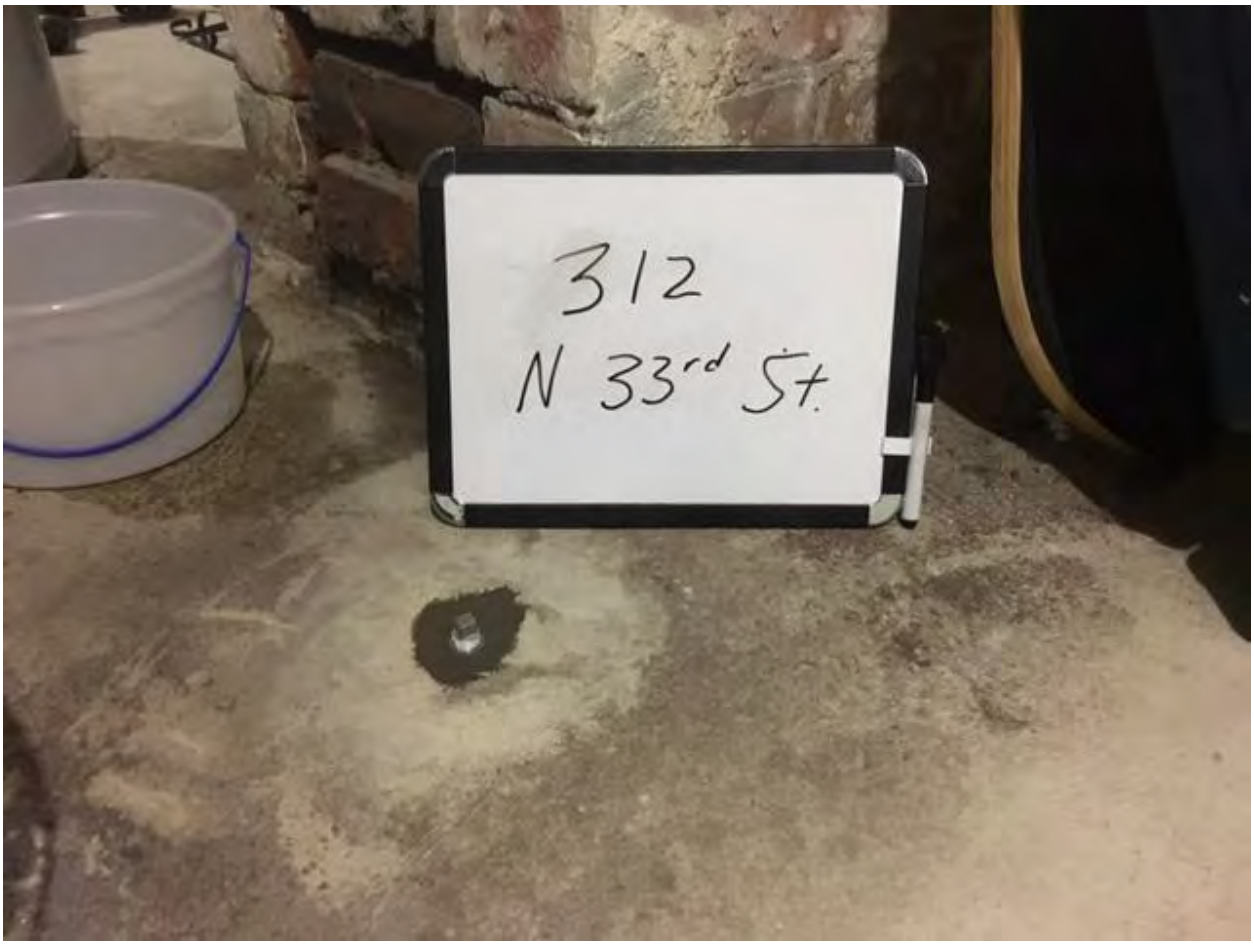
Note:

-- If an item doesn't apply, please insert an "NA" in the "**Date**" column and provide an explanation in the "**Project Notes**" section below.

Sarah Sor Andrew Vana	Syris/Brandt/Jake/Joel/Sarah	2/26/2018
Project Manager	Field Manager / Team Members	Date Reviewed
MDEQ / Billings PCE / 312 N. 33rd Street	Trihydro	
Client / Project Name / Location	Excavator/Driller Name	Date Action Items Completed

Project Notes: [Please cross reference to the appropriate checklist-item number[s] when possible.]

VI Sample: 312 N 33rd St_Subslab



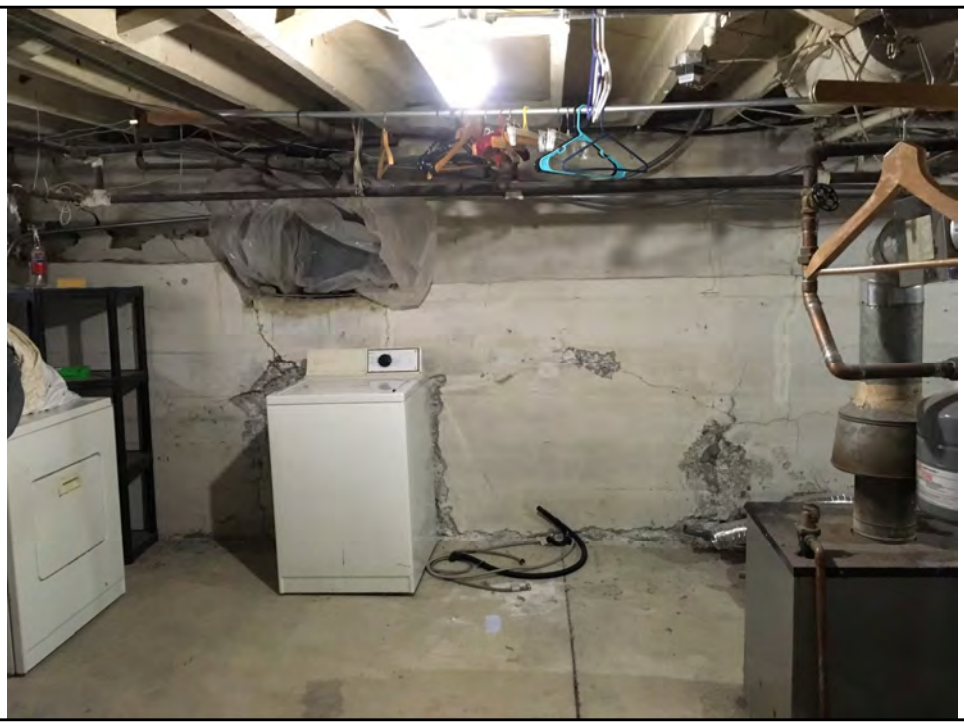
VI Sample: 312 N 33rd St_Subslab

ADDRESS: 312 N 33RD ST

NOTES:
INDOOR AIR BASEMENT – ONLY PLASTIC BETWEEN BASEMENT AND CRAWL SPACE

ADDRESS: 312 N 33RD ST

NOTES:
CRAWL SPACE SAMPLE ON WEST SIDE OF BASEMENT BEHIND PLASTIC SHEETING



ADDRESS: 312 N 33RD ST

NOTES:
BASEMENT VIEW LOOKING TOWARD CRAWL SPACE OPENING ON WEST

ADDRESS: 312 N 33RD ST

NOTES:
INDOOR AIR MAIN FLOOR IN DINING ROOM

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Derek Doles

Physical Address of property under investigation: 317 Terry Ave

Mailing Address: Same

Phone (optional):

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
02/05/18	Indoor Air	20180205-317Terry-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
02/05/18	Basement Air	20180205-317Terry-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
02/05/18	Crawlspace Air	20180205-317Terry-03	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
02/06/18	Sub-slab vapor	20180206-317Terry-01	VOCs, APH, Fixed Gases, Helium

*OTHER (specify analysis) Indoor Air Analyses - VOCs (TO-15), APH (Petroleum)

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample. NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

Signature: On behalf DEQ

Printed Name: S SEITZ (Trinydro)

Telephone #: 406-558-4850

Date: 2/6/18

Property owner/operator copy = white DEQ copy = yellow

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	317 Terry Ave, Billings MT		
Project Name:	PCE Billings	PID (model/serial #):	ppbrae 3000 / 22839
Sample location:	sub-slab	Helium Detector (model/serial #):	Dielectric / 8628
Date:	02/06/2018	Weather:	Cloudy & snowy
Field Personnel:	Joel & Cameron	Air Temp:	20°F
Recorded by:	Joel Riebli	Atmospheric Pressure:	30.4"

Slab Data

Surface/slab Type:	Concrete, cracked
Surface/slab Thickness (inches):	~12"
Slab/subsurface substrate comments:	Crack in concrete approx 10" from sample port
Depth of hole through the slab:	12"
Length of sampling train (feet):	3'

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 90

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
	1615	100	31.1	31.8				
	1616	200	30.0	31.1				
	1616	300	28.9	30.0				
	1617	400	27.6	28.9				
	1618	500	26.6	27.2	1575	Ø		

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
02/06/18	1620	1656	20180206-317 Terry -01	#0652	FC0652		-27.3	-4.7

Comments: Shut in test: -27.3 initial -27.3 after 2 minutes. Passed.

* Concrete crack near sub-slab sample port that is under the sample shroud.
* Radon remediation station is running - also during testing.

highest he reading under the shroud = 35.3 %

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	317 Terry	Start Weather:	Cloudy, snowy, overcast
		Start Outdoor Air Temp:	15°F
Project Name:	Billings PCE	Start Atmospheric Pressure:	30.3 in Hg.
Sample Location:	Indoor, basement + CS		
Date:	2/5/18	End Weather:	Cloudy, snowy, light snow, NE wind 15mph
Field Personnel:	ST/JR/MO	End Outdoor Air Temp:	20°F
Recorded by:	MO	End Atmospheric Pressure:	30.4 in Hg

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
2/5/18	1605	2/6/18	1605	20180205-317TERRY-01	2136	0759	—	-27.5	-2 in Hg	65	65*
2/5/18	1607	2/6/18	1607	20180205-317 TERRY-02	0981	1013	—	-28	-2 in Hg	65	65
2/5/18	1610	2/6/18	1610	20180205-317TERRY-03	1632	0260	—	-26.6	0 in Hg	65	65

Comments:

Shut in test -01 2136 27.5 25.0 pass Indoor Air main floor -01
Shut in test -02 0981 28.0 28.0 pass Basement main area -02
Shut in test -03 1632 26.0 26.0 pass Crawl space -03

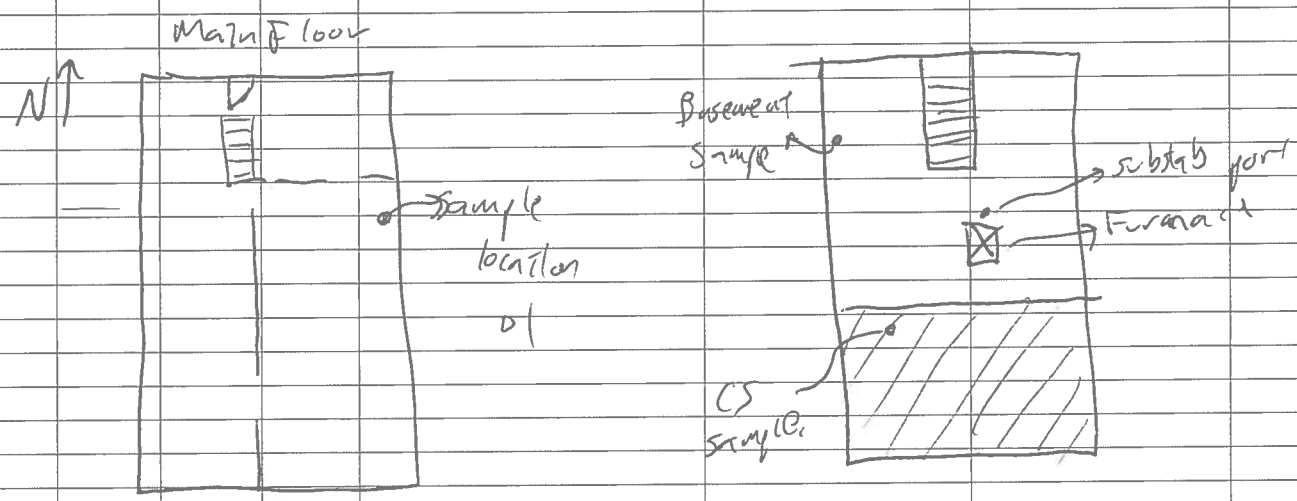
*upstairs, basement cooler

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

01 - Indoor Air Main floor living Room
02 - Basement Air, laundry room
03 - Crawlspace Air

Location Sketch:



OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 1-29-18

1. Name: Derek Doles

   Address: 317 Terry Ave.
   Billings, MT

   Home Phone: 406-896-9045 Work Phone: _____

2. What is the best time to call to speak with you? _____ At: Work ☐ or Home ☐ ?

3. Are you the Owner ☑, Renter ☐, Other ☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

   _____

   _____

   _____

4. Total number of occupants/persons at this location? 2
   Number of Children ___/___ Ages adults

5. How long have you lived at this location? Bought 2000, 18 years

General Home Description

6. Type of Home/Structure (check only one): Single Family Home ☑, Duplex ☐, Apartment ☐, Townhouse ☐ Other _____

7. Home/Structure Description:
   Number of floors: 2 floors
   Basement ☐
   Crawlspace ☐
   Partial Crawlspace/Basement ☑ % of each 2/3 rds
   Slab On Grade ☐
   Other ☐ _____

   Visqueen between crawlspace & basement
   Cement wall, between dirt & basements
   * sub-slab part not far from furnace

8. Age of Home/Structure: 1945 years, Not Sure/Unknown ☐

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood ☑, Brick ☐, Concrete ☐, Cement block ☐, Other ☐ _____
   Garage: ☐ Attached ☐ Detached ☐ None

10. Foundation Construction (check all that apply):
    Concrete Slab ☑
    Fieldstone ☐
    Concrete Block ☐
    Elevated Above Ground/Grade ☐
    Other ☐ _____

11. Do you have Private Well ☑ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____
NO

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____ city water / city sewer
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☑

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☐ Unfinished ☑ Partially Finished ☐ Partial Crawlspace ☐?

15. If finished, how many rooms are in the basement? _____
What are rooms used for? Bedrooms ☐ Family Room ☐ Storage ☑ rough
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☑

17. Is the basement floor (check all that apply) Concrete ☑, Tile ☐, Carpeted ☐, Dirt ☑,
Other ☐ _____ both

18. Are the basement walls Poured Concrete ☐, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☑
Typically dry no

Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☑

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐,
Floor Drain ☑, Other Hole/Opening In Floor ☐
Describe _____

22. Are any of the following used or stored in the basement (check all that apply):
- [x] Paint basement
- [ ] Solvents (degreasers, paint thinner, etc.) NO
- [ ] Fuels/Oils (gasoline, diesel, used oil) NO
- [x] Other Cleaners (drain cleaners, laundry spot treatment, other solvents) Some spot w/laundry
- [ ] Pesticides - spray raid/ant traps sometimes not now

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: NA

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☐ No ☑
If yes, specify what was done, where in the home, and what month:

floors refinished a couple summers ago ~ maybe 2016

24. Have you installed new carpeting in your home within the last year? Yes ☐ No ☑
If yes, when and where? _____

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐ way less once per quarter maybe ☑ rarely
Yes, work at a dry cleaning service ☐
No ☐

26. Does anyone in your home use solvents at work? used to but not now
Yes ☐ If yes, how many persons? oil field
No ☐ If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes ☐ No ☑

28. Where is the washer/dryer located?
Basement ☑
Upstairs Utility Room ☐
Kitchen ☐
Garage ☐
Use a Laundromat ☐
Other, please specify ☐ _____

29. If you have a dryer, is it vented to the outdoors? Yes ☑ No ☐

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas ☑, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system:
- Forced Hot Air ☑
- Forced Hot Water ☐
- Steam ☐
- Radiant Floor Heat ☐
- Wood Stove ☐
- Coal Furnace ☐
- Fireplace ☐
- Other ☐ _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? NO
How is/was the tank filled?
Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☐ No ☐
Central Air Conditioning ☑
Window Air Conditioning Unit(s) ☐
Other (please specify)

33. Do you use any of the following? Room Fans ☑, Ceiling Fans ☐, Attic Fan ☐

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☑

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☑ Unknown ☐
If yes, please specify type of pest controlled
And approximate date of service

36. Water heater type: Gas ☑, Electric ☐, by Furnace ☐,
Other (please describe)

37. Water heater location: Basement ☑, Upstairs Utility Room ☐, Garage ☐,
Other (please specify)

38. What type of cooking appliance do you have? Electric ☑, Gas ☐
Other (please describe)

39. Is there a stove exhaust hood present? Yes ☐ No ☑
Does it vent to the outdoors? Yes ☐ No ☐ NA

40. Smoking in Home:
None ☑, Rare (only guests) ☐, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐

41. If yes to question 40, what is smoked?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☐ No ☑ sporadically

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐
NO

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation:

yes – radon/vapor mitigation system by EPA updated by owners contractors

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

45. Please check weekly household cleaning practices:

Dusting ☐

Dry Sweeping ☐

Vacuuming ☐

Polishing (furniture, etc.) ☐

Washing/Waxing Floors ☐

Other (describe) ☐ _____

46. Other comments:

_____

_____

_____

_____

_____

_____

_____

_____

_____

47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

VI Sample: 317 Terry Ave_Basement

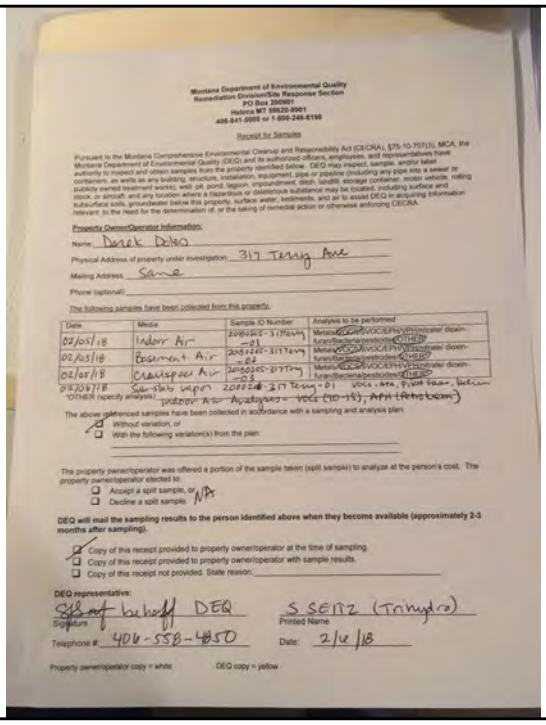
VI Sample: 317 Terry Ave_Crawlspace

ADDRESS: 317 TERRY AVE

NOTES:
SUBSLAB SAMPLE LOCATION

ADDRESS: 317 TERRY AVE

NOTES:
SUBSLAB SAMPLE LOCATION



Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

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Property Owner/Operator Information:

Name: Derek Dolso

Physical Address of property under investigation: 317 Terry Ave

Mailing Address: Same

Phone (optional):

The following samples have been collected from this property.

Date	Media	Sample ID Number	Analysis to be performed
02/05/18	Indoor Air	20180205-317Terry-01	Metals/VOCs/SVOC/PHV/EH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER
02/05/18	Basement Air	20180205-317Terry-02	Metals/VOCs/SVOC/PHV/EH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER
02/05/18	Crawlspace Air	20180205-317Terry-03	Metals/VOCs/SVOC/PHV/EH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER
2/12/18	Sub-slab vapor	20180205-317Terry-01	VOCs, MTBE, PCM Fear, Helium

*OTHER (specify analysis): ~~Indoor Air Analyses - VOCs (TO-15), APH (Ambient)~~

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample. N/A

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

Signature: ~~SS~~ behalf DEQ

Printed Name: S SEITZ (Trihydro)

Telephone #: 406-558-4850

Date: 2/12/18

Property owner/operator copy = white DEQ copy = yellow

ADDRESS: 317 TERRY AVE

NOTES:
SAMPLE RECEIPT

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Kelsey Condon

Physical Address of property under investigation: 319 Custer, Billings MT

Mailing Address: Same

Phone (optional): –

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/9/18	Indoor Air	20180209-319CUSTER -02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/9/18	Basement/Crawl Air	20180209-319CUSTER -01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/10/18	Sub slab vapor	20180210-319CUSTER -01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*

*OTHER (specify analysis) Indoor/Basement Air: TO15 (VOCs), APH (Petroleum)
Sub slab vapor: TO15 (VOCs), APH (Petroleum), Fixed Gases, Helium

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample. NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

Signature: on behalf DEQ

Printed Name: S. SEITZ (TRI HYDRO)

Telephone #: 406-558-4850

Date: 2/10/18

Property owner/operator copy = white DEQ copy = yellow

Sub-Slab Soil Vapor Sampling Field Data Sheet

-26

Prepared by the Montana Department of Environmental Quality

Site ID:	319 Custer Ave		
Project Name:	MT DEQ Billings PCE	PID (model/serial #):	ppb RE4300 / 12875
Sample location:	Basement Part	Helium Detector (model/serial #):	Dielectric / 8628
Date:	2/10/18	Weather:	Cold, Sunny
Field Personnel:	ST, MG, SS, M. Gipson	Air Temp:	-30F
Recorded by:	ST	Atmospheric Pressure:	30.3 inHg

Slab Data

Surface/slab Type:	Concrete with blockwalls, open crawlspace
Surface/slab Thickness (inches):	3"; Sand under slab
Slab/subsurface substrate comments:	Concrete with cracking on slab
Depth of hole through the slab:	13"; Sand 3" → 13"
Length of sampling train (feet):	5'2" sample ≈ 4.3 ft → 5 ft

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 150 ml

Helium Tracer Leak Test Field Data / **Sample Collection Data**

Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
2/10/18	~~1059~~ 1130	50	~~29.2~~ 27.7	~~29.5~~ 27.9				
2/10/18	~~1100~~ 1130	100	~~28.4~~ 27.4	~~28.8~~ 27.6				
2/10/18	~~1101~~ 1130	150	27.1	~~28.1~~ 27.3				
2/10/18	1131	200	26.8	27.0				
2/10/18	1131	250	26.7	26.7				

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

2/10/18	1131	300	26.3	26.4				
2/10/18	1132	350	26.0	26.1	15,050 ppm.			

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
2/10/18	1139	1217	20180210-319CUSTER-01	3326	1634		-26	-2.5
	1150	Valve to canister closed partially, opened fully						

He - 0ppm in sample train after sample. PID - 1952 ppb.

Comments:

Tubing plugged, unable to purge on 1st attempt. Removed tubing, found concrete in bottom of sample tube, causing plug. Abandoned the tubing, leaving only the cap in place. OVER

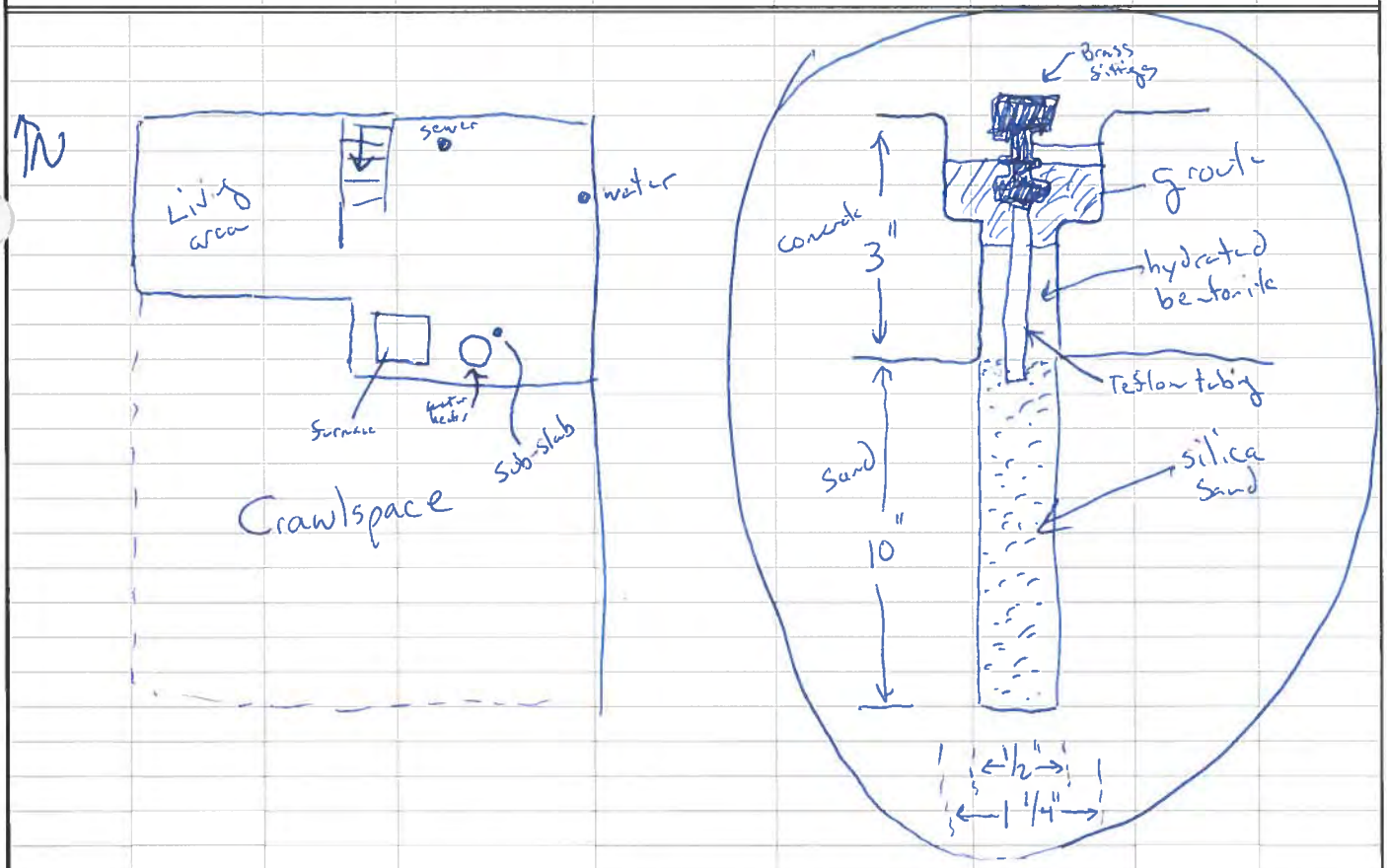
Sub-Slab Soil Vapor Sampling Field Data Sheet

Project Name: MTDEQ Billings PCE
Sample Location/ ID: 319 Custer Ave
Date:

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

Tubing removed, and sample train reassembled. Purge successful, but ~~Hg~~ elevated He in train. Train checked for leaks + reassembled. Clay placed around port. Due to limited ~~[illegible]~~ ~~[illegible]~~ Helium @ property, sample initiated w/o 3rd purge.

Location Sketch:



Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	319 Custer Ave	**Start Weather:**	Mostly Cloudy.
		Start Outdoor Air Temp:	3°F
Project Name:	MT DEQ Billings PCE	**Start Atmospheric Pressure:**	30.50 inhg
Sample Location:	Basement/crawlspace & main Floor		
Date:	02/09/2018	**End Weather:**	Sunny
Field Personnel:	Joel Riebli	**End Outdoor Air Temp:**	-3°F
Recorded by:	Joel Riebli	**End Atmospheric Pressure:**	30.3 inHg.

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
02/09/18	1047	2/10/18	1050	20180209-319custer-01	#2800	FC 0329		-23.2	-1.0	60°F	60°F
02/09/18	1045	2/10/18	1050	20180209-319custer-02	#1037	FC 0389		-28.0	-2.0	70°F	70°F

Comments:

2018 0209 - 319 custer - 01 is the basement/crawlspace sample. Place canister on the wall separating the finished basement and the crawlspace. ~~0~~

02 - Ambient air.

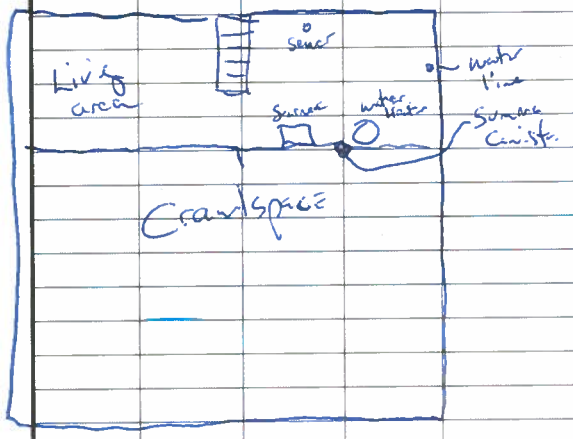
Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

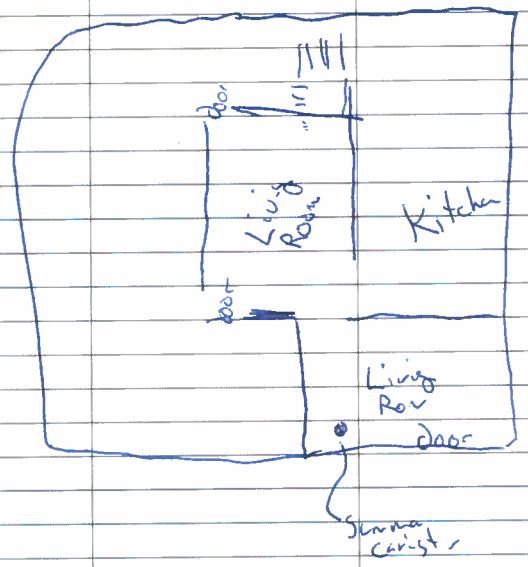
The Basement/crawlspace Sample: on 02/08/2019 the furnace located in the basement was worked on by another contractor. The property owner indicated that solvents were used on the maintenance of the furnace.

Location Sketch:

20180209-319 Custer-01:



20180209-319 Custer-02:



OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 2/8/18

1. Name: Kelsey Michael Condon

   Address: 319 CUSTER

   Home Phone: _____ Work Phone: _____

2. What is the best time to call to speak with you? _____ At: Work ☐ or Home ☒ ?

3. Are you the Owner ☒, Renter ☐, Other ☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

4. Total number of occupants/persons at this location? 2
   Number of Children 3 Ages 14-10

5. How long have you lived at this location? 10 yr

General Home Description

6. Type of Home/Structure (check only one): Single Family Home ☒, Duplex ☐, Apartment ☐, Townhouse ☐ Other _____

7. Home/Structure Description:
   Number of floors: 1
   Basement ☒
   Crawlspace ☐
   Partial Crawlspace/Basement ☒ % of each _____
   Slab On Grade ☐
   Other ☐ _____

8. Age of Home/Structure: 99 years, Not Sure/Unknown ☐

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood ☒, Brick ☐, Concrete ☐, Cement block ☐, Other ☐ _____
   Garage: ☐ Attached ☒ Detached ☐ None

10. Foundation Construction (check all that apply):
    Concrete Slab ☒
    Fieldstone ☐
    Concrete Block ☐
    Elevated Above Ground/Grade ☐
    Other ☐ _____

11. Do you have Private Well ☐ or Cistern ☐? Is there a GWIC number for your well? NO
If yes, please describe location, use, and current condition _____

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐ No
If yes, what is the construction type? _____
Where is it located? _____
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☐ No

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☐ Unfinished ☑ Partially Finished ☐ Partial Crawlspace ☐?

15. If finished, how many rooms are in the basement? _____
What are rooms used for? Bedrooms ☐ Family Room ☐ Storage ☐
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☒

17. Is the basement floor (check all that apply) Concrete ☒, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☐, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☑
No ☐

Describe the moisture problem Floor Drain backup

20. Does the basement ever flood?

Yes, frequently (3 or more times/year) ☐

Yes, occasionally (1-2 times/year) ☐

Yes, rarely (less that 1 time/year) ☑

No ☐

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐,
Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe _____

22. Are any of the following used or stored in the basement (check all that apply):
- ☐ Paint
- ☐ Solvents (degreasers, paint thinner, etc.)
- ☐ Fuels/Oils (gasoline, diesel, used oil)
- ☐ Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- ☐ Pesticides

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☒ No ☐
If yes, specify what was done, where in the home, and what month:
Paint.

24. Have you installed new carpeting in your home within the last year? Yes ☐ No ☒
If yes, when and where? _____

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
No ☒

26. Does anyone in your home use solvents at work?
Yes ☐ If yes, how many persons?
No ☒ If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes ☐ No ☐

28. Where is the washer/dryer located?
Basement ☒
Upstairs Utility Room ☐
Kitchen ☐
Garage ☐
Use a Laundromat ☐
Other, please specify ☐ _____

29. If you have a dryer, is it vented to the outdoors? Yes ☒ No ☐

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas ☒, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system:
- Forced Hot Air ☒
- Forced Hot Water ☐
- Steam ☐
- Radiant Floor Heat ☐
- Wood Stove ☐
- Coal Furnace ☐
- Fireplace ☐
- Other ☐ _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? No.

How is/was the tank filled?

Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☐ No ☒
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☐
Other (please specify)

33. Do you use any of the following? Room Fans ☒, Ceiling Fans ☐, Attic Fan ☐

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☒

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☒ Unknown ☐
If yes, please specify type of pest controlled
And approximate date of service

36. Water heater type: Gas ☒, Electric ☐, by Furnace ☐,
Other (please describe)

37. Water heater location: Basement ☒, Upstairs Utility Room ☐, Garage ☐,
Other (please specify)

38. What type of cooking appliance do you have? Electric ☒, Gas ☐
Other (please describe)

39. Is there a stove exhaust hood present? Yes ☐ No ☒
Does it vent to the outdoors? Yes ☐ No ☒

40. Smoking in Home:
None ☒, Rare (only guests) ☐, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐ former

41. If yes to question 40, what is smoked?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☒ No ☐

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation: No

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

45. Please check weekly household cleaning practices:

Dusting ☐
Dry Sweeping ☒
Vacuuming ☒
Polishing (furniture, etc.) ☐
Washing/Waxing Floors ☐
Other (describe) ☐ _____

46. Other comments:

_____
_____
_____
_____
_____
_____
_____
_____
_____

47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

Excavation, Drilling, and Utility-Locating Checklist

319 Custer Ave

Task	Date	Initials
A. Excavation-site planning:		
1. The local One Call regulations have been checked for local utility-notification requirements (e.g., 48 hours vs. 72 hours).	02/08/18	JR
2. Per the local One Call regulations, list the responsible party (generally the excavation/drilling contractor) for requesting and verifying completion of utility locates below: Trihydro	02/08/18	JR
3. The property owner and/or business owner has been notified of the excavation schedule.	02/04/18	JR
4. Each proposed excavation site or "area of interest" has been delineated for utility-line locators using white spray paint and/or wooden stakes/lathes with white flagging.	—	—
5. Public-utility locates have been requested by calling One Call at least 48 hours (72 hours in some states) before work is scheduled to begin, and the request includes depths, as available.	02/01/18	JR
6. Each utility company has been notified of the excavation schedule and invited to review the proposed excavation sites.	02/04/18	JR
7. On-site meetings have been scheduled with the appropriate representatives of critical utility facilities (e.g., gas/oil pipelines, high-voltage cables, fiber-optic lines).	—	—
8. Private-utility locates—including fuel lines; tanks; and water, sewer, gas, electricity, and other utilities—have been requested.	—	—
9. The property owner was contacted to determine if he/she knows of privately owned subsurface facilities within 5 feet of the proposed excavation sites. (Review locations with the manager/owner.) Examples of privately owned facilities that are not commonly marked on private property include:	02/08/18	JR
a) Water and sewer laterals — water east, sewer north	02/08/18	JR
b) Gas lines — east	02/08/18	JR
c) Power lines (including those for landscape/yard lighting, pool and spa lines, and "out building" lines) — North	02/08/18	JR
d) Irrigation lines	—	—
e) Communication lines (cable, telephone, Internet) — North	02/08/18	JR
f) Propane tank lines	—	—
10. The proposed excavation sites have been reviewed by the appropriate stakeholders (e.g., owner, tenant, driller, excavator) and the Trihydro project manager.	02/08/18	JR
11. Proposed excavation sites have been visually inspected, and available plans and aerial photos have been reviewed for evidence of potential utilities.	—	—
12. A scaled site plan showing the proposed excavation sites relative to subsurface utilities has been prepared and is available for stakeholder/Management review.	—	—
13. The basis for each buried utility line's location and the accuracy of the data defining the utility location are documented on the site plan.	—	—
14. The proposed excavation sites are at least 5 feet from subsurface utilities shown on the building plans.	—	—
15. The proposed excavation sites are at least 5 feet from subsurface utilities shown on public right-of-way / street-improvement plans. [Note: Work with utility companies to determine if they require a representative present during excavation activities.]	—	—
16. The proposed excavation sites are at least 7 feet from the pad surrounding underground storage tanks (USTs) shown on the building plans.	—	—
17. The utility-locate ticket number is available on site.	02/08/18	JR
18. A traffic-control plan has been prepared if appropriate. Note: If the project area encompasses a public street or right of way, the local and/or state authority must approve the traffic-control plan before fieldwork begins.	—	—
19. Arrangements have been made to contact the appropriate personnel if utility-line repairs are needed. (Who must be contacted if a line is unexpectedly damaged?)	02/08/18	JR
20. Contact information is in place and readily available with the driller, excavator, and other project stakeholders.	02/08/18	JR
21. The client and other relevant stakeholders (if any) have been notified of the excavation planning/pre-planning steps and results.	—	—
22. A detailed work scope was developed by the project team and reviewed by the Project Director and Contracting Team.	—	—
Project Director (excavation-site planning tasks):		

319 Custer Ave

Excavation, Drilling, and Utility-Locating Checklist 319 Custer

Task	Date	Initials
B. Utility-line marking:		
1. Electrical circuits are energized during utility-line marking for subsurface power lines (e.g., circuits on timers or light-sensing switches).	02/08/18	JR
2. Public-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	02/08/18	JR
3. Private-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	—	—
4. Verify that One Call locators marked their facilities in the designated excavation area or provided notification that they do not have any facilities near the proposed excavation sites.	02/08/18	JR
5. One Call was contacted to request a "refresh" if utility-locate markings are missing, difficult to see, or more than 14 days old (7 days in some states). "Refresh" markings must be performed by the original marking organization.	—	—
Project Director (utility-line marking tasks):		
C. Job walk:		
1. Visual verification that each proposed excavation site does not lie on a line connecting two similar-looking manhole covers (e.g., sanitary sewers or storm drains). (Consider having the line snaked to confirm their locations.)	02/08/18	JR
2. Visual verification that each proposed excavation site does not lie on a line with any water, gas, electrical meters, utility cleanouts, or other utility boxes in the surrounding areas.	02/08/18	JR
3. Visual verification that the pavement near each proposed excavation site has not subsided or give the appearance it may be covering a previous excavation (e.g., linear cracks or sagging curbs).	02/08/18	JR
4. Visual verification that each proposed excavation has adequate overhead clearance for the excavation equipment (e.g., at least 10 feet from overhead-utility lines and/or reasonable distance from canopies).	02/08/18	JR
5. Fences and fields have been checked for markers, signs, posts, valves, stub outs, etc.	02/08/18	JR
6. Surface structures such as tank batteries, wells, valves, phone pedestals, and electrical junction boxes have been checked for evidence of subsurface utilities.	—	—
7. Observed evidence of subsurface utilities has been photographed, sketched, or otherwise documented.	02/08/18	JR
8. Proposed excavation sites have been "walked"/reviewed by the excavation contractor, Trihydro project manager, and other stakeholders (e.g., client representative, property owner, tenant).	02/08/18	JR
9. Proposed excavation sites are located at least 5 feet from marked utilities (i.e., the "tolerance zone"), or written approval to excavate within the 5-foot tolerance zone has been obtained from the appropriate utility owner. In no case shall a proposed excavation be located closer than 2 feet from the outside edge of a marked utility. (Note: The tolerance zone is measured from the outside edge of a subsurface structure—not its centerline.)	02/08/18	JR
10. Verify that the excavation contractor (with help from appropriate utility-line locators, if part of the client-approved work scope) has walked each proposed excavation site to verify all expected utility-line markings are present.	02/08/18	JR
11. Traffic-control devices, safety barricades, caution tape, and other safety-management devices are in place as needed to protect project personnel.	—	—
Project Director (job-walk tasks):		
D. Daylighting / potholing / "soft digging":		
1. The proposed excavation sites located within the "tolerance zone" (and sites located outside the "tolerance zone" when required by the client) have been potholed to a depth below the anticipated utility zone using "minimally intrusive excavation methods" such as vacuum excavation (either air-entrainment or water-jet) and careful hand-tool use.		
2. Monitoring and emergency equipment is available on site when hazardous atmospheres are expected to be encountered in the potholing excavations.		
3. A list of emergency-contact names/numbers is maintained at the potholing excavation site.		
4. The project health and safety plan addresses potential hazards and safety-performance requirements related to utility-clearance operations.		
5. The location of and directions to the nearest hospital are known by all members of the project team.		
6. Representatives of utility owners that requested to be on site for utility locates are present.		

Excavation, Drilling, and Utility-Locating Checklist

31st Custer Ave

Task	Date	Initials
7. Pothole excavations have been visually checked with a flashlight by the excavation contractor, Trihydro project manager, or her/his designee.		
8. Utilities adjacent to the excavation or that cross the excavation have been daylighted using "minimally intrusive excavation methods."		
9. The areal extent of the excavation-clearance pothole has been verified to extend at least 120% beyond the outside diameter of the largest-diameter down-hole tool to be used in the borehole, or at least 2 feet on each side of daylighted/exposed lines, whichever is greater.		
10. If vacuum excavation (e.g., air knife, air vac, hydro-vac) is not available to daylight utility lines, verify that the non-conductive probe method was used as follows: Scratch the ground no more than 10 inches deep above the utility and then probe the scratched area. If the utility isn't found in the scratched area, repeat the first step until the utility is located. Once the utility is found, its depth must be continually verified with the probe until 2 feet of soil remain above the utility. Carefully hand dig the remaining overburden to expose the utility.		
11. The soil encountered in the excavation-clearance pothole has been verified to be free of bedding material (e.g., clean gravel, clean sand, aggregate base [gravelly sand with ~10% fines], or other non-native-looking material) that could indicate the presence of a previously installed utility line.		
12. Excavation work within 2 feet of an underground utility was "hand dug."		
13. Once the utility lines were exposed and the excavations were safe to enter, the exposed lines (including their protective coating) was examined for damage.		
14. The condition of each utility line exposed during daylighting was documented, and the documentation was forwarded to the Trihydro project manager to place in the project file.		
15. If a utility line was damaged in any way, it was reported to the utility owner and Trihydro project manager and documented in the project file.		
16. Damage to a utility line was documented and repaired before it was reburied. The utility owner signed off on the repairs.		
17. Employees entering the excavation followed the procedures described in the Trihydro "Trenching and Excavation Program" and used the Trihydro "Daily Excavation/Trench Inspection Report" to document excavation condition.		
18. The location of daylighted utilities was documented and photographed after daylighting was completed and before the pothole excavation was backfilled.		
19. Locations for hand digging within the "tolerance zone" were noted.		
Project Director (daylighting/potholing tasks):		
E. Excavation (including drilling):		
1. The appropriate permits have been obtained for the work (e.g., hot-work permits, entry permits).	—	—
2. The utility-owner and/or agency representatives that requested to be on site during excavation work are present. (Trihydro Utility Locate Acknowledgement Form)	—	—
3. A safety kickoff meeting was conducted with the excavation contractor to review roles/responsibilities, work activities, anticipated hazards, this checklist, and emergency-response procedures before starting excavation work the site. The safety kickoff meeting was documented in the project file.	02/08/18	JR
4. A daily tailgate safety meeting was conducted and documented in the project file. Verify weather conditions, safety hazards, PPE requirements, job duties, communication, hand signals, etc.	02/08/18	JR
5. JSAs covering the work to be done are in place and have been reviewed, "marked up" where appropriate, and acknowledged by the excavation project-team members.	02/08/18	JR
6. Site workers have been reminded to look for hazardous conditions, processes, and activities, and that they are authorized to stop work if they see an unsafe condition.	02/08/18	JR
7. The emergency-response plan has been reviewed by all excavation project-team members (e.g., contact numbers, evacuation muster points, hospital routes).	02/08/18	JR
8. The excavation contractor has checked the excavation sites relative to overhead utilities, subsurface-utility locates, and adjacent surface structures.	02/08/18	JR
9. The excavation contractor has acknowledged the potential location of each subsurface utility marked in the excavation areas.	02/08/18	JR
10. Proper traffic control and exclusion zones have been established.	—	—
11. The excavation equipment (e.g., drill rig, backhoe) has been inspected for proper operation and condition.	02/08/18	JR
12. Emergency equipment (fire extinguisher, first aid kit, emergency shut-off switch, etc.) has been checked, is readily available, and is in working order.	02/08/18	JR
13. Excavation project-team members are wearing appropriate PPE per the Trihydro HASP and client/site-specific requirements.	02/08/18	JR
14. Power in the excavation area has been de-energized, if possible. If power cannot be de-energized, the excavation contractor was advised of the hazard.	—	—

Excavation, Drilling, and Utility-Locating Checklist

319 Custer

Task	Date	Initials
Project Director (excavation/drilling tasks):		
F. If an unmarked utility line is discovered:		
1. Verify the One Call utility-locate request was made correctly.	02/08/18	JR
2. Identify the owner/operator of the unmarked utility line and contact One Call (dial "811") to request a "No Response" ticket. If the owner/operator fails to respond again, seek a third-party locating service to mark the utility before: a) excavation work begins, or b) advancing the excavation further.	—	—
3. Contact the owner/operator of non-locatable utilities to request they be taken out of service before excavation begins.	—	—
4. If possible, a representative of the unmarked utility line should be on site when the unmarked utility is daylighted.	—	—
Project Director (unmarked utility line tasks):		

Note:

-- If an item doesn't apply, please insert an "NA" in the "**Date**" column and provide an explanation in the "**Project Notes**" section below.

Andrew Vann	Joel Riebli & Camaro-Brown	
Project Manager	Field Manager / Team Members	Date Reviewed
MT DEQ / Billing PCE / 319 Custer Ave	Trihydro	
Client / Project Name / Location	Excavator/Driller Name	Date Action Items Completed

Project Notes: [Please cross reference to the appropriate checklist-item number[s] when possible.]

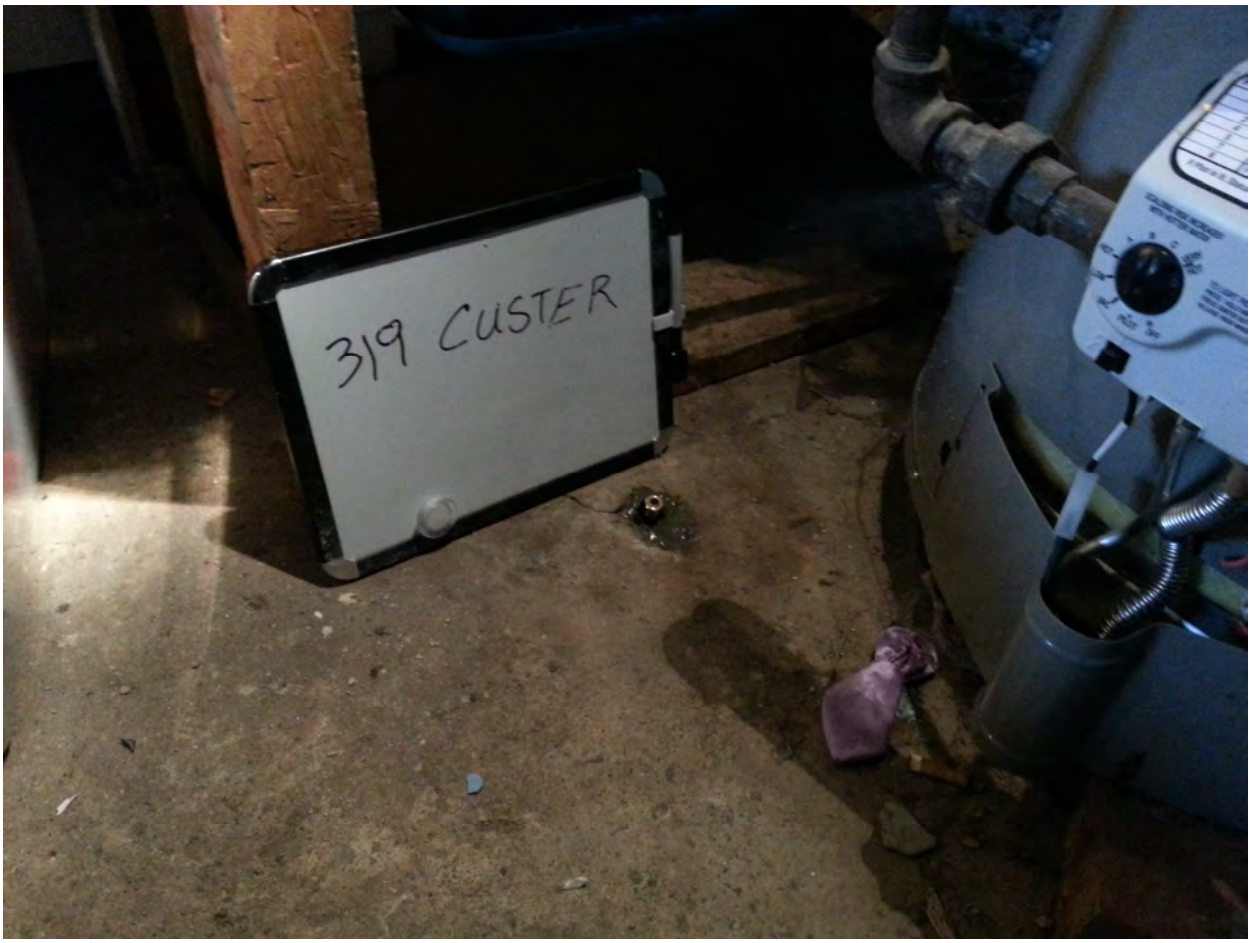
VI Sample: 319 Custer Ave_Basement/Crawlspace

VI Sample: 319 Custer Ave_Main

VI Sample: 319 Custer Ave_Basement/Crawlspace

VI Sample: 319 Custer Ave_Subslab

VI Sample: 319 Custer Ave_Subslab



VI Sample: 319 Custer Ave_Subslab

VI Sample: 319 Custer Ave_Subslab

Montana Department of Environmental Quality
Remediation Division/Site Response Section
1100 North Last Chance Gulch
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Dawn Lebrun
Physical Address of property under investigation: 323 Miles Ave.
Mailing Address: Same
Phone (optional): (406) 647-8353

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed (circle all that apply)
2/27/2018	Indoor Air	20180227-323Miles-01	Metals/VOCs/SVOC/EPH/VPH/nitrate/dioxin-furan/ Bacteria /pesticides/ OTHER*
2/27/2018	Indoor Air	20180227-323Miles-02	Metals/VOCs/SVOC/EPH/VPH/nitrate/dioxin-furan/ Bacteria /pesticides/ OTHER*
2/27/2018	Indoor Air	20180227-01	Metals/VOCs/SVOC/EPH/VPH/nitrate/dioxin-furan/ Bacteria /pesticides/ OTHER*

*OTHER (specify analysis): Indoor air:TO-15, APH Sub-slab: TO-15, APH, Fixed Gases, Methane

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.
- ☑ N/A

DEQ will mail the results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason: _____

DEQ representative:

S/Seitz on behalf of DEQ
Signature

S. Seitz
Printed Name

Telephone # 406-558-4850

Date: 3/1/2018

Property owner/operator copy = white DEQ copy = yellow

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	323 MILES	Start Weather:	Sunny, <5 mph.
		Start Outdoor Air Temp:	33°F
Project Name:	BPCE	Start Atmospheric Pressure:	30.08
Sample Location:	CS / IA.		
Date:	2/27/18	End Weather:	Sunny, 5-10 mph. South
Field Personnel:	ST / JS	End Outdoor Air Temp:	39°F
Recorded by:	ST	End Atmospheric Pressure:	30.04

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
2/27/18	1135	2/28/18	1136	20180227-323MILES-01	1234	1439		-27	1.5	63°	
2/27/18	1135	2/28/18	1136	20180227-A	2142	0030		-25	2	63°	
2/27/18	1138	2/28/18	1135	20180227-323MILES-02	1563	1400		-28	3	70°	

Comments:

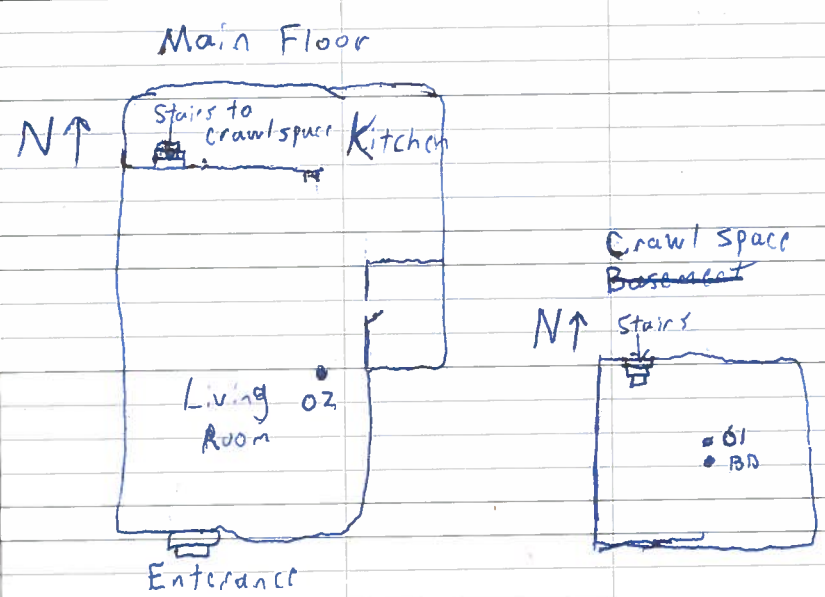
01- Crawlspace
02 - Indoor Air
A - Duplicate of Crawlspace

698-9056 PAM.

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

Location Sketch:



OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 2/27/18

1. Name: Dawn Lebrun

   Address:
   323 Miles Ave.
   Billings, MT

   Home Phone: 406-647-8353 Work Phone: _____

2. What is the best time to call to speak with you? ——— At: Work ☐ or Home ☐ ?

3. Are you the Owner ☒, Renter ☐, Other ☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

   _____

   _____

   _____

4. Total number of occupants/persons at this location? 2 adults
   Number of Children _____ Ages raised children - out of house now

5. How long have you lived at this location? 30 years

General Home Description

6. Type of Home/Structure (check only one): Single Family Home ☒, Duplex ☐, Apartment ☐, Townhouse ☐ Other _____

7. Home/Structure Description:
   Number of floors: 1 main floor
   Basement ☐
   Crawlspace ☒ = Root cellar - gravel/concrete broken to be gravel
   Partial Crawlspace/Basement ☐ % of each _____
   Slab On Grade ☐
   Other ☐ _____

8. Age of Home/Structure: 1914 years, Not Sure/Unknown ☐

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood ☒, Brick ☐, Concrete ☐, Cement block ☐, Other ☐ _____
   Garage: ☐ Attached ☐ Detached ☐ None

   Stucco house

10. Foundation Construction (check all that apply):
    Concrete Slab ☒
    Fieldstone ☒ sandstone - later concrete walls in cellar 10x10 area
    Concrete Block ☐
    Elevated Above Ground/Grade ☐
    Other ☐ _____

11. Do you have Private Well ☐ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____
well - installed by EPA (no pump in it now) *

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____ city water city sewer
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☒

Basement Description (please check all boxes that apply): NA

14. Is the basement Finished ☐ Unfinished ☐ Partially Finished ☐ Partial Crawlspace ☐?

15. If finished, how many rooms are in the basement? _____
What are rooms used for? Bedrooms ☐ Family Room ☐ Storage ☐
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐

17. Is the basement floor (check all that apply) Concrete ☐, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☐, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐,
Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe _____

* EPA came by last year to test
Matim on behalf EPA

22. Are any of the following used or stored in the basement (check all that apply):
- [x] Paint (stairwell to cellar)
- [ ] Solvents (degreasers, paint thinner, etc.)
- [ ] Fuels/Oils (gasoline, diesel, used oil) NO storage
- [ ] Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- [ ] Pesticides

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☐ No ☒
If yes, specify what was done, where in the home, and what month:

24. Have you installed new carpeting in your home within the last year? Yes ☐ No ☒
If yes, when and where? _____

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
No ☒

26. Does anyone in your home use solvents at work?
Yes ☐ If yes, how many persons?
No ☒ If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes ☐ No ☐ NA

28. Where is the washer/dryer located?
Basement ☐
Upstairs Utility Room ☒ main floor
Kitchen ☐
Garage ☐
Use a Laundromat ☐
Other, please specify ☐ _____

29. If you have a dryer, is it vented to the outdoors? Yes ☒ No ☐

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas ☒, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system:
- Forced Hot Air ☒
- Forced Hot Water ☐
- Steam ☐
- Radiant Floor Heat ☐
- Wood Stove ☐
- Coal Furnace ☐
- Fireplace ☐
- Other ☐ _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? _____
NO
How is/was the tank filled? _____
Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☑ No ☐
Central Air Conditioning ☑
Window Air Conditioning Unit(s) ☐
Other (please specify) _____

33. Do you use any of the following? Room Fans ☐, Ceiling Fans ☑, Attic Fan ☐ NO
all the time

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☑

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☑ Unknown ☐
If yes, please specify type of pest controlled _____
And approximate date of service _____

36. Water heater type: Gas ☑, Electric ☐, by Furnace ☐,
Other (please describe) _____

37. Water heater location: Basement ☑, Upstairs Utility Room ☑, Garage ☐,
Other (please specify) crawlspace

38. What type of cooking appliance do you have? Electric ☐, Gas ☑
Other (please describe) _____

39. Is there a stove exhaust hood present? Yes ☑ No ☐
Does it vent to the outdoors? Yes ☐ No ☑
recirculating

40. Smoking in Home:
None ☑, Rare (only guests) ☐, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐

41. If yes to question 40, what is smoked?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☐ No ☑

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____
NO

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation: _____
NO

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

cleaning

45. Please check weekly household cleaning practices:

Dusting ☐
Dry Sweeping ☐
Vacuuming ☐
Polishing (furniture, etc.) ☐ NO
Washing/Waxing Floors ☐ NO
Other (describe) ☐ _____

weekly cleaning

46. Other comments:

_____
_____
_____
_____
_____
_____
_____
_____
_____

47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

VI Sample: 323 Miles Ave_Main

VI Sample: 323 Miles Ave_Crawlspace

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Travis Bird

Physical Address of property under investigation: 342 MILES AVE. DILLON, MT

Mailing Address:

Phone (optional): 406-860-6957

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
~~20180301~~ 3/1/18	AIR	20180301-342MILES-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15
3/1/18	AIR	20180301-342MILES-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15
3/1/18	AIR	20180301-342MILES-03	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15
3/1/18	AIR	20180301-A	TO-15

*OTHER (specify analysis)

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☒ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.
- ☒ N/A

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☐ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

Signature: [signature] Printed Name: Sara Trahan

Telephone #: 307 745-7474 Date: 3/14/18

Property owner/operator copy = white DEQ copy = yellow

Add Sample: 3/1/18 AIR 20180301 342MILES-01 TO-15, FIXED GAS, CHA

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID: 342 Miles Ave.

Project Name:	BPCE	PID (model/serial #):	PhoRAE 3000/12875
Sample location:	342	Helium Detector (model/serial #):	Piaelectric/MGD-2002
Date:	3/2/18	Weather:	Sunny, 4mph NNE
Field Personnel:	ST, BS	Air Temp:	31°F
Recorded by:	BS	Atmospheric Pressure:	29.84

Slab Data EPA Installed

Surface/slab Type: ~~Unk~~ Concrete slab

Surface/slab Thickness (inches): Unk.

Slab/subsurface substrate comments: Unk.

Depth of hole through the slab: Unk.

Length of sampling train (feet): Assume 4'. Sample train

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 120

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
3/2/18	1437	50	61.9	62.0			62.1 max	
	1438	100	61.4	61.6				
	1438	150	60.5	61.1				
	1438	200	59.2	60.1				
	1439	250	57.3	58.5				

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

	1439	300	55.9	56.7	0ppm detected	

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
3/2/18	1441	1521	20180302-342 Miles-01	3037	1201		27	4.5

Comments:

Peak ppb in ambient air – 2112 ppb.

Sub slab:

LEL: 0

CO: 0

H2S: 0

O2: 18.5%

PID: >10,000 PPM

Sub-Slab Soil Vapor Sampling Field Data Sheet

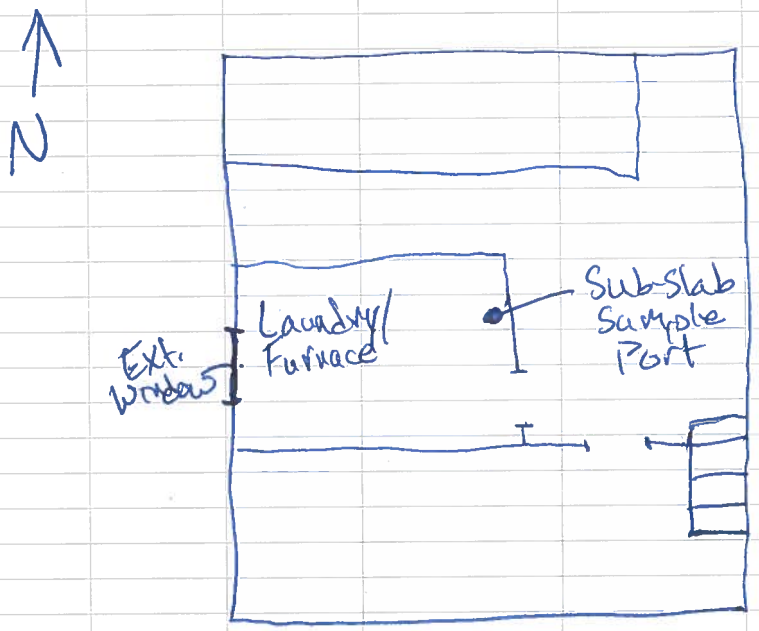
Project Name: BPCE
Date: 3/2/18

Sample Location/ ID: 342 Miles

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

EPA Installed

Location Sketch: Basement



Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	342 MILES	Start Weather:	OVERCAST, light Breeze
		Start Outdoor Air Temp:	30°F
Project Name:	BPCE	Start Atmospheric Pressure:	29.88
Sample Location:	Indoor Air		
Date:	3/1/18	End Weather:	Sunny NE 10MPH
Field Personnel:	ST / BS	End Outdoor Air Temp:	20°F
Recorded by:	ST	End Atmospheric Pressure:	29.74 inHg

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
3/1/18	1404	3/2/18	1409	20180301-342MILES-01	2835	0443		27.5	3.5	70°F	70°F
3/1/18	1405	3/2/18	1410	20180301-342MILES-02	2151	1070		25	1	70°F	70°F
3/1/18	1408	3/2/18	1411	20180301-342MILES-03	0940	0018		24	0.5	70°F	70°F
3/1/18	1408	3/2/18	1411	20180301-4	0571	1402		27	2.5	70°F	70°F

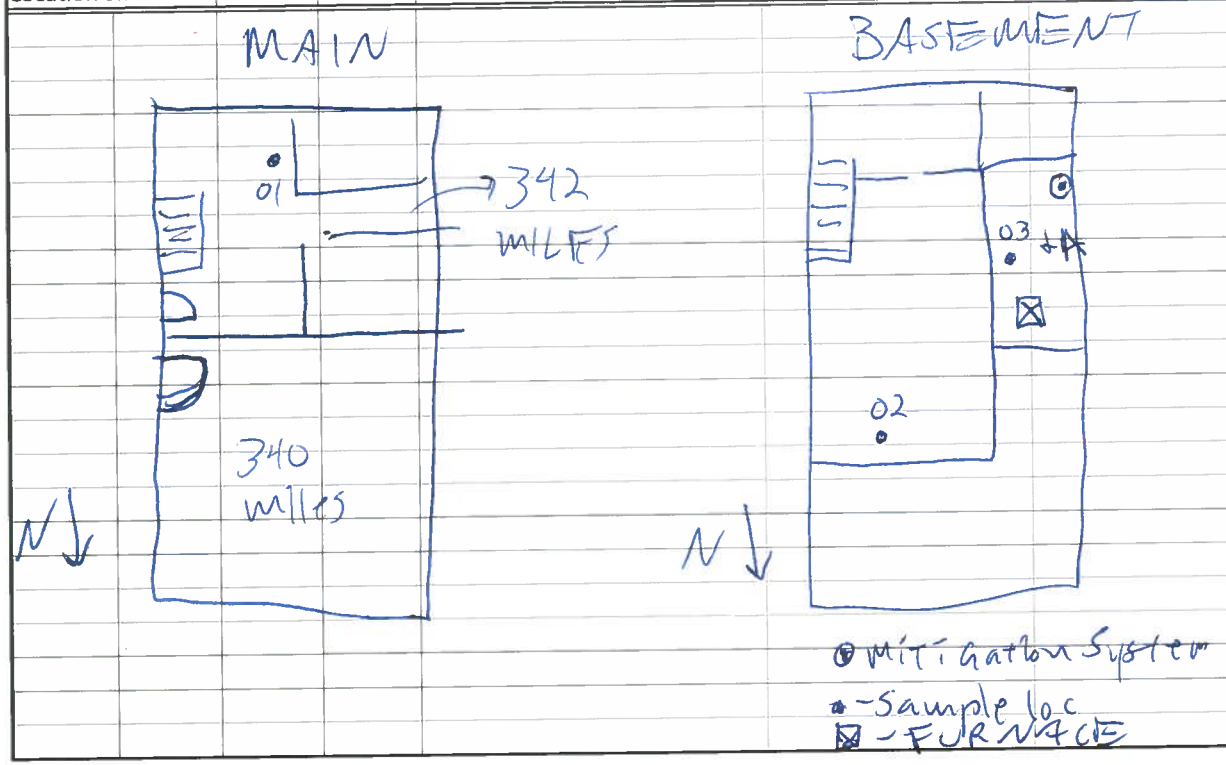
Comments:

01 - MAIN FLOOR
02 - BASEMENT
03 - FURNACE ROOM
4 - DUPLICATE OF 03

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

Location Sketch:



VI Sample: 342 Miles Ave_Basement

VI Sample: 342 Miles Ave_Main

VI Sample: 342 Miles Ave_Furnace Room

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

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Property Owner/Operator Information:

Name: Cheryl Brock

Physical Address of property under investigation: 406/408 HOWARD AVE, BILLINGS, MT

Mailing Address: SAME

Phone (optional): 406-598-1584

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
3/3/18	AIR	20180303 - 408 HOWARD-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15
3/3/18	AIR	20180303 - 408 HOWARD-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15
3/4/18	AIR	20180304 - 408 HOWARD-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15, FIXED GA
3/3/18	AIR	20180303 - A, DUP of -02 on 3/3/18	TO-15

*OTHER (specify analysis) _____

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☐ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.

☒ N/A

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☐ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason: _____

DEQ representative:

Signature: [signature] Printed Name: Syris Trahan

Telephone #: 307-715-7174 Date: 3/4/18

Property owner/operator copy = white DEQ copy = yellow

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	408 HOWARD	Start Weather:	Snow, 4mph N.
		Start Outdoor Air Temp:	31°F
Project Name:	BPCF	Start Atmospheric Pressure:	29.93"
Sample Location:	Basement AIR / Indoor AIR		
Date:	3/3/18	End Weather:	Snow, N 12MPH
Field Personnel:	ST / BS	End Outdoor Air Temp:	21°F
Recorded by:	ST	End Atmospheric Pressure:	29.88 in Hg

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum -in Hg	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
3/3/18	1206	3/4/18	1157	20180303-408 HOWARD-01	Ø484	1101		27	2	65°F	65°F
3/3/18	1214	3/4/18	1158	20180303-408 HOWARD-02	1635	0218		25.5	2	70°F	70°F
3/3/18	1214	3/4/18	1158	20180303-A	3489	1393		28.5	3	70°F	70°F

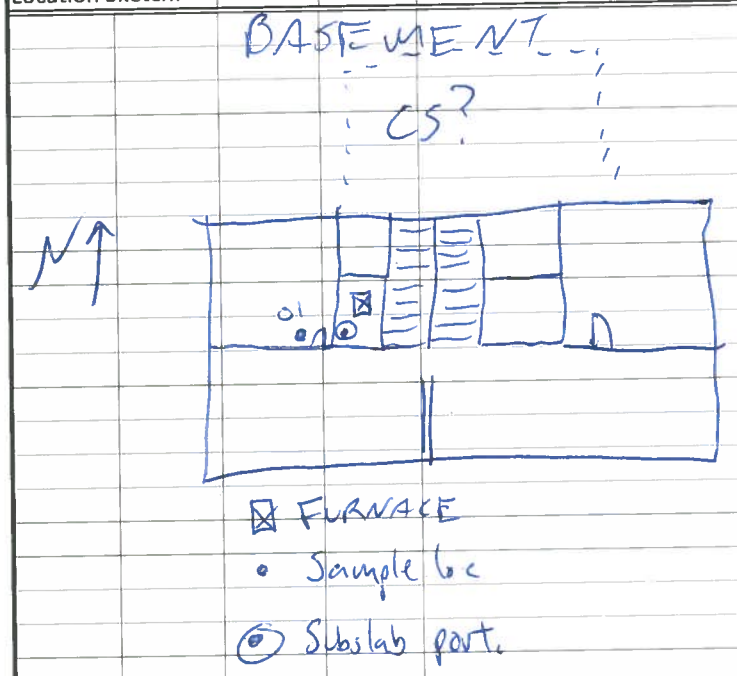
Comments:

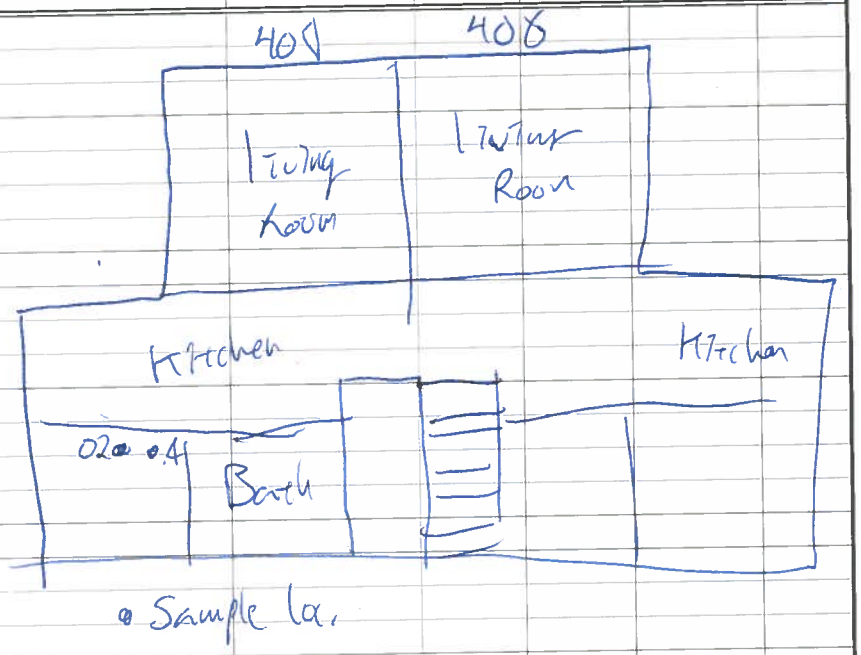
01- Basement AIR
02- Main Floor - Bedroom on 408 side
A- Duplicate of 02.

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

Location Sketch:





Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	408 HOWARD		
Project Name:	BPCE	PID (model/serial #):	ppb RAE 3000 / 12825
Sample location:	SUBSLAB	Helium Detector (model/serial #):	Dielectric / 8628
Date:	3/4/18	Weather:	Snowy, N 12mph
Field Personnel:	ST/BS	Air Temp:	21° F
Recorded by:	ST	Atmospheric Pressure:	29.88 inHg.

Slab Data

Surface/slab Type:	Concrete, some chips & cracks
Surface/slab Thickness (inches):	Unk.
Slab/subsurface substrate comments:	Unk
Depth of hole through the slab:	Unk
Length of sampling train (feet):	3' + 1' = 4'

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 120 ml

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
3/4/18	1207	50	33.5	34.0				34.1
	1207	100	32.6	33.4				
	1208	150	31.5	32.2				
	1208	200	30.7	31.3				
	1208	250	29.8	30.3				
	1209	30	28.9	29.5	3600			

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
3/4/18	1218	1300	20180304-408HOWARD-01	1592	2829		27	2.5

0ppb Ambient Air. PID

39.9% during Sample

Comments: Crack in concrete slab approx 1/4" thick 1.5' N of Sub Slab Sample port. 0 ppb detected in crack.

PID: 12.99 ppm
CO: 0
O_2: 20.9
H_2S: 0
LEL: 0

Sub-Slab Soil Vapor Sampling Field Data Sheet

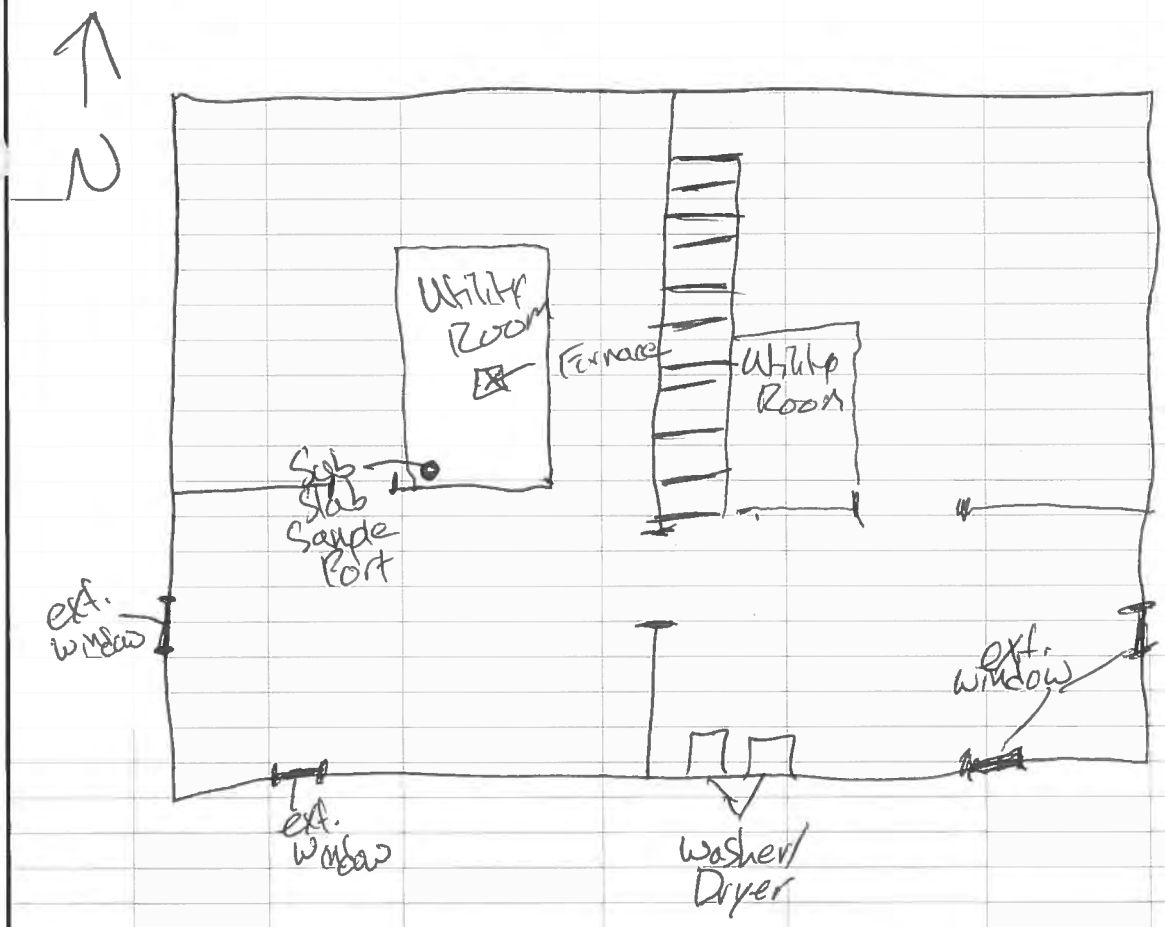
Project Name: Sample Location/ ID:

Date:

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

EPA Installed

Location Sketch: Basement



Completed by S. Tarhan after sampling via phone

OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 3/3/18

1. Name: Cheryl Brock

   Address:
   408 HOWARD AVENUE

   Home Phone: 406-598-1584 Work Phone: _____

2. What is the best time to call to speak with you? _____ At: Work ☐ or Home ☐ ?

3. Are you the Owner ☒, Renter ☐, Other ☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

4. Total number of occupants/persons at this location? 2
   Number of Children _____ Ages _____

5. How long have you lived at this location? 5 years

General Home Description

6. Type of Home/Structure (check only one): Single Family Home ☐, Duplex ☐, Apartment ☐, Townhouse ☒ Other Former Duplex, converted to single family

7. Home/Structure Description:
   Number of floors: 1
   Basement ☒
   Crawlspace ☐
   Partial Crawlspace/Basement ☐ % of each _____
   Slab On Grade ☐
   Other ☐ _____

8. Age of Home/Structure: 108 years, Not Sure/Unknown ☐

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood ☒, Brick ☐, Concrete ☐, Cement block ☐, Other ☐ _____
   Garage: ☐ Attached ☐ Detached ☐ None

10. Foundation Construction (check all that apply):
    Concrete Slab ☒
    Fieldstone ☐
    Concrete Block ☐
    Elevated Above Ground/Grade ☐
    Other ☐ _____

11. Do you have Private Well ☐ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____

12. Do you have a Septic System? Yes ☐ No ☒ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☐

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☐ Unfinished ☐ Partially Finished ☒ Partial Crawlspace ☐?

15. If finished, how many rooms are in the basement? 1
What are rooms used for? Bedrooms ☐ Family Room ☐ Storage ☒
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐

17. Is the basement floor (check all that apply) Concrete ☒, Tile ☐, Carpeted ☒, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☐, Cement Block ☒, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

Describe the moisture problem Dehumidifier running always.
Foundation cracks into floor.

20. Does the basement ever flood?

Yes, frequently (3 or more times/year) ☐

Yes, occasionally (1-2 times/year) ☐

Yes, rarely (less that 1 time/year) ☒

No ☐

21. Does the basement have any of the following? Floor Cracks ☒, Wall Cracks ☒, Sump ☐,
Floor Drain ☒, Other Hole/Opening In Floor ☐
Describe _____

22. Are any of the following used or stored in the basement (check all that apply):
- [x] Paint
- [x] Solvents (degreasers, paint thinner, etc.)
- [ ] Fuels/Oils (gasoline, diesel, used oil)
- [ ] Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- [x] Pesticides
- [x] Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
- Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes [x] No [ ]
If yes, specify what was done, where in the home, and what month:
Tear out walls to rejoin duplex into single family home.

24. Have you installed new carpeting in your home within the last year? Yes [x] No [ ]
If yes, when and where? Runners in basement.

25. Do you regularly use or work in a dry cleaning service?
- Yes, use dry-cleaning regularly (at least weekly) [ ]
- Yes, use dry-cleaning infrequently (monthly or less) [ ]
- Yes, work at a dry cleaning service [ ]
- No [x]

26. Does anyone in your home use solvents at work?
Yes [ ] If yes, how many persons?
No [x] If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes [ ] No [ ]

28. Where is the washer/dryer located?
- Basement [x]
- Upstairs Utility Room [ ]
- Kitchen [ ]
- Garage [ ]
- Use a Laundromat [ ]
- Other, please specify [ ] _____

29. If you have a dryer, is it vented to the outdoors? Yes [x] No [ ]

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas [x], Oil [ ], Electric [ ], Wood [ ], Coal [ ],
Other [ ] _____

Heat conveyance system:
- Forced Hot Air [ ]
- Forced Hot Water [x]
- Steam [ ]
- Radiant Floor Heat [ ]
- Wood Stove [ ]
- Coal Furnace [ ]
- Fireplace [ ]
- Other [ ] _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? _____

How is/was the tank filled? _____

Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☐ No ☒
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☒ bedrooms
Other (please specify) _____

33. Do you use any of the following? Room Fans ☒, Ceiling Fans ☒, Attic Fan ☒

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐

35. Has your home had termite or other pesticide treatment? Yes ☒ No ☐ Unknown ☐
If yes, please specify type of pest controlled have sprayed outside for insects.
And approximate date of service _____

36. Water heater type: Gas ☒, Electric ☐, by Furnace ☐,
Other (please describe) _____

37. Water heater location: Basement ☒, Upstairs Utility Room ☐, Garage ☐,
Other (please specify) _____

38. What type of cooking appliance do you have? Electric ☐, Gas ☒
Other (please describe) _____

39. Is there a stove exhaust hood present? Yes ☒ No ☐
Does it vent to the outdoors? Yes ☐ No ☒

40. Smoking in Home:
None ☐, Rare (only guests) ☒, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐

41. If yes to question 40, what is smoked?
Cigarettes ☒ Cigars ☐
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☐ No ☒

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation: _____

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

45. Please check weekly household cleaning practices:

Dusting ☐

Dry Sweeping ☐

Vacuuming ☐

Polishing (furniture, etc.) ☐

Washing/Waxing Floors ☐

Other (describe) ☐ _____

46. Other comments:

_____

_____

_____

_____

_____

_____

_____

_____

_____

47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

ADDRESS: 406 and 408 HOWARD AVE – RESIDENTIAL STRUCTURE BEING CONVERTED FROM DUPLEX TO SINGLE FAMILY HOME

NOTES: OUTSIDE OF STRUCTURE - RESIDENTIAL

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Joanne Peabody

Physical Address of property under investigation: 425 Howard Ave, Billings MT

Mailing Address: same

Phone (optional): 406-245-4367

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
3/1/2018	Crawl space Vapor	20180301-425Howard-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
3/1/2018	Indoor Air	20180301-425Howard-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
			Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*

*OTHER (specify analysis) VOCs = TO-15, Other = APH

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample. NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

Signature: [signature] for DEQ

Printed Name: S. Seitz

Telephone #: 406-558-4850

Date: 3/2/2018

Property owner/operator copy = white DEQ copy = yellow

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	425 HOWARD	Start Weather:	Partly cloudy, 65mph
		Start Outdoor Air Temp:	34°F
Project Name:	BPCE	Start Atmospheric Pressure:	30.04"
Sample Location:	CS/IA		
Date:	3/1/18	End Weather:	~~20°F~~ Cloudy, calm
Field Personnel:	ST/DS	End Outdoor Air Temp:	20°F
Recorded by:	ST	End Atmospheric Pressure:	29.74 inHg

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
3/1/18	1038	3/2/18	1033	20180301-425HOWARD-01	2675	0599		25.5	1	60°F	60°F
3/1/18	1040	3/2/18	1032	20180301-425Howard-02	2123	1459		26.5	2	70°F	70°F

Comments:

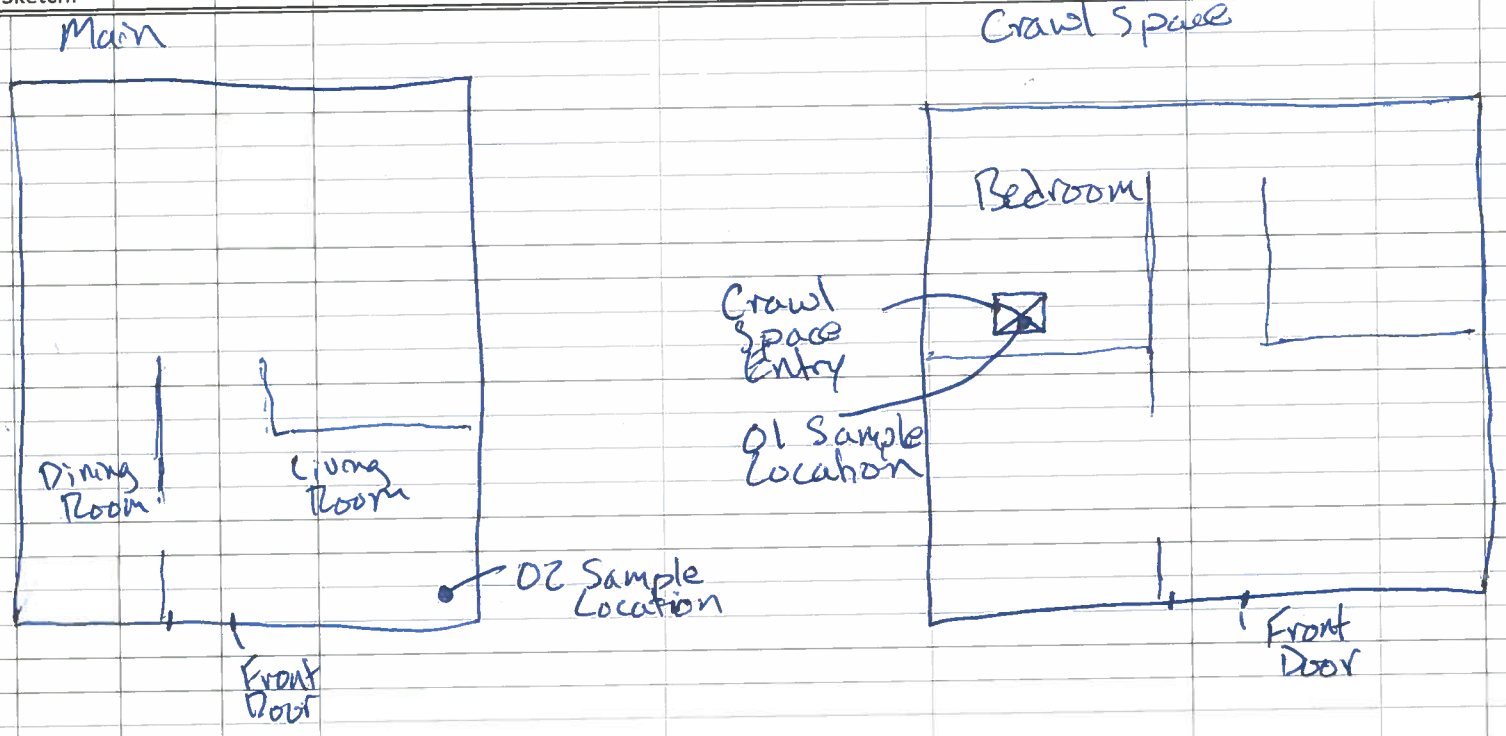
01 - CRAWLSPACE
02 - Living Room

~~A~~ Tubes of flooring adhesives stored in crawl space unopened.

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

Location Sketch:



Completed by S. Trahan after Sampling, via phone call.

OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 3/3/18

1. Name: Joanne Peabody

   Address: 425 Howard Ave.

   Home Phone: 406-245-4367 Work Phone: _____

2. What is the best time to call to speak with you? _____ At: Work ☐ or Home ☐ ?

3. Are you the Owner ☑, Renter ☐, Other ☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

4. Total number of occupants/persons at this location? 2
   Number of Children _____ Ages _____

5. How long have you lived at this location? 11 years

General Home Description

6. Type of Home/Structure (check only one): Single Family Home ☑, Duplex ☐, Apartment ☐, Townhouse ☐ Other _____

7. Home/Structure Description:
   Number of floors: _____
   Basement ☐
   Crawlspace ☑
   Partial Crawlspace/Basement ☐ % of each _____
   Slab On Grade ☐
   Other ☐ _____

8. Age of Home/Structure: 73 years, Not Sure/Unknown ☐

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood ☑, Brick ☐, Concrete ☐, Cement block ☐, Other ☐ _____
   Garage: ☐ Attached ☑ Detached ☐ None

10. Foundation Construction (check all that apply):
    Concrete Slab ☑
    Fieldstone ☐
    Concrete Block ☐
    Elevated Above Ground/Grade ☐
    Other ☐ _____

11. Do you have Private Well ☐ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☐

Basement Description (please check all boxes that apply): Crawlspace only

14. Is the basement Finished ☐ Unfinished ☐ Partially Finished ☐ Partial Crawlspace ☐?

15. If finished, how many rooms are in the basement? _____
What are rooms used for? Bedrooms ☐ Family Room ☐ Storage ☐
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐

17. Is the basement floor (check all that apply) Concrete ☐, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☐, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

Describe the moisture problem _____

20. Does the basement ever flood?

Yes, frequently (3 or more times/year) ☐

Yes, occasionally (1-2 times/year) ☐

Yes, rarely (less that 1 time/year) ☐

No ☐

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐,
Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe _____

22. Are any of the following used or stored in the basement (check all that apply):
- ☐ Paint
- ☐ Solvents (degreasers, paint thinner, etc.)
- ☐ Fuels/Oils (gasoline, diesel, used oil)
- ☐ Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- ☐ Pesticides

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☐ No ☒
If yes, specify what was done, where in the home, and what month:

24. Have you installed new carpeting in your home within the last year? Yes ☐ No ☒
If yes, when and where? _____

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
No ☒

26. Does anyone in your home use solvents at work?
Yes ☐ If yes, how many persons?
No ☒ If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes ☐ No ☐

28. Where is the washer/dryer located?
Basement ☐
Upstairs Utility Room ☒
Kitchen ☐
Garage ☐
Use a Laundromat ☐
Other, please specify ☐ _____

29. If you have a dryer, is it vented to the outdoors? Yes ☒ No ☐

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas ☒, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system:
- Forced Hot Air ☒
- Forced Hot Water ☒
- Steam ☐
- Radiant Floor Heat ☐
- Wood Stove ☐
- Coal Furnace ☐
- Fireplace ☐
- Other ☐ _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? _____

How is/was the tank filled? _____

Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☐ No ☒
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☒
Other (please specify) _____

33. Do you use any of the following? Room Fans ☒, Ceiling Fans ☐, Attic Fan ☐

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☒ Unknown ☐
If yes, please specify type of pest controlled _____
And approximate date of service _____

36. Water heater type: Gas ☒, Electric ☐, by Furnace ☐,
Other (please describe) _____

37. Water heater location: Basement ☐, Upstairs Utility Room ☐, Garage ☐,
Other (please specify) CS

38. What type of cooking appliance do you have? Electric ☒, Gas ☐
Other (please describe) _____

39. Is there a stove exhaust hood present? Yes ☒ No ☐
Does it vent to the outdoors? Yes ☐ No ☒

40. Smoking in Home:
None ☒, Rare (only guests) ☐, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐

41. If yes to question 40, what is smoked?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☐ No ☐

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation: _____

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

99% of stuff is only rarely used, if ever

45. Please check weekly household cleaning practices:

Dusting ☐

Dry Sweeping ☐

Vacuuming ☐

Polishing (furniture, etc.) ☐

Washing/Waxing Floors ☐

Other (describe) ☐ _____

46. Other comments:

_____

_____

_____

_____

_____

_____

_____

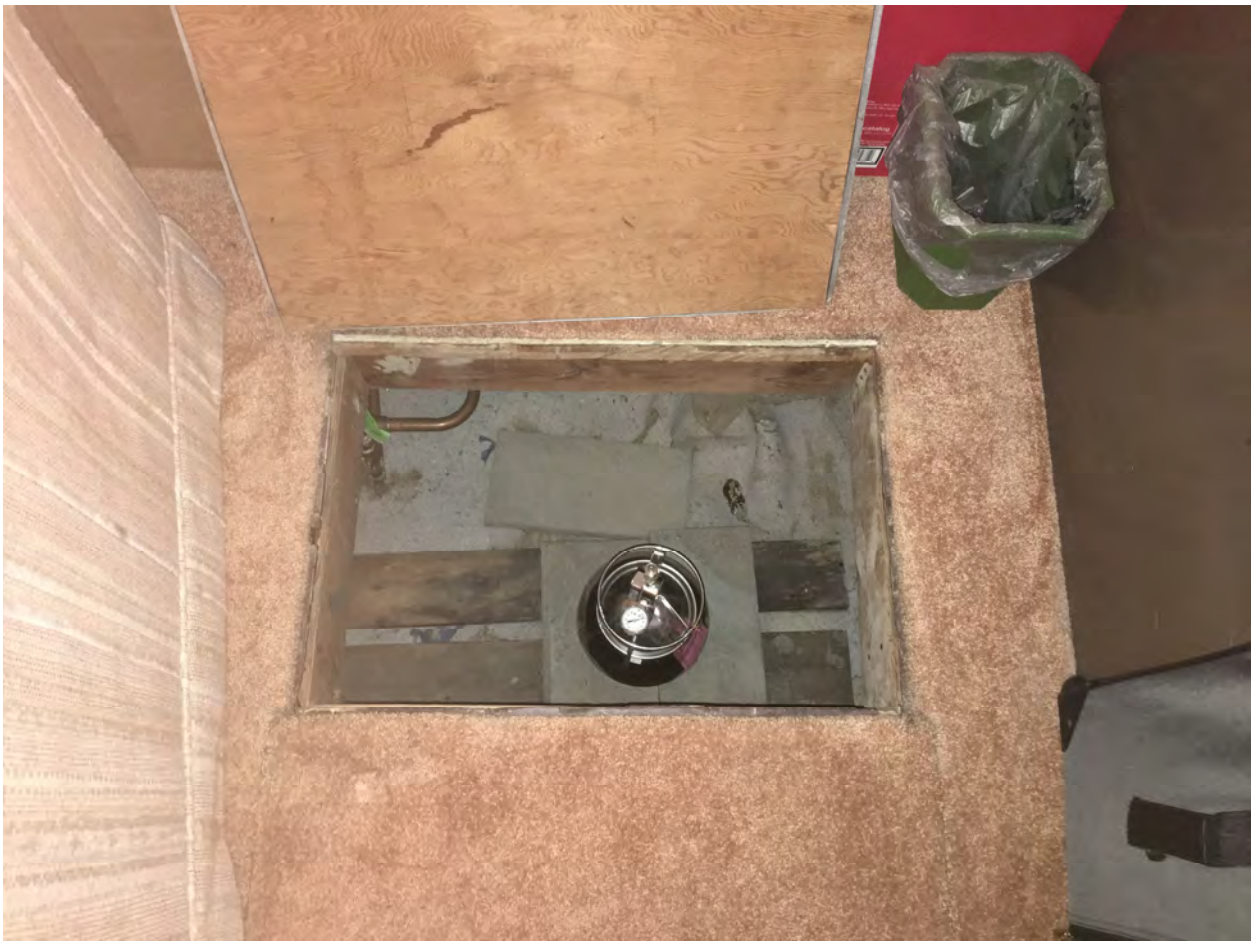
_____

_____

47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

VI Sample: 425 Howard Ave_Crawlspace



Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Barb Capito

Physical Address of property under investigation: 519 Cook Ave, Billings, MT

Mailing Address: —

Phone (optional): —

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/7/18	Indoor Air - Crawlspace	20180207-519Cook-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/7/18	Indoor Air - Main	20180207-519Cook-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
			Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*

*OTHER (specify analysis) TO-15 (VOCs), APH (Petroleum)

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample. NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

SASeitz for DEQ
Signature

SARAH SEITZ (TRIHYDRO)
Printed Name

Telephone #: 406-558-4850

Date: 2/11/18

Property owner/operator copy = white DEQ copy = yellow

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	518 Cook	Start Weather:	Overcast
		Start Outdoor Air Temp:	37°F
Project Name:	Billings PCE	Start Atmospheric Pressure:	30.0
Sample Location:	Indoor & Crawl space		
Date:	2/7/18	End Weather:	Overcast, calm
Field Personnel:	ST/MO	End Outdoor Air Temp:	20°F
Recorded by:	MO	End Atmospheric Pressure:	29.9

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
2/7/18	1308	2/8/18	1301	20180207-518Cook-01 *	0012	1401		-27.5	-2.0	~65°F	~65°F
2/7/18	1314	2/8/18	1258	20180207-518Cook-02	1741	0137		-28.0	-3.2	68°F	68°F

* Need Photo

Comments:

Shut-in test

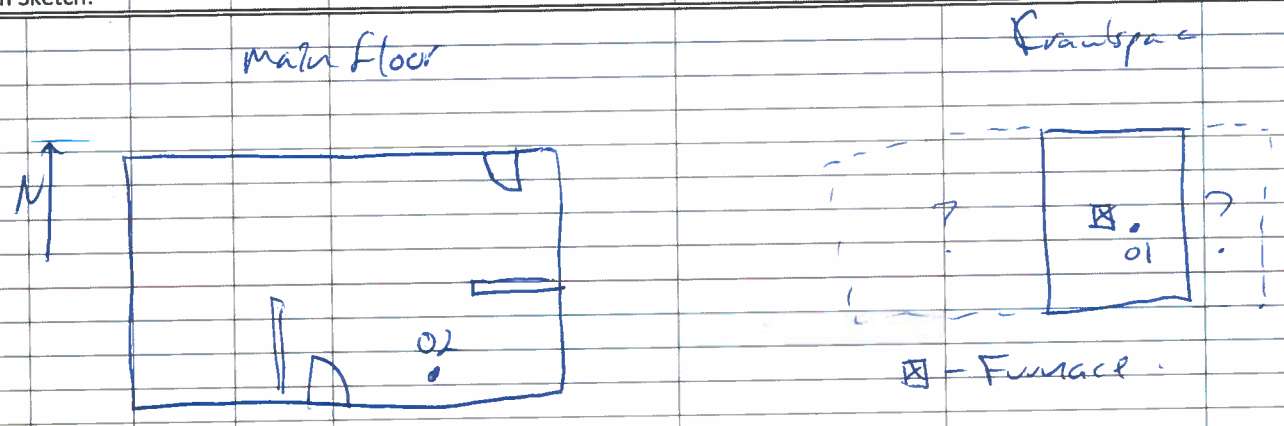
01	0012	28.0/28.0	pass	Crawlspace
02	1741	28.0/28.0	pass	Main floor

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

01 - Crawlspace
02 - Indoor Air

Location Sketch:



OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 2/5/18

1. Name: Barb Capito

   Address: 518 Cook Ave

   Home Phone: 406-698-17 Work Phone: _____

2. What is the best time to call to speak with you? _____ At: Work☐ or Home☐ ? Scheduled 2/

3. Are you the Owner☑, Renter☐, Other☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

4. Total number of occupants/persons at this location? 1
   Number of Children —— Ages adult + dogs

5. How long have you lived at this location? 11 years

General Home Description

6. Type of Home/Structure (check only one): Single Family Home☑, Duplex☐, Apartment☐, Townhouse☐ Other _____

7. Home/Structure Description:
   Number of floors: 1 main floor
   Basement☑ – dirt floor basement
   Crawlspace☐
   Partial Crawlspace/Basement☐ % of each _____
   Slab On Grade☐
   Other☐ _____

8. Age of Home/Structure: built 1898 years, Not Sure/Unknown☐

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood☑, Brick☐, Concrete☐, Cement block☐, Other☐ _____
   Garage: ☐Attached ☐Detached ☐None

10. Foundation Construction (check all that apply):
    Concrete Slab☑
    Fieldstone☐
    Concrete Block☐
    Elevated Above Ground/Grade☐
    Other☐ _____

11. Do you have Private Well ☐ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____
NO

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____ city water city sewer
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☑

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☐ Unfinished ☑ Partially Finished ☐ Partial Crawlspace ☐?

15. If finished, how many rooms are in the basement? _____
What are rooms used for? Bedrooms ☐ Family Room ☐ Storage ☐
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☑

17. Is the basement floor (check all that apply) Concrete ☐, Tile ☐, Carpeted ☐, Dirt ☑,
Other ☐ _____

18. Are the basement walls Poured Concrete ☑, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☑

Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☑

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐,
Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe _____ NA

22. Are any of the following used or stored in the basement (check all that apply):
- ☐ Paint NO
- ☐ Solvents (degreasers, paint thinner, etc.)
- ☐ Fuels/Oils (gasoline, diesel, used oil) NO
- ☐ Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- ☐ Pesticides

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☑ No ☐
If yes, specify what was done, where in the home, and what month:
painting - new floor in kitchen & remodel

24. Have you installed new carpeting in your home within the last year? Yes ☐ No ☑
If yes, when and where? _____

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
No ☑

26. Does anyone in your home use solvents at work?
Yes ☐ If yes, how many persons?
No ☐ If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes ☐ No ☑

28. Where is the washer/dryer located?
Basement ☐
Upstairs Utility Room ☑
Kitchen ☐
Garage ☐
Use a Laundromat ☐
Other, please specify ☐ _____

29. If you have a dryer, is it vented to the outdoors? Yes ☑ No ☐

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas ☑, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system:
- Forced Hot Air ☑ basement
- Forced Hot Water ☐
- Steam ☐
- Radiant Floor Heat ☐
- Wood Stove ☐
- Coal Furnace ☐
- Fireplace ☐
- Other ☐ _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? NO
How is/was the tank filled?
Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☐ No ☑
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☐
Other (please specify)

33. Do you use any of the following? Room Fans ☐, Ceiling Fans ☐, Attic Fan ☐ NO

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐ NA

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☐ Unknown ☐
If yes, please specify type of pest controlled
And approximate date of service

36. Water heater type: Gas ☐, Electric ☑, by Furnace ☐,
Other (please describe)

37. Water heater location: Basement ☑, Upstairs Utility Room ☐, Garage ☐,
Other (please specify)

38. What type of cooking appliance do you have? Electric ☑, Gas ☐
Other (please describe)

39. Is there a stove exhaust hood present? Yes ☑ No ☐ recirculate
Does it vent to the outdoors? Yes ☐ No ☑

40. Smoking in Home:
None ☐, Rare (only guests) ☐, Moderate (residents, light smokers) ☑,
Heavy (at least one heavy smoker in household) ☐

Detached garage

41. If yes to question 40, what is smoked?
Cigarettes ☑ Cigars ☐
Pipe ☐ Other ☐

plug-ins

42. Do you regularly use air fresheners? Yes ☑ No ☐

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐
NO

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation:
NO

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

45. Please check weekly household cleaning practices:

Dusting ☐

Dry Sweeping ☐

Vacuuming ☐

Polishing (furniture, etc.) ☐

Washing/Waxing Floors ☐

Other (describe) ☐ _____

46. Other comments:

_____

_____

_____

_____

_____

_____

_____

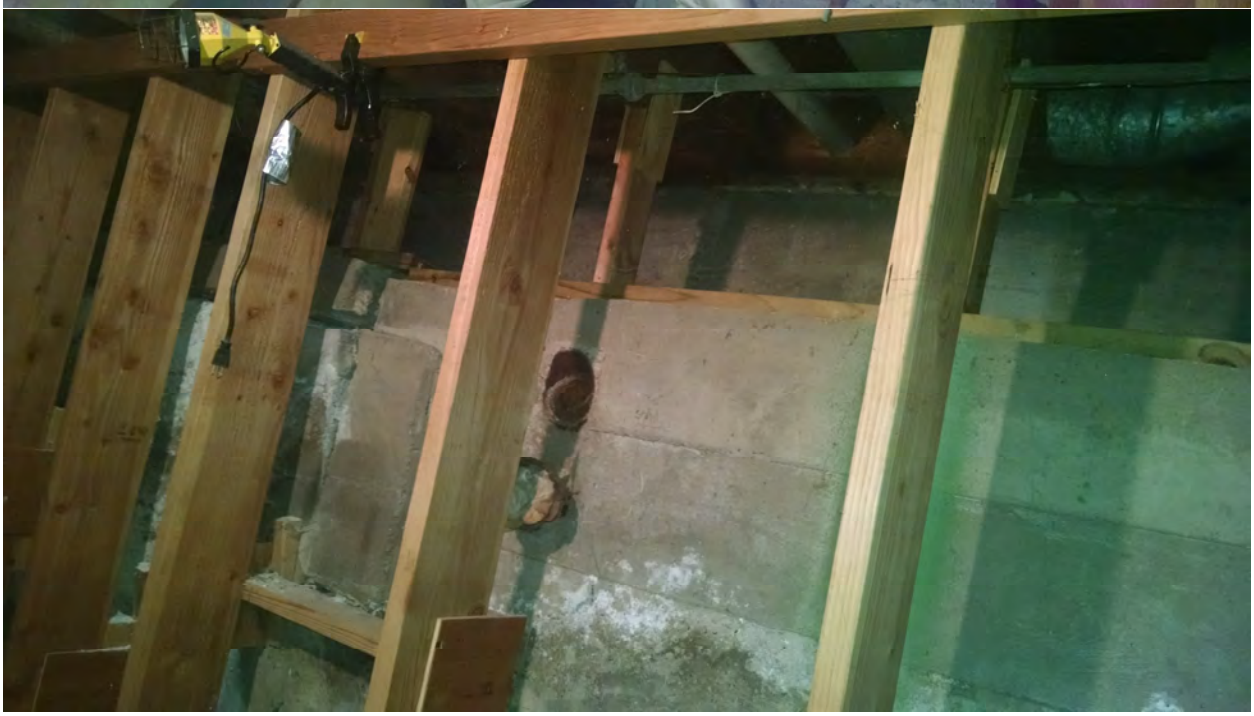
_____

_____

47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

VI Sample: 518 Cook Ave_Crawlspace



VI Sample: 518 Cook Ave_Main

VI Sample: 518 Cook Ave_Crawlspace

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Kelly Starr

Physical Address of property under investigation: 522 HOWARD AVE, BILLINGS, MT

Mailing Address: Same

Phone (optional): 406-698-2845

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
3/2/18	AIR	20180302-522 HOWARD-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15
3/2/18	AIR	20180302-522 HOWARD-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15
3/2/18	AIR	20180302-B DUP. of Sample-01 on	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15

3/3/18 AIR 3/2/18

*OTHER (specify analysis) 20180303-522HOWARD-01 TO-15 FIXED GAS, CH4

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.

NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

Signature

Syris Trolan
Printed Name

Telephone #: 307-745-7474

Date: 3/4/18

Property owner/operator copy = white DEQ copy = yellow

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	522 HOWARD		
Project Name:	BPCE	PID (model/serial #):	Dielectric / 8628
Sample location:	Subslab-Furnace Room	Helium Detector (model/serial #):	ppbRAE300 / 12875
Date:	3/3/18	Weather:	Sunny, NNE 5 mph
Field Personnel:	ST/BS	Air Temp:	28°F
Recorded by:	ST	Atmospheric Pressure:	29.94 inHg.

Slab Data

Surface/slab Type:	Concrete Slab.
Surface/slab Thickness (inches):	Unk.
Slab/subsurface substrate comments:	UNK.
Depth of hole through the slab:	UNK.
Length of sampling train (feet):	3' + 1' = 4'

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 120

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
3/3/18	1714	50	26.3	26.6				28.8
	1715	100	25.9	26.2				
	1715	150	25.4	25.7				
	1715	200	24.9	25.3				
	1716	250	24.3	24.7				
	1716	300	23.6	24.1	75ppm			

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
3/3/18	1723	1805	20180303-522HOWARD-01	3372	1643		27.5	3

Comments:

O_2 - 19.0%

CO, H_2S, LEL all Ø

PID - 304.4 ppm and climbing about 0.5~1 ppm/s, after waiting for 2 to stabilize for ~5 min

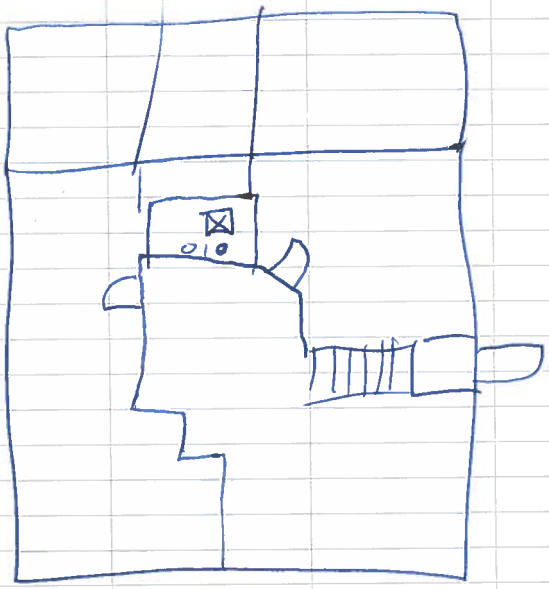
0 ppb ambient ATV!

Sub-Slab Soil Vapor Sampling Field Data Sheet

Project Name:	Sample Location/ ID:
Date:	

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

Location Sketch:



• Sample location
⊠ FURNACE

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	522 Howard	Start Weather:	Partly Cloudy, 4mph NE
		Start Outdoor Air Temp:	26 °F
Project Name:	BPCE	Start Atmospheric Pressure:	29.87
Sample Location:	522 Howard		
Date:	3/2/18	End Weather:	Sunny, NNE 5mph
Field Personnel:	BS, ST	End Outdoor Air Temp:	28°F
Recorded by:	BS	End Atmospheric Pressure:	29.94 inHg

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
3/2/18	1739	3/3/18	1707	20180302-522Howard-01	2370	0124		30	3	70°F	70°F
3/2/18	1739	3/3/18	1707	20180302-B	2760	1054		28	3	70°F	70°F
3/2/18	1741	3/3/18 ~~1703~~	1703	20180302-522HOWARD-02	1646	0116		28	3	65°F	65°F

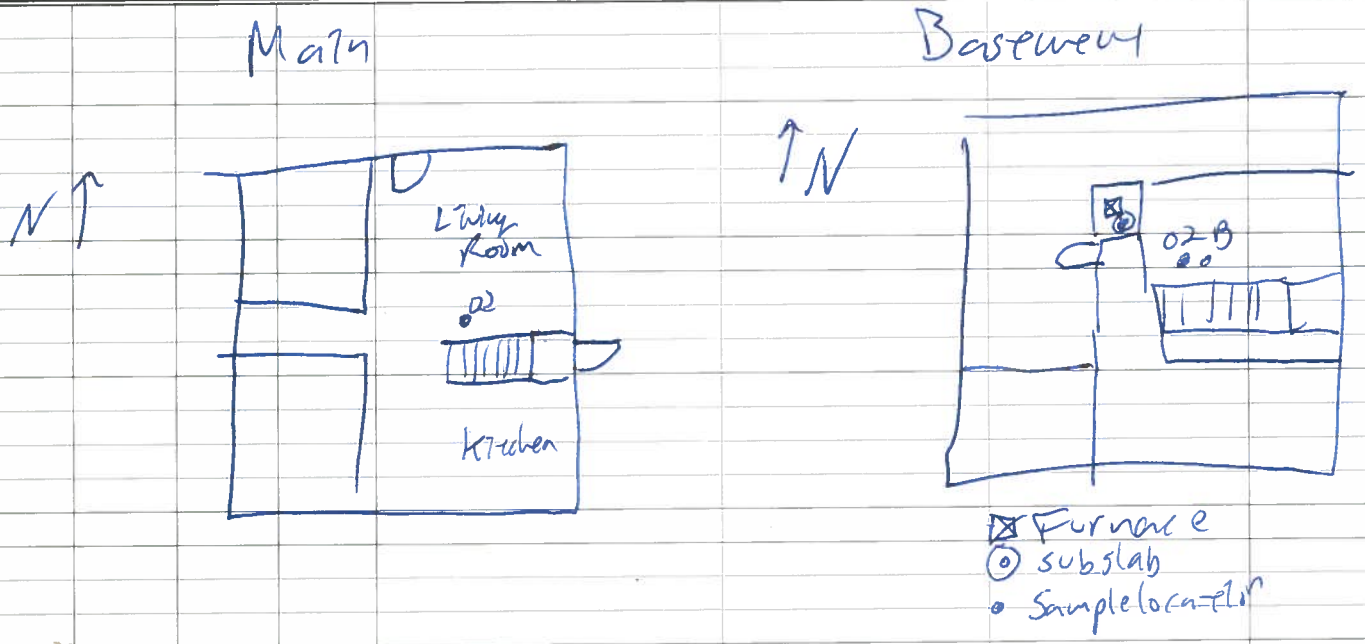
Comments:

01 - Basement
B - Duplicate of basement.
02 - Main floor living room.

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

Location Sketch:



ADDRESS: 522 HOWARD AVE

NOTES: OUTSIDE OF STRUCTURE - RESIDENTIAL

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Neal Clarren

Physical Address of property under investigation: 527 St. John's Ave, Billings MT

Mailing Address: Copy left w/ tennants Dan & Aaron

Phone (optional):

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/8/2018	Indoor Air Basement	20180209-527STJOHN -01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/8/2018	Indoor Air main	20180209-527STJOHN -02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/9/2018	Subslab vapor	20180209-527STJOHN -01 *	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*

*OTHER (specify analysis) Indoor Air; VOCs, Petroleum; Subslab - VOCs, Petroleum, Fixed gases, He
*Duplicate 20180209-A

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample. NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

on behalf DEQ
Signature

S. SEITZ (TRIHYDRO)
Printed Name

Telephone #: 406-558-4850

Date: 2/11/18

Property owner/operator copy = white DEQ copy = yellow

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	527 St. Johns		
Project Name:	BPCE	PID (model/serial #):	ppb RAE 3000 / 22 x 8
Sample location:	Basement SS sample	Helium Detector (model/serial #):	Dilectric / 8628
Date:	2/9/18	Weather:	Sunny, cold NWind
Field Personnel:	ST, MO	Air Temp:	70F
Recorded by:	ST	Atmospheric Pressure:	30.5 in Hg

Slab Data

Surface/slab Type:	Concrete slab
Surface/slab Thickness (inches):	Unk.
Slab/subsurface substrate comments:	✓
Depth of hole through the slab:	Unk.
Length of sampling train (feet):	~5 Ft.

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 150 mL

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
2/9/18	1412	50	26.7	26.8				
2/9/18	1412	100	26.1	26.7				
2/9/18	1413	150	25.1	25.9				
2/9/18	1414	200	24.1	25.1				
2/9/18	1414	250	23.0	23.8				

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

2/9/18	1415	300 mL	22.1	22.7	500 ppm
2/9/18					

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
2/9/18	1420	1500	20180209-527STJOHN-01	3329	0911	~~-2.5~~	-27	-2.5
2/9/18	1420	1500	20180209-A	3347	0658	~~-2.5~~	-28	-2.5

Comments:

1456 ppb ~~VOC~~ PID

CO, H_2O, LEL = 0

O_2 ~~O2~~ = 20.9

Sub-Slab Soil Vapor Sampling Field Data Sheet

Project Name:	Sample Location/ ID:
Date:	

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

Location Sketch:

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	527 St. Johns	Start Weather:	OVERCAST, FREEZING RAIN
		Start Outdoor Air Temp:	20°F
Project Name:	BPCE	Start Atmospheric Pressure:	29.9 in Hg
Sample Location:	Indoor + Basement Air		
Date:	2/8/18	End Weather:	~~PC~~ Sunny,
Field Personnel:	ST, MO	End Outdoor Air Temp:	~~20~~ 110
Recorded by:	ST	End Atmospheric Pressure:	30.5

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
2/8/18	1335	2/9/18	1333	20180208-5275TJOHN-01	1078	1403		-27.5	-3.0	64	71 ~~70~~
2/8/18	1336	2/9/18	1332	20180208-5275TJOHN-02	2699	0231		-25.5	-0.5	64	71

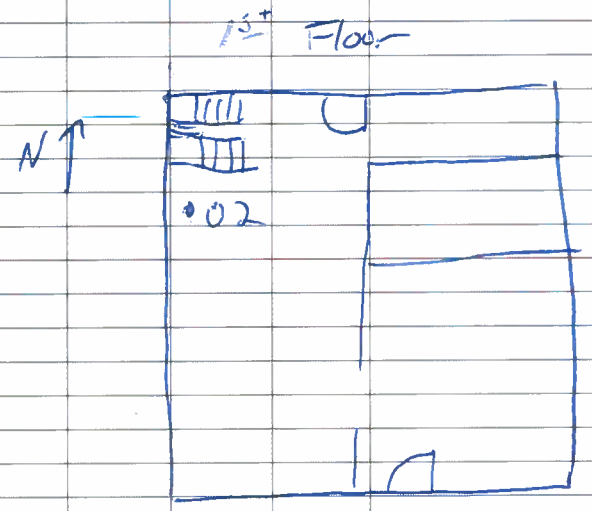
Comments:

01- Basement Air
02 - Indoor Air

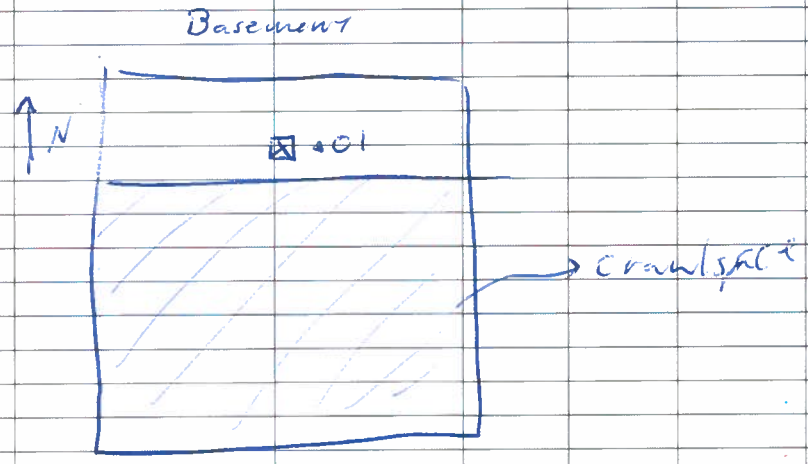
Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

Location Sketch:



• Sample location 02



⊠ Furnace

• Sample Location 01

OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 2/4/18

1. Name: Dan Mehrens-Wallace

   Address: 527 St. Johns

   Home Phone: _____ Work Phone: _____

2. What is the best time to call to speak with you? _____ At: Work☐ or Home☐ ?

3. Are you the Owner☐, Renter☐, Other☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

4. Total number of occupants/persons at this location? 2
   Number of Children — Ages adults

5. How long have you lived at this location? few years

General Home Description

6. Type of Home/Structure (check only one): Single Family Home☑, Duplex☐, Apartment☐, Townhouse☐ Other _____

7. Home/Structure Description:
   Number of floors: 1 main
   Basement☐
   Crawlspace☐
   Partial Crawlspace/Basement☑ % of each open to eachother through basement*
   Slab On Grade☐
   Other☐ _____

8. Age of Home/Structure: _____years, Not Sure/Unknown☐

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood☑, Brick☐, Concrete☐, Cement block☐, Other☐ _____
   Garage: ☐Attached ☐Detached ☐None

10. Foundation Construction (check all that apply):
    Concrete Slab☑ both
    Fieldstone☑
    Concrete Block☐
    Elevated Above Ground/Grade☐
    Other☐ _____

* slab slab part

11. Do you have Private Well ☐ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____
_____ NO
_____

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____ City water city sewer
Where is it located? _____
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☐

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☒ Unfinished ☐ Partially Finished ☐ Partial Crawlspace ☐?

15. If finished, how many rooms are in the basement? none - storage
What are rooms used for? Bedrooms ☐ Family Room ☐ Storage ☒
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☒

17. Is the basement floor (check all that apply) Concrete ☒, Tile ☐, Carpeted ☐, Dirt ☐, w/ part
Other ☐ _____

18. Are the basement walls Poured Concrete ☒, Cement Block ☐, Stone ☒, Wood ☐, both
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☒ when melt to basement
Yes, rarely (less that 1 time/year) ☐
No ☐

Describe the moisture problem _____
_____
_____

20. Does the basement ever flood?

Yes, frequently (3 or more times/year) ☐

Yes, occasionally (1-2 times/year) ☒

Yes, rarely (less that 1 time/year) ☐

No ☐

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☒,
Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe _____

22. Are any of the following used or stored in the basement (check all that apply):
- [x] Paint
- [ ] Solvents (degreasers, paint thinner, etc.) NO
- [ ] Fuels/Oils (gasoline, diesel, used oil)
- [ ] Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- [ ] Pesticides

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☐ No ☒
If yes, specify what was done, where in the home, and what month:

24. Have you installed new carpeting in your home within the last year? Yes ☐ No ☒
If yes, when and where? _____

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
No ☒

26. Does anyone in your home use solvents at work?
Yes ☒ If yes, how many persons?
No ☒ If no, go to question 28 maybe not after

27. If yes for question 26, are the work clothes washed at home? Yes ☐ No N/A

28. Where is the washer/dryer located?
Basement ☒
Upstairs Utility Room ☐
Kitchen ☐
Garage ☐
Use a Laundromat ☐
Other, please specify ☐ _____

29. If you have a dryer, is it vented to the outdoors? Yes ☒ No ☐

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas ☒, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system:
- Forced Hot Air ☒
- Forced Hot Water ☐
- Steam ☐
- Radiant Floor Heat ☐
- Wood Stove ☐
- Coal Furnace ☐
- Fireplace ☐
- Other ☐ _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? _____
none
How is/was the tank filled? _____
Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☐ No ☑
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☐
Other (please specify) _____

33. Do you use any of the following? Room Fans ☐, Ceiling Fans ☐, Attic Fan ☐

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☑

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☑ Unknown ☐
If yes, please specify type of pest controlled _____
And approximate date of service _____

36. Water heater type: Gas ☐, Electric ☐, by Furnace ☐,
Other (please describe) _____

37. Water heater location: Basement ☑, Upstairs Utility Room ☐, Garage ☐,
Other (please specify) _____

38. What type of cooking appliance do you have? Electric ☑, Gas ☐
Other (please describe) _____

39. Is there a stove exhaust hood present? Yes ☐ No ☑
Does it vent to the outdoors? Yes ☐ No ☐

40. Smoking in Home:
None ☑, Rare (only guests) ☐, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐

41. If yes to question 40, what is smoked?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☐ No ☑

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ ND

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation: _____
Yes, does not have vacuum

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

Kitchen sink typical strong

45. Please check weekly household cleaning practices:

Dusting ☐

Dry Sweeping ☐

Vacuuming ☐

Polishing (furniture, etc.) ☐

Washing/Waxing Floors ☐

Other (describe) ☐ _____

46. Other comments:

_____

_____

_____

_____

_____

_____

_____

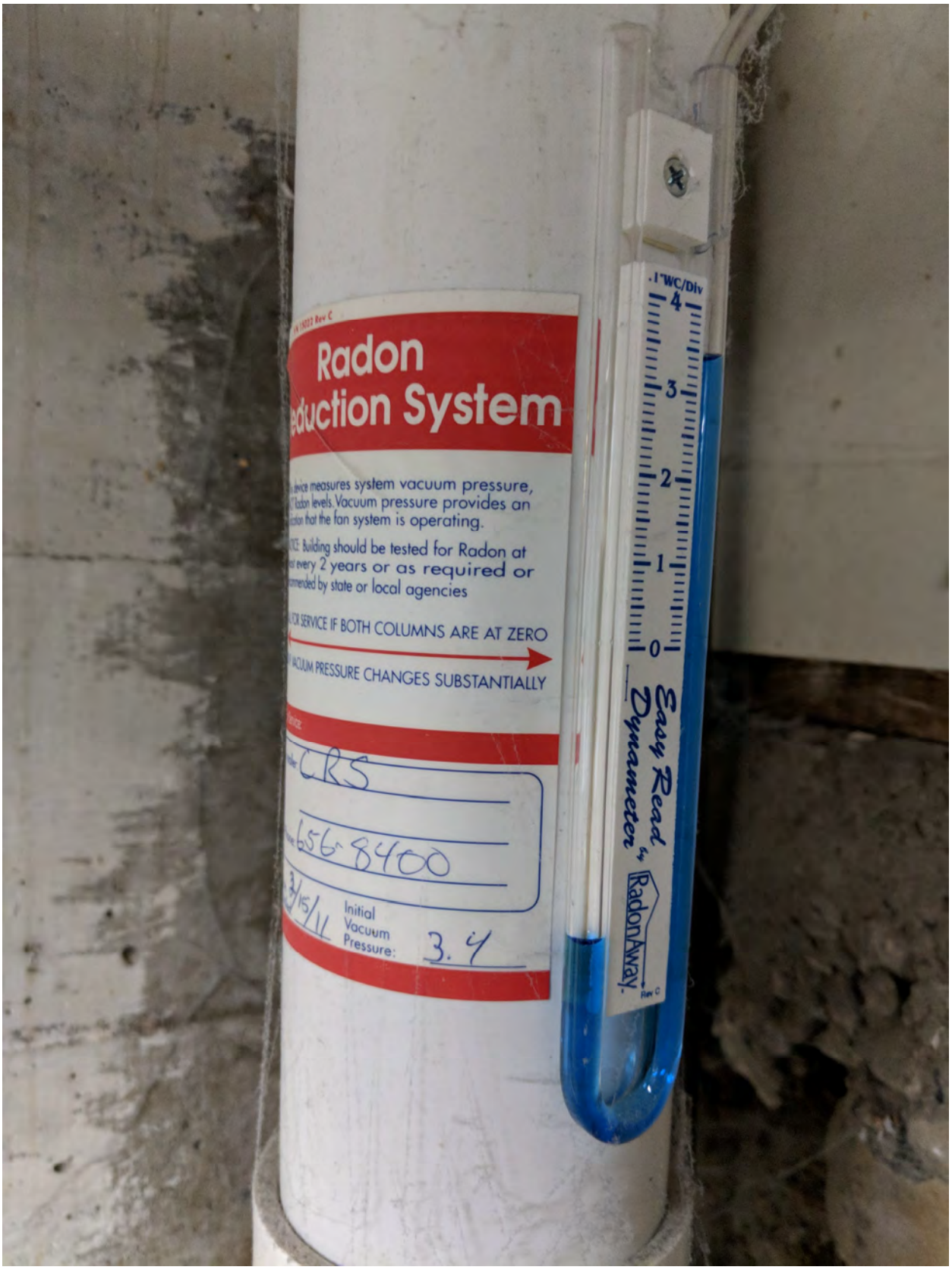
_____

_____

47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

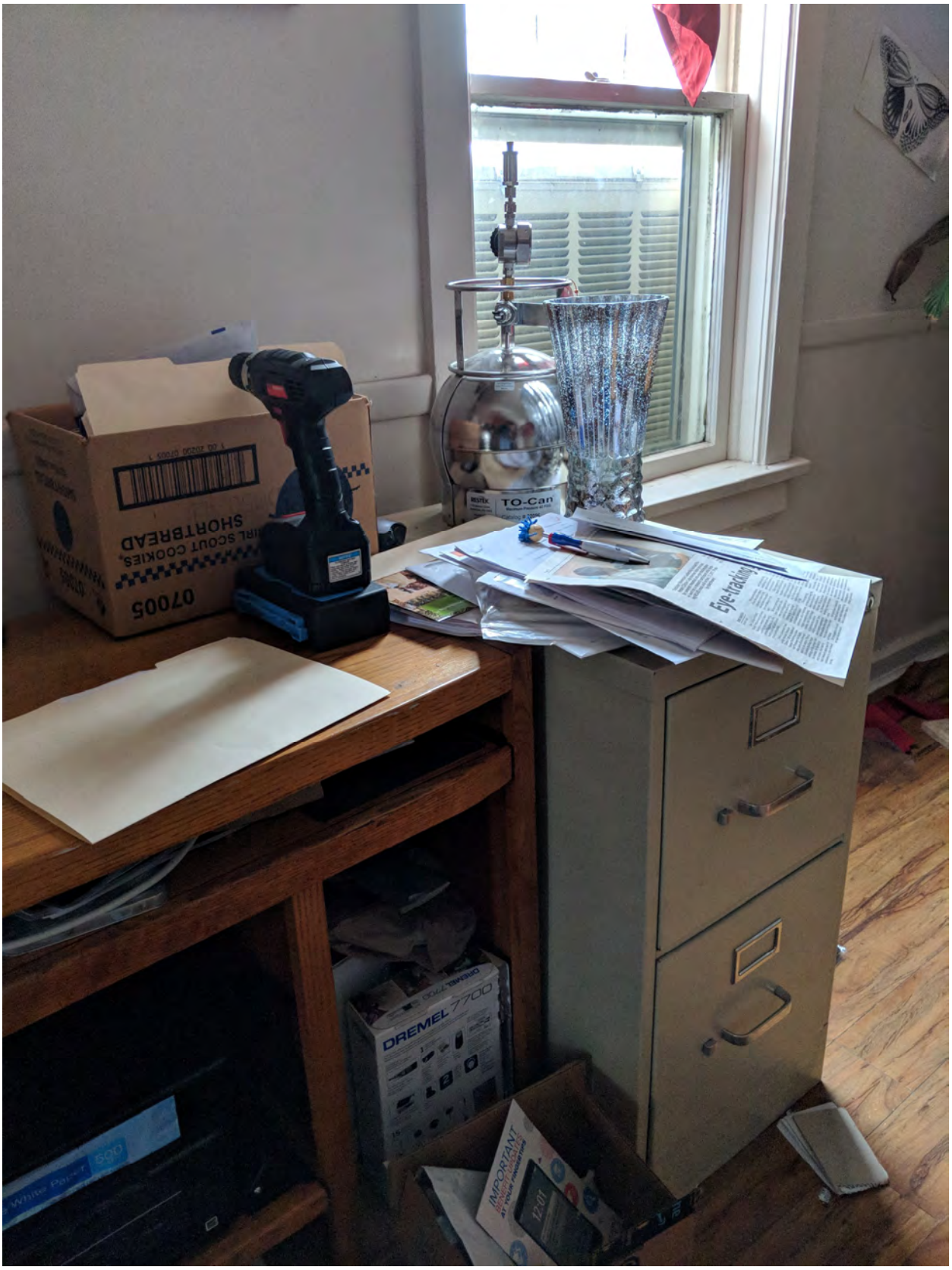
VI Sample: 527 St Johns Ave_Basement



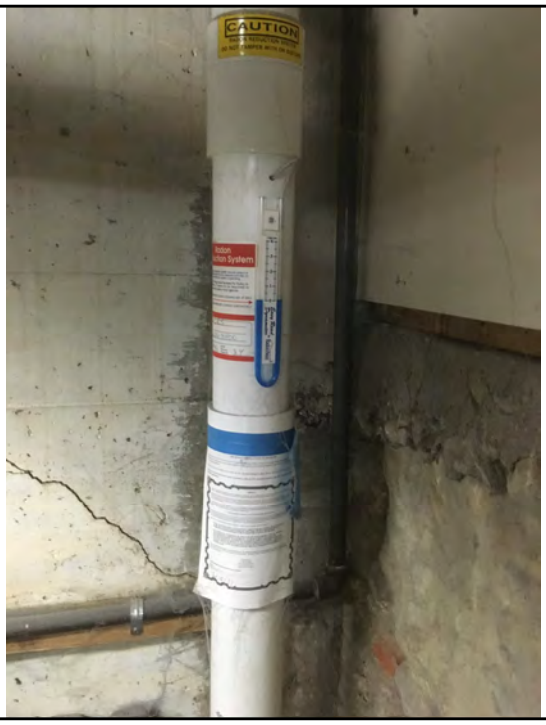
VI Sample: 527 St Johns Ave_Basement

VI Sample: 527 St Johns Ave_Basement

VI Sample: 527 St Johns Ave_Main



VI Sample: 527 St Johns Ave_Basement

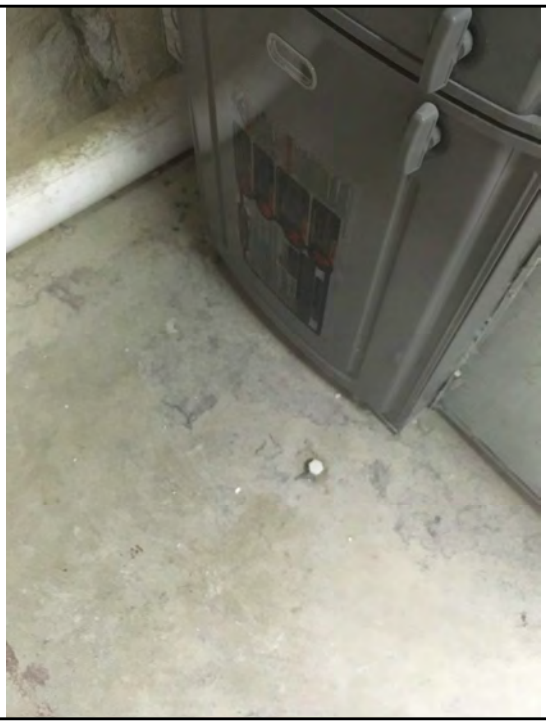


ADDRESS: 527 ST JOHNS AVE

NOTES:
MITIGATION OFF

ADDRESS: 527 ST JOHNS AVE

NOTES:
MITIGATION ON



ADDRESS: 527 ST JOHNS AVE

NOTES:
SUBSLAB SAMPLE LOCATION

Montana Department of Environmental Quality
Remediation Division/Site Response Section
1100 North Last Chance Gulch
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Gordon Gooselaw
Physical Address of property under investigation: 611 St. Johns Ave.
Mailing Address: Same
Phone (optional): _____

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed (circle all that apply)
2/27/2018	Indoor Air	20180227-611St.JohnsAve-01	Metals/VOCs/SVOC/EPH/VPH/nitrate/dioxin-furan/ Bacteria /pesticides/ OTHER*
2/27/2018	Indoor Air	20180227-611St.JohnsAve-01	Metals/VOCs/SVOC/EPH/VPH/nitrate/dioxin-furan/ Bacteria /pesticides/ OTHER*
2/28/2018	Sub-Slab	20180228-611St.Johns-01	Metals/VOCs/SVOC/EPH/VPH/nitrate/dioxin-furan/ Bacteria /pesticides/ OTHER*

*OTHER (specify analysis): Indoor air:TO-15, APH Sub-slab: TO-15, APH, Fixed Gases, Methane

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.
- ☑ N/A

DEQ will mail the results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason: _____

DEQ representative:

S. Seitz on behalf of DEQ
Signature

S. Seitz
Printed Name

Telephone # 406-558-4850

Date: 3/1/2018

Property owner/operator copy = white DEQ copy = yellow

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID: 611 St. Johns Ave

4 Gas): QRAE2 II / 152-M1984

Project Name: MDEQ Billings PCE

PID (model/serial #): RAE Systems ppbRA 3000 PGM-7340

Sample location: Basement Sub-slab Sampling

Helium Detector (model/serial #): Dielectric MGD 2002 #8628

Date: 02/28 2018

Weather: Sunny; WSW 13 mph

Field Personnel: Joel Riebli : Jake Scott

Air Temp: 39°F

Recorded by: Joel Riebli

Atmospheric Pressure: 29.99 in

Slab Data

Surface/slab Type: Concrete

Surface/slab Thickness (inches): Unknown, installed previously by EPA

Slab/subsurface substrate comments: Unknown substrate material below concrete slab

Depth of hole through the slab: Unknown, assume 12"

Length of sampling train (feet): 4'

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 120

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
02/28/18	1527	100	23.5	24.3				
	1528	200	22.4	23.5				
	1528	300	21.1	22.4				
	1529	400	20.1	21.1				
	1530	500	22.5	23.1	450 ppM	469 ppb		

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
02/28/17	1532	1608	20180228-611 St Johns-01	3379	FC 1603	—	-26.6	-4.8

Comments:

	Initial	Final	
2 min shut down test #3379 FC 1603	-26.6	-26.6	Pass

CO = 0 ppm H_2S = 0.0 ppm O_{xy} = 20.9% LEL = 1%

Highest He under the shroud = 24.3%

Sub-Slab Soil Vapor Sampling Field Data Sheet

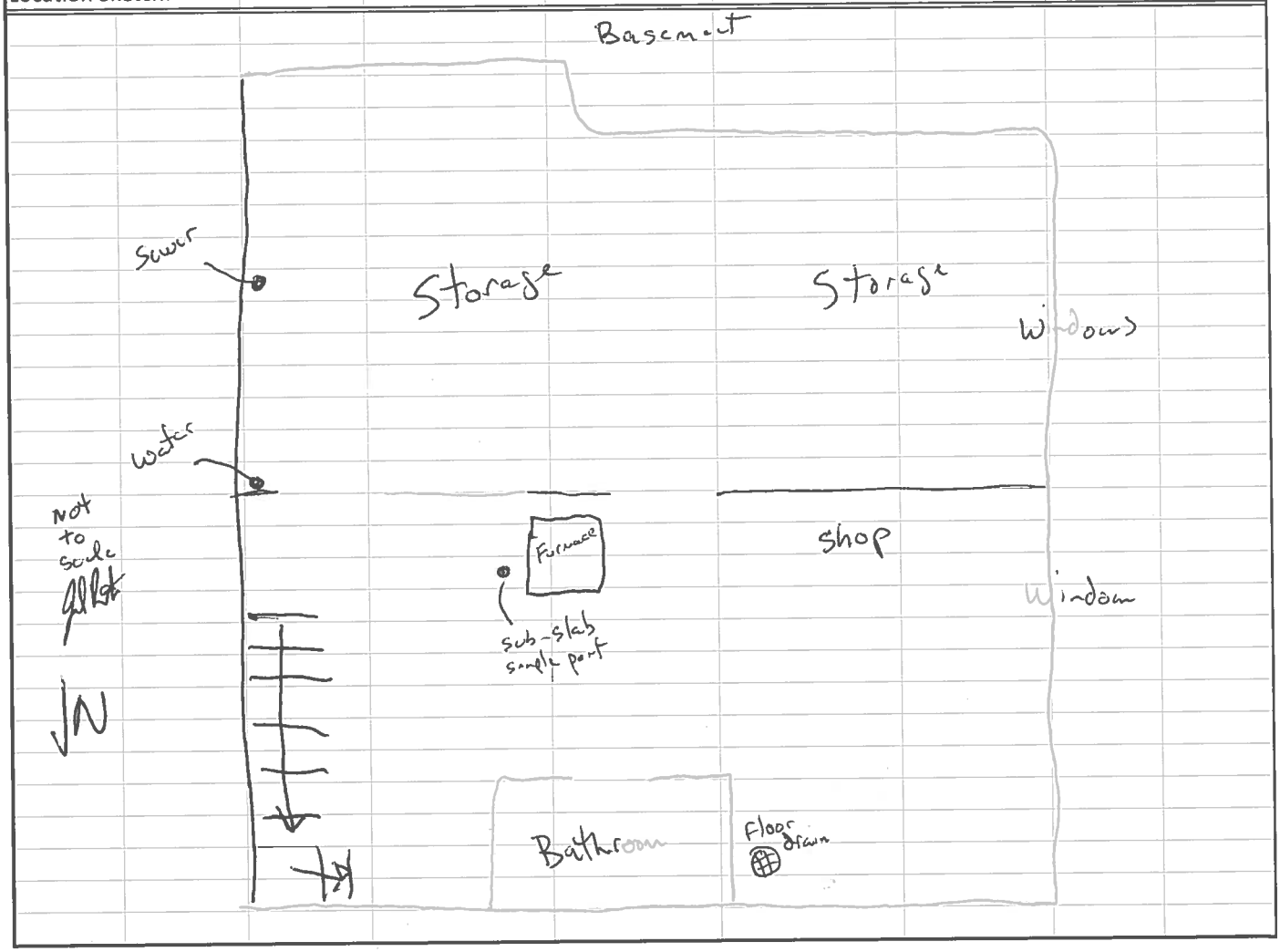
Project Name: MDEQ Billings PCE Sample Location/ ID: Coll St, Johns

Date:

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

Unknown, installed previously by EPA.

Location Sketch:



Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	611 ST. Johns Ave	**Start Weather:**	Clear, Sunny, WSW 9mph
		Start Outdoor Air Temp:	35°F
Project Name:	MDEQ Billings PCE	**Start Atmospheric Pressure:**	29.95 in
Sample Location:	Basement (01), First Floor (02)		
Date:	02/27/2018 → 02/28/2018	**End Weather:**	Clear, Sunny, WSW 13mph
Field Personnel:	Joel & Luke	**End Outdoor Air Temp:**	39°F
Recorded by:	Joel Riebli	**End Atmospheric Pressure:**	30.02 in

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
2/27/18	1417	02/28/18	1417	20180227-611ST Johns Ave-01	Ø511	FCØ75Ø	NA	-27.5 ~~-28.5~~	~2.0	~68°F	~68°F
2/27/18	1422	02/28/18	1422	20180227-611ST Johns Ave-02	Ø129	FC 1362	NA	-26.5	~5.8	~70°F	~70°F

Comments:

Shut down test (2 min)

0511	FC Ø75Ø	28.0 in	28.0 in	Pass
0129	FC 1362	27.5 in	27.5 in	Pass

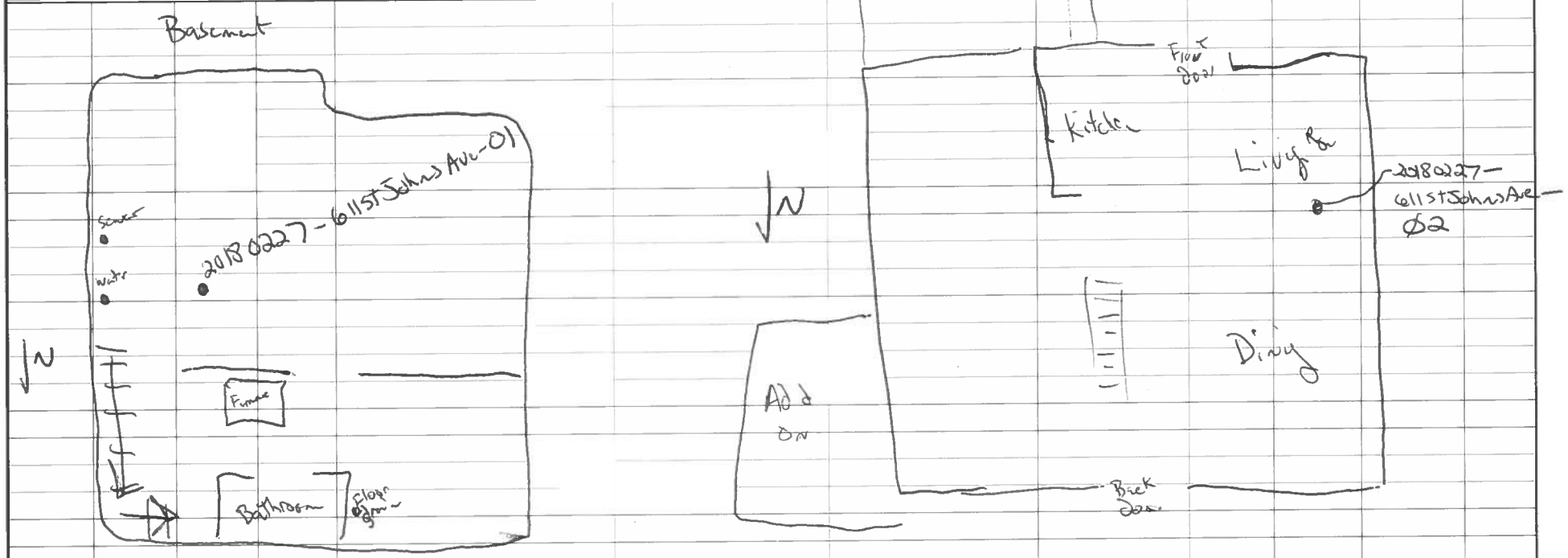
Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s): 611 ST. Johns Ave

*20180227 - 611ST Johns - 01 in basemnt, on desk in storage rooms. Set sample collect at 4' inlet. Chemicals (paints, sealers, liquid nails, spray adhesive, stripper) big stored in basemnt.

*20180227 - 611ST Johns - 02 placed on chair in living/dining room

Location Sketch:



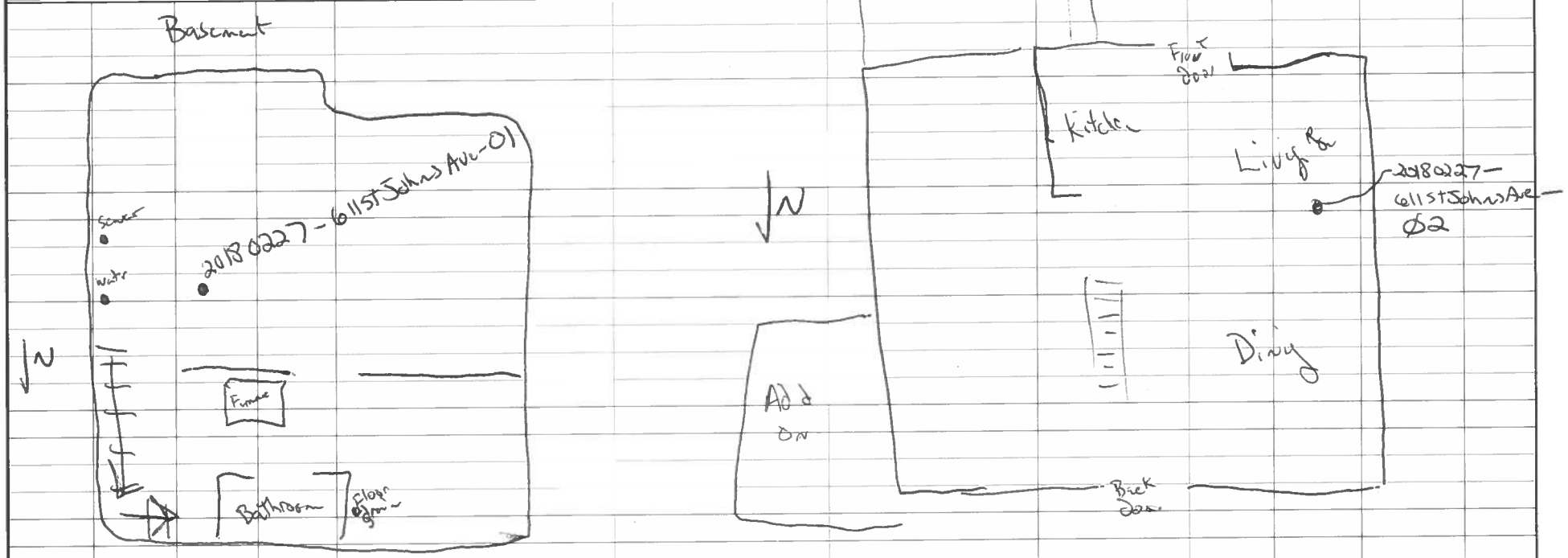
Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s): 611 ST. Johns Ave

*20180227 - 611ST Johns - 01 in basemnt, on desk in storage rooms. Set sample collect at 4' inlet. Chemicals (paints, sealers, liquid nails, spray adhesive, stripper) big stored in basemnt.

*20180227 - 611ST Johns - 02 placed on chair in living/dining room

Location Sketch:



OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 2/27/18

1. Name: Gordon Gooselaw

   Address: 6972 St. Johns Billings MT

   Home Phone: _____ Work Phone: _____

2. What is the best time to call to speak with you? — At: Work ☐ or Home ☐ ? in person

3. Are you the Owner ☑, Renter ☐, Other ☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

   _____

   _____

   _____

4. Total number of occupants/persons at this location? 2 adults (wife mother's previously)
   Number of Children _____ Ages _____

5. How long have you lived at this location? 1990 since

General Home Description

6. Type of Home/Structure (check only one): Single Family Home ☑, Duplex ☐, Apartment ☐, Townhouse ☐ Other _____

7. Home/Structure Description:
   Number of floors: 1 main
   Basement ☑
   Crawlspace ☐
   Partial Crawlspace/Basement ☐ % of each _____
   Slab On Grade ☐
   Other ☐ _____

8. Age of Home/Structure: 1946 years, Not Sure/Unknown ☐

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood ☑, Brick ☐, Concrete ☐, Cement block ☐, Other ☐ _____
   Garage: ☐ Attached ☐ Detached ☐ None

10. Foundation Construction (check all that apply):
    Concrete Slab ☑ 24×24 – small addition and garage conversion on slab to bedroom
    Fieldstone ☐
    Concrete Block ☐
    Elevated Above Ground/Grade ☐
    Other ☐ _____

11. Do you have Private Well ☒ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____

not used since EPA action - not even irrigation

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____ city water city sewer
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☒

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☒ Unfinished ☐ Partially Finished ☐ Partial Crawlspace ☐?

15. If finished, how many rooms are in the basement? _____
What are rooms used for? Bedrooms ☐ Family Room ☐ Storage ☐
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☒ No ☐ more in future

17. Is the basement floor (check all that apply) Concrete ☒, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☒, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☒

Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☒

21. Does the basement have any of the following? Floor Cracks ☒, Wall Cracks ☐, Sump ☐,
Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe _____

into sewer

soil and concrete

22. Are any of the following used or stored in the basement (check all that apply):
- [x] Paint (latex)
- [ ] Solvents (degreasers, paint thinner, etc.)
- [ ] Fuels/Oils (gasoline, diesel, used oil)
- [ ] Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- [ ] Pesticides

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes [x] No [ ]
If yes, specify what was done, where in the home, and what month:

24. Have you installed new carpeting in your home within the last year? Yes [ ] No [x]
If yes, when and where? _____

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) [ ]
Yes, use dry-cleaning infrequently (monthly or less) [ ]
Yes, work at a dry cleaning service [ ]
No [x]

26. Does anyone in your home use solvents at work?
Yes [ ] If yes, how many persons?
No [x] If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes [ ] No [ ]

28. Where is the washer/dryer located?
Basement [ ]
Upstairs Utility Room [x] main floor
Kitchen [ ]
Garage [ ]
Use a Laundromat [ ]
Other, please specify [ ] _____

29. If you have a dryer, is it vented to the outdoors? Yes [x] No [ ]

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas [x], Oil [ ], Electric [ ], Wood [ ], Coal [ ],
Other [ ] _____

Heat conveyance system:
- Forced Hot Air [x]
- Forced Hot Water [ ]
- Steam [ ]
- Radiant Floor Heat [ ]
- Wood Stove [ ]
- Coal Furnace [ ]
- Fireplace [ ]
- Other [ ] _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? _____

How is/was the tank filled? _____

Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☒ No ☐
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☐
Other (please specify) _____

33. Do you use any of the following? Room Fans ☐, Ceiling Fans ☒, Attic Fan ☐
Kitchen

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☒

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☐ Unknown ☐
If yes, please specify type of pest controlled _____
And approximate date of service _____

36. Water heater type: Gas ☒, Electric ☐, by Furnace ☐,
Other (please describe) tankless

37. Water heater location: Basement ☒, Upstairs Utility Room ☐, Garage ☐,
Other (please specify) _____

38. What type of cooking appliance do you have? Electric ☐, Gas ☒
Other (please describe) _____

39. Is there a stove exhaust hood present? Yes ☒ No ☐
Does it vent to the outdoors? Yes ☒ No ☐

40. Smoking in Home:
None ☒, Rare (only guests) ☐, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐

41. If yes to question 40, what is smoked?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☒ No ☐ wax diffuser

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____
NO

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation: _____
NO

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
~~Spray-on deodorant~~	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

45. Please check weekly household cleaning practices:

Dusting ☑
Dry Sweeping ☑ yes
Vacuuming ☑
Polishing (furniture, etc.) ☐ no
Washing/Waxing Floors ☐ no
Other (describe) ☐ _____

46. Other comments:

Concern over irrigation well not being able to be used and risk.

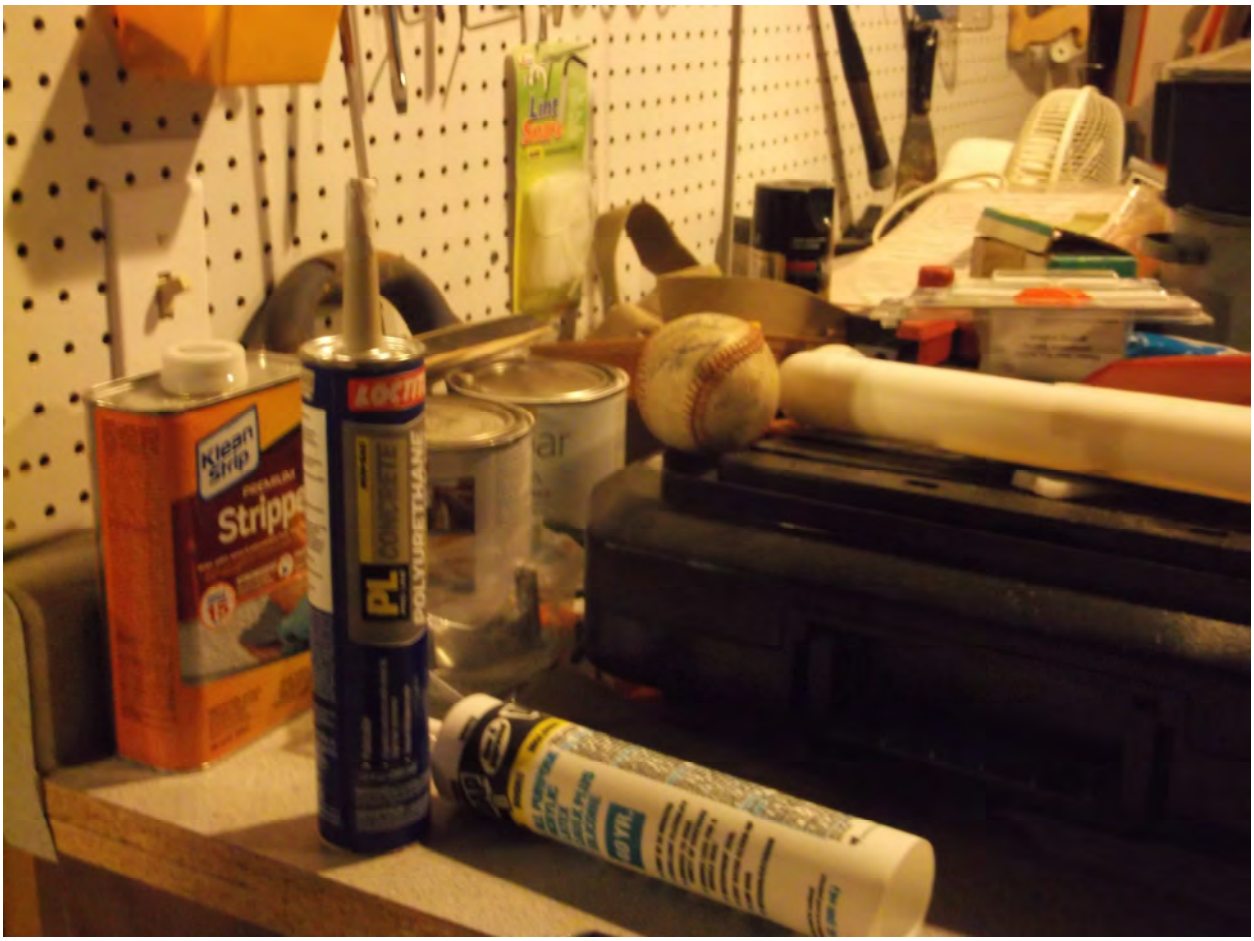
Willing to use well - no pump - pipe & foot valve kept.

47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

VI Sample: 611 St Johns Ave_Basement

VI Sample: 611 St Johns Ave_Basement



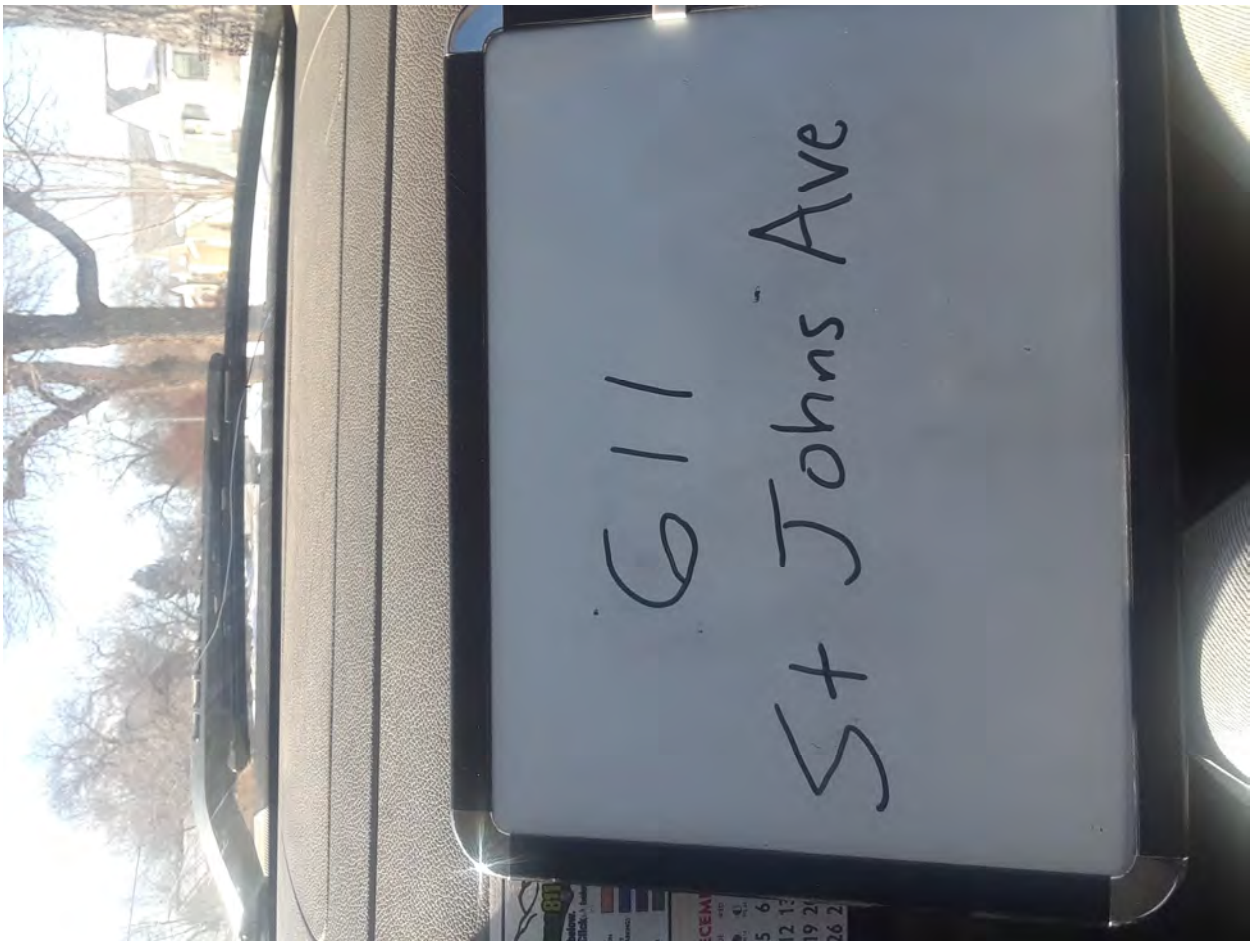
VI Sample: 611 St Johns Ave_Basement

VI Sample: 611 St Johns Ave_Basement

VI Sample: 611 St Johns Ave_Basement

VI Sample: 611 St Johns Ave_Main

611 St Johns Ave

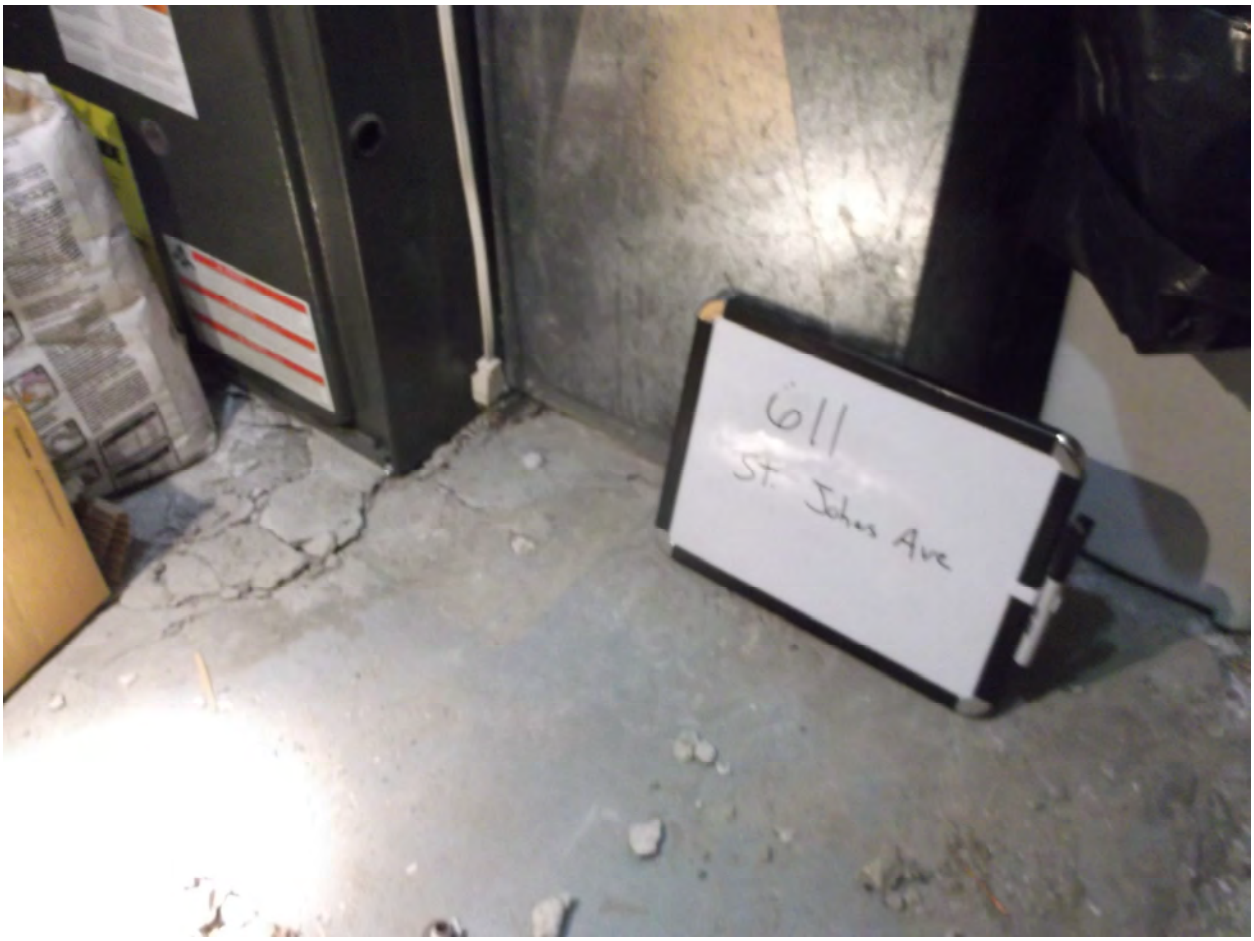


VI Sample: 611 St Johns Ave_Subslab

VI Sample: 611 St Johns Ave_Subslab

VI Sample: 611 St Johns Ave_Subslab

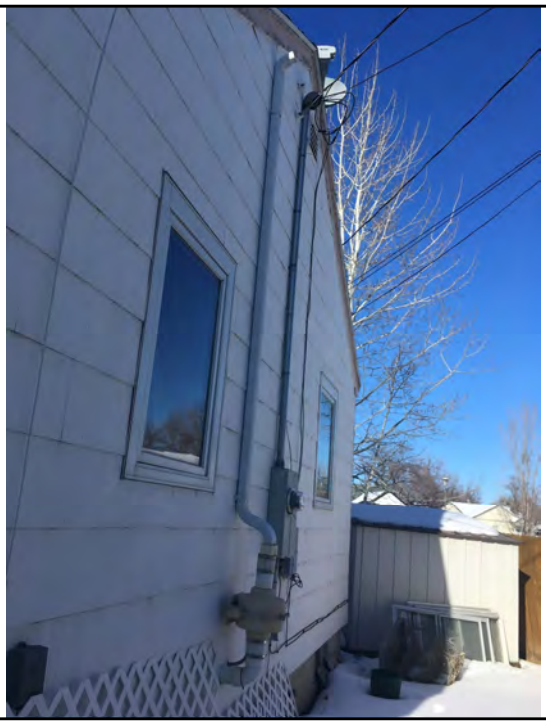
VI Sample: 611 St Johns Ave_Subslab



VI Sample: 611 St Johns Ave_Subslab

VI Sample: 611 St Johns Ave_Basement

VI Sample: 611 St Johns Ave_Basement



ADDRESS: 632 ST JOHNS #02

NOTES:
NOT SAMPLED – OUTDOOR VIEW OF EPA INSTALLED MOTIVATION SYSTEM THAT DOES NOT APPEAR TO BE OPERATING

ADDRESS: 632 ST JOHNS #02

NOTES:
NOT SAMPLED – FRONT VIEW OF 632 ST JOHNS #02, DOES NOT APPEAR OCCUPIED

632 ST JOHN'S AVENUE #6

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	632 St. Johns		
Project Name:	Billings PCE GW	PID (model/serial #):	ppb RAE3000 / 12875
Sample location:	Subslab	Helium Detector (model/serial #):	Dielectric / R11189
Date:	~~3/6/18~~ 3/8/18	Weather:	Cloudy
Field Personnel:	DS, LD	Air Temp:	30°
Recorded by:	LD	Atmospheric Pressure:	29.85 in

Slab Data

Surface/slab Type:	Concrete; easily breaks up, Surface cracks.
Surface/slab Thickness (inches):	4 1/4, surface cracking,
Slab/subsurface substrate comments:	
Depth of hole through the slab:	5 1/4"
Length of sampling train (feet):	5" + 39" ~41

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 120.

Helium Tracer Leak Test Field Data / **Sample Collection Data**

Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
3/8/18		50						
	1715	100	19.8	20.8	0			21.7
		150						
		200						
		250						
		300						

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
3/8/18	1719	1755	20180308-632STJOHNS-01	3505	2851		27	5

Comments:

PID - never settled inside basement 310 - 1150 ppb consistently 500 - 550 ppb outside dropped to Ø

Helium ran out at about ~~14p~~ 1730 Consistent at ~19

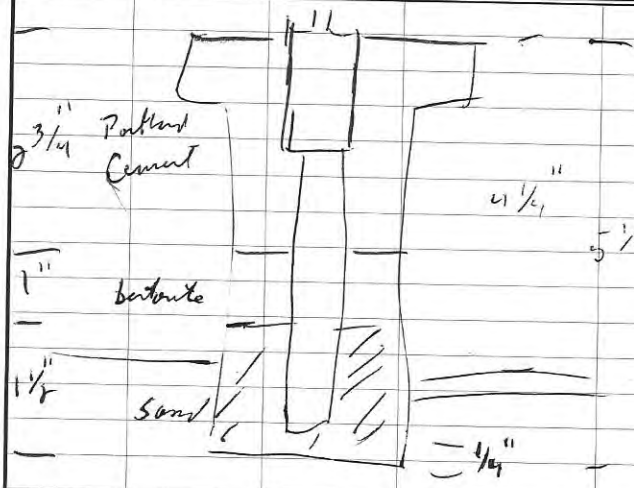
4-Gas

CO	Ø	O_2	20.9%
H_2S	Ø	LEL	0

Sub-Slab Soil Vapor Sampling Field Data Sheet

Project Name:	Sample Location/ ID:
Date:	

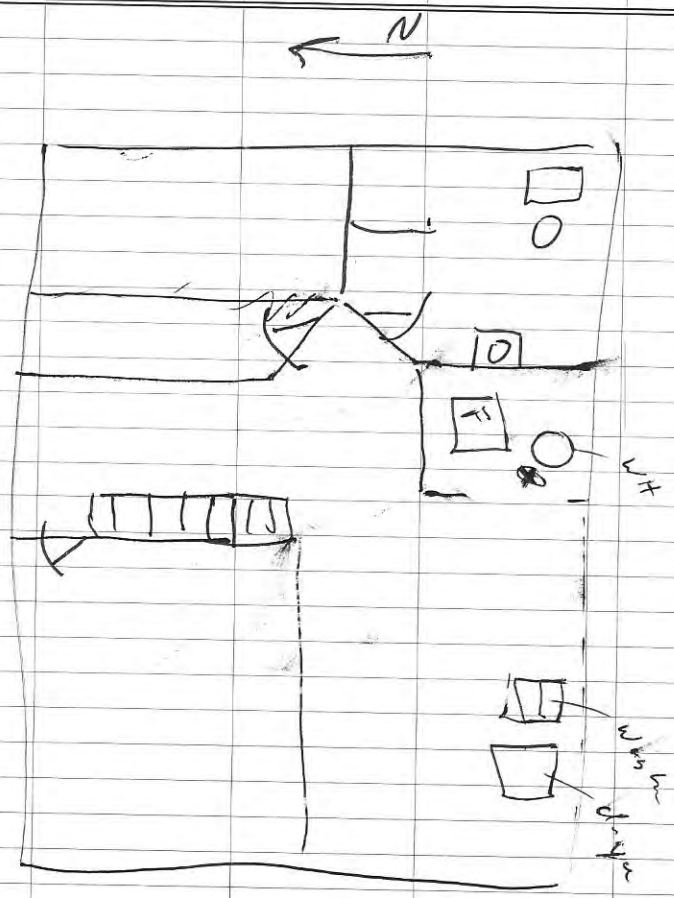
Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.



in utility room
- near furnace, hot water heater

From 5"

Location Sketch:



Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	632 St. Johns #6	Start Weather:	Sunny w 5MPH
		Start Outdoor Air Temp:	45°F
Project Name:	BPCF	Start Atmospheric Pressure:	30.11 inHg
Sample Location:	Indoor Air		
Date:	3/7/18	End Weather:	Cloudy w 8mph NNE
Field Personnel:	ST/BJ	End Outdoor Air Temp:	30°F
Recorded by:	ST	End Atmospheric Pressure:	29.87 in

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
3/7/18	1703	3/8/18	1659	20180307-6325TJOHNG-01	1079	0350		24	Ø	65°F	
3/7/18	1708	3/8/18	1656	20180307-6325TJOHNG-02	2169	1061		29.5	3	70°F	

Comments:

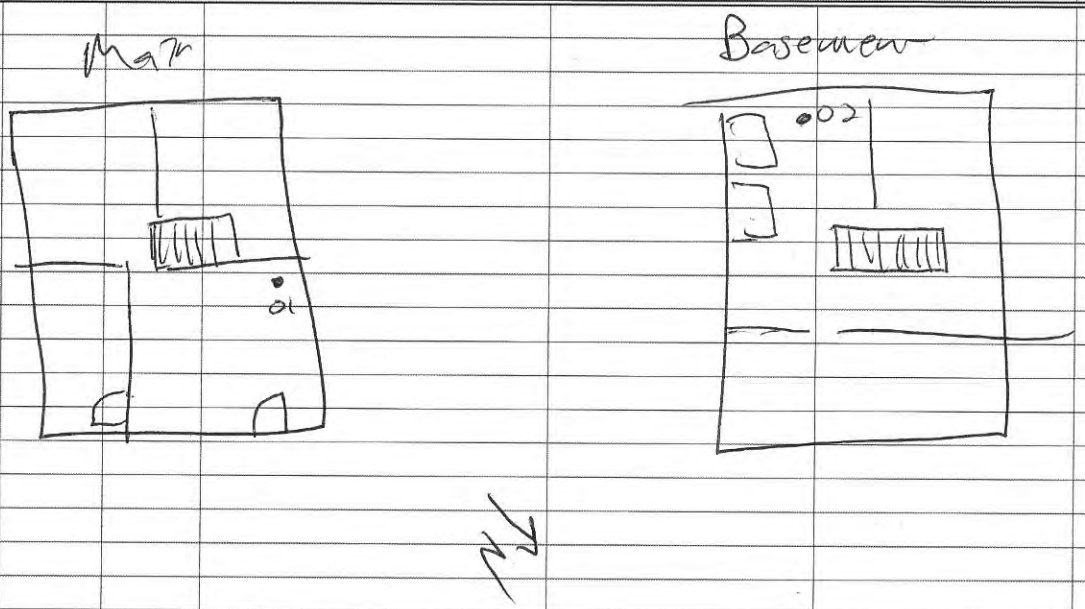
01 - ~~Crawlspace~~ Basement Air

02 - Main floor.

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

Location Sketch:



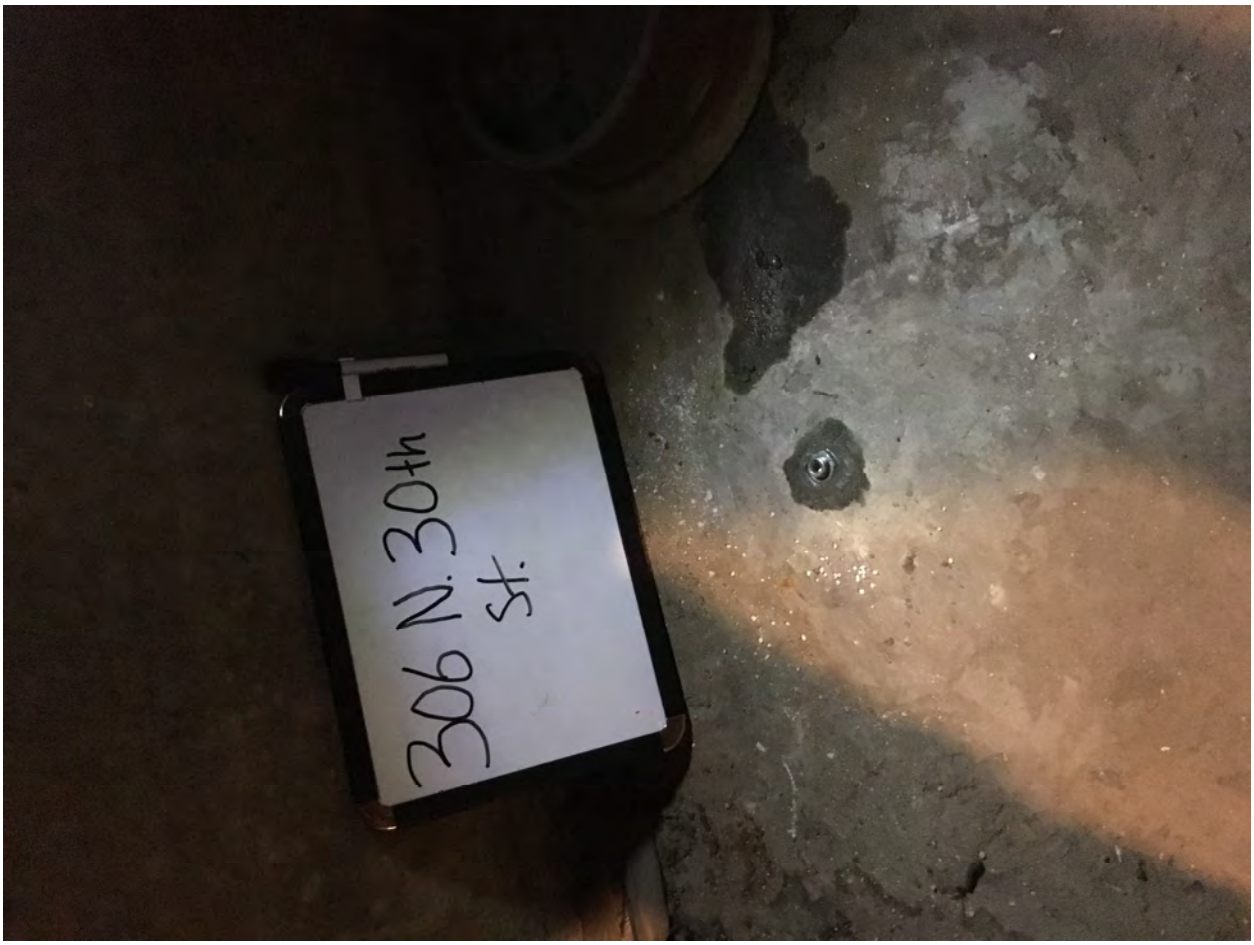
ADDRESS: 632 St. John's Avenue – Unit 6

NOTES: OUTSIDE OF STRUCTURE – RESIDENTIAL VI SAMPLE STRUCTURE

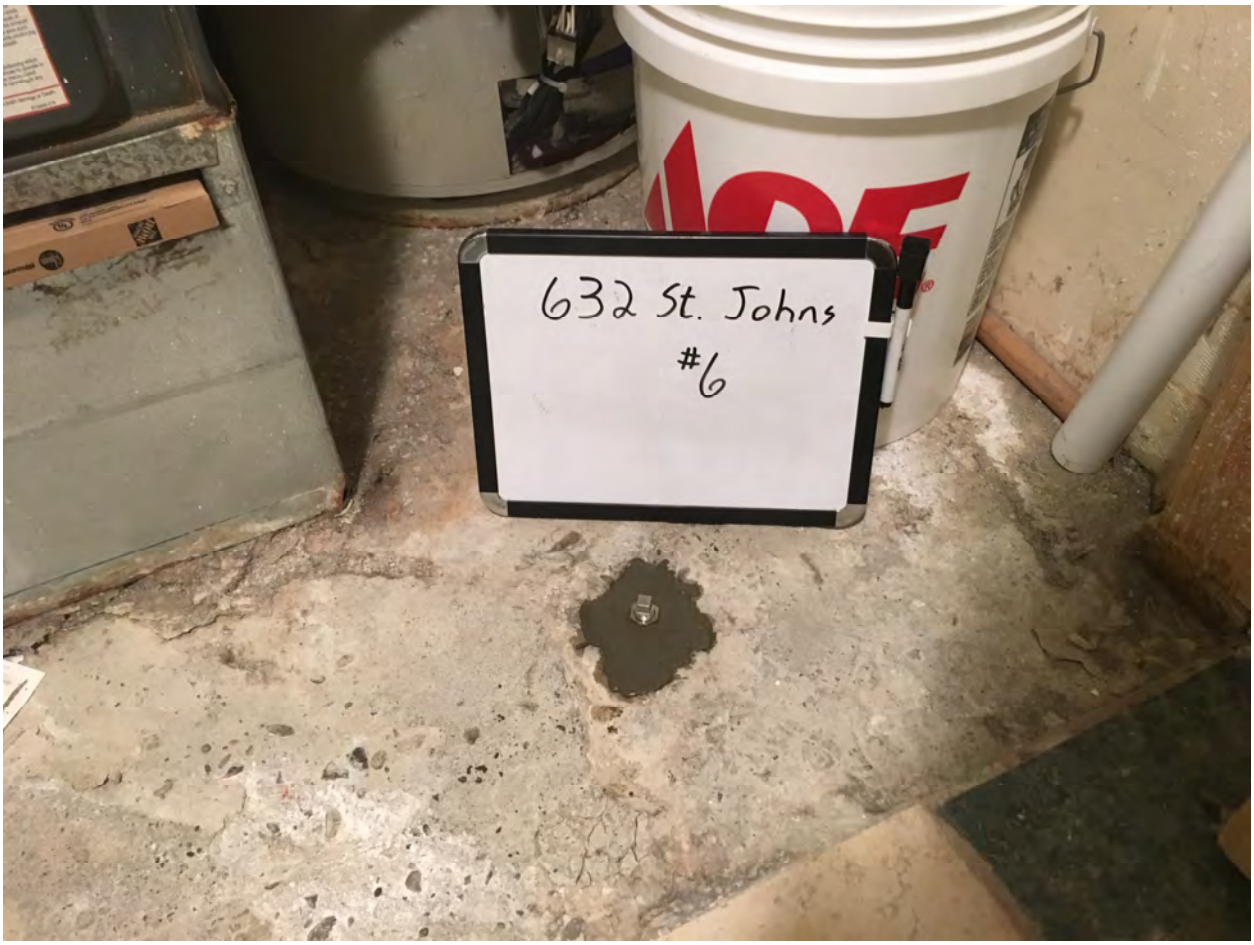
ADDRESS: 632 St. John's Avenue – Unit 6

NOTES: OUTSIDE OF STRUCTURE – RESIDENTIAL VI SAMPLE STRUCTURE

VI Sample: 632 St Johns Ave No6_Subslab



VI Sample: 632 St Johns Ave No6_Subslab



Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Pam Jackson

Physical Address of property under investigation: 708 ½ St. John's, Billings MT

Mailing Address: 708 St. John's

Phone (optional): —

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/8/18	Indoor Air	20180208-708 1/2 ST JOHN-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/8/18	Indoor Air-Crawl	20180208-708 1/2 ST JOHN-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
			Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*

*OTHER (specify analysis) VOCs (TO-15), Petroleum (APH)

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample. NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

[signature] on behalf DEQ — Signature

S. SEITZ (TRI HYDRO) — Printed Name

Telephone #: 406-558-4850

Date: 2/11/18

Property owner/operator copy = white DEQ copy = yellow

OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: _____

1. Name: Pam Jackson

   Address: 708 1/2 St. Johns Ave

   Home Phone: 406-670-0508 Work Phone: _____

2. What is the best time to call to speak with you? _____ At: Work ☐ or Home ☐ ?

3. Are you the Owner ☑, Renter ☐, Other ☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

4. Total number of occupants/persons at this location? 2 adults
   Number of Children 1 Ages newborn

5. How long have you lived at this location? Nov 10, 2017

General Home Description

6. Type of Home/Structure (check only one): Single Family Home ☑, Duplex ☐, Apartment ☐, Townhouse ☐ Other _____

7. Home/Structure Description:
   Number of floors: 1
   Basement ☐
   Crawlspace ☑ dirt
   Partial Crawlspace/Basement ☐ % of each _____
   Slab On Grade ☐
   Other ☐ _____

8. Age of Home/Structure: _____ years, Not Sure/Unknown ☐

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood ☑, Brick ☐, Concrete ☐, Cement block ☐, Other ☐ _____
   Garage: ☐ Attached ☐ Detached ☐ None

   Access to crawlspace Back door near laundry room

10. Foundation Construction (check all that apply):
    Concrete Slab ☐
    Fieldstone ☐
    Concrete Block ☐
    Elevated Above Ground/Grade ☐
    Other ☐ _____

    dirt crawlspace

11. Do you have Private Well ☑ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____

Haven't used it, has a pump. - not used w/ EPA noted & water was funky 20 yrs ago

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____ city water / city sewer
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☑ No ☐

Have in the past - but likely internal

MIL used to live there & flooded flower bed

Basement Description (please check all boxes that apply): NA

14. Is the basement Finished ☐ Unfinished ☐ Partially Finished ☐ Partial Crawlspace ☐?

15. If finished, how many rooms are in the basement? _____
What are rooms used for? Bedrooms ☐ Family Room ☐ Storage ☐
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐

17. Is the basement floor (check all that apply) Concrete ☐, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☐, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐,
Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe_____

22. Are any of the following used or stored in the ~~basement~~ crawlspace (check all that apply):
- ☐ Paint
- ☐ Solvents (degreasers, paint thinner, etc.) > no
- ☐ Fuels/Oils (gasoline, diesel, used oil) empty crawlspace
- ☐ Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- ☐ Pesticides

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☒ No ☐
If yes, specify what was done, where in the home, and what month:
Painting & carpet in Oct/Nov. = old linoleum under the new linoleum

24. Have you installed new carpeting in your home within the last year? Yes ☒ No ☐
If yes, when and where? ~~Also~~ no glue - stretch/tack

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
No ☒

26. Does anyone in your home use solvents at work?
Yes ☐ If yes, how many persons?
No ☒ If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes ☐ No ☒

28. Where is the washer/dryer located?
- Basement ☐
- Upstairs Utility Room ☐
- Kitchen ☐
- Garage ☐
- Use a Laundromat ☐
- Other, please specify ☐ _____

No washer dryer

29. If you have a dryer, is it vented to the outdoors? Yes ☐ No ☐

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas ☒, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system:
- Forced Hot Air ☒
- Forced Hot Water ☐
- Steam ☐
- Radiant Floor Heat ☐
- Wood Stove ☐
- Coal Furnace ☐
- Fireplace ☐
- Other ☐ _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? _____
NO
How is/was the tank filled? _____
Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☐ No ☒
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☐
Other (please specify) _____

33. Do you use any of the following? Room Fans ☐, Ceiling Fans ☐, Attic Fan ☐

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☐ Unknown ☐
If yes, please specify type of pest controlled _____
And approximate date of service _____

36. Water heater type: Gas ☒, Electric ☐, by Furnace ☐,
Other (please describe) _____

37. Water heater location: Basement ☐, Upstairs Utility Room ☒, Garage ☐,
Other (please specify) _____

38. What type of cooking appliance do you have? Electric ☒, Gas ☐
Other (please describe) _____

39. Is there a stove exhaust hood present? Yes ☒ No ☐
Does it vent to the outdoors? Yes ☐ No ☒

40. Smoking in Home:
None ☒, Rare (only guests) ☐, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐

41. If yes to question 40, what is smoked?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☐ No ☐

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____
NO

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation: _____
NO

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

45. Please check weekly household cleaning practices:

Dusting ☐

Dry Sweeping ☐

Vacuuming ☐

Polishing (furniture, etc.) ☐

Washing/Waxing Floors ☐

Other (describe) ☐ _____

46. Other comments:

_____

_____

_____

_____

_____

_____

_____

_____

_____

47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	708 St John + 708 1/2	Start Weather:	Overcast / freezing rain
		Start Outdoor Air Temp:	19°F
Project Name:	Billings	Start Atmospheric Pressure:	29.9
Sample Location:	Crawl space / basement		
Date:	2/8/18	End Weather:	Overcast, snowy
Field Personnel:	ST / MO	End Outdoor Air Temp:	3°F
Recorded by:	MO	End Atmospheric Pressure:	30.24

Canister and Sample Information

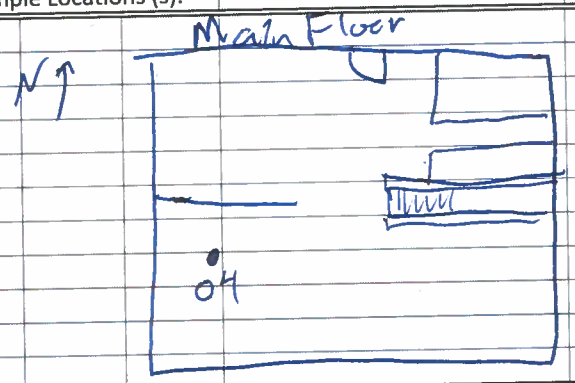
Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
								TAKE PICTURES			
2/8/18	0904	2/9/18	0852	20180208-708ST JOHN-01	~~2018~~ 3351	0763		26	-0.5	68°F	68°F
2/8/18	0906	2/9/18	0855	20180208-708ST JOHN-02	1729	1021		26	-3.5	↓	68°F
2/8/18	0908	2/9/18	0856	20180208-708ST JOHN-03	1069 ~~1069~~	0259		26	-2.5	↓	68°F
2/8/18	0910	2/9/18	0901	20180208-708ST JOHN-04 ~~20180208-708 1/2 ST JOHN~~	1081	1391		27.5	-2.5	↓	68°F
2/8/18	0916	2/9/18	0907	20180208-708 1/2 ST JOHN-01	3344	0867		28	-2.5	70°/70	
2/8/18	0918	2/9/18	0905	20180208-708 1/2 ST JOHN-02	0361	1088		28	-3	65/65	

Comments:

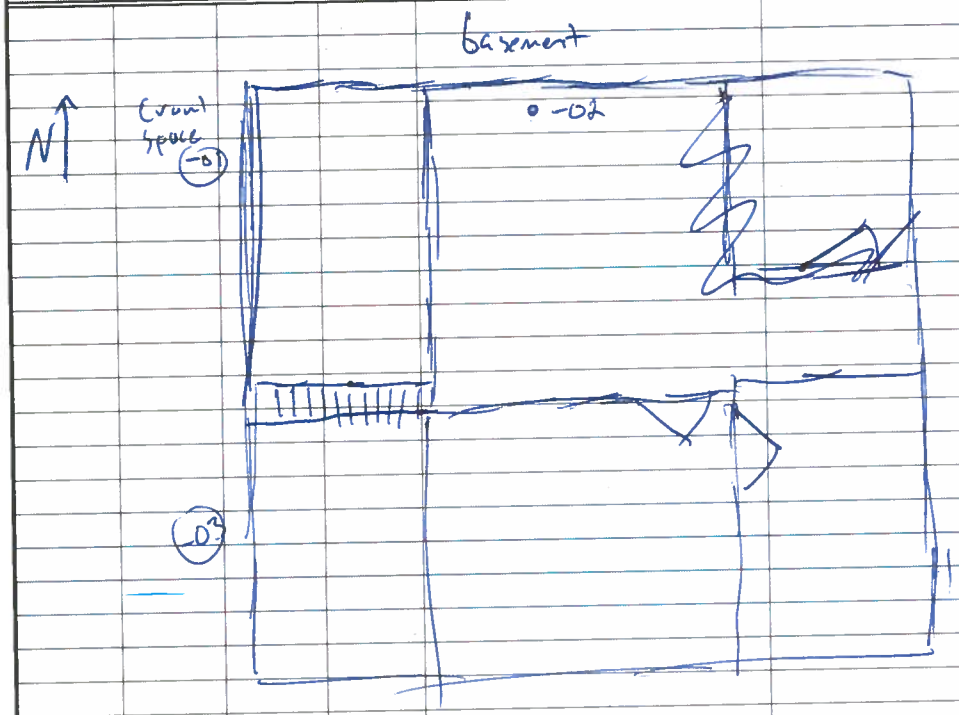
01 - Crawl space north
02 - ~~Crawl sp~~ basement
03 - Crawl space south
04 - Kitchen table 708 1/2
708 1/2 ST JOHN-01 - Kitchen table @ 708 1/2
-02 - Crawl space

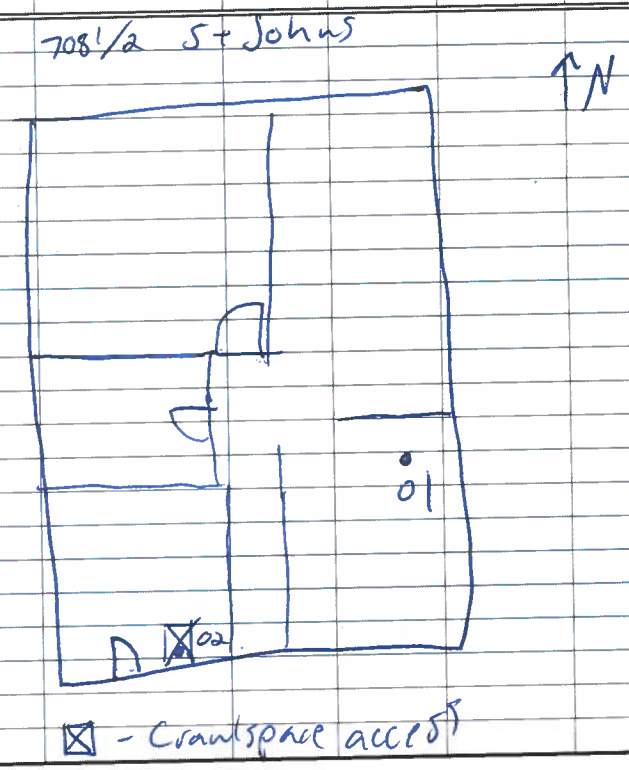
Indoor Air Sampling Field Data Sheet

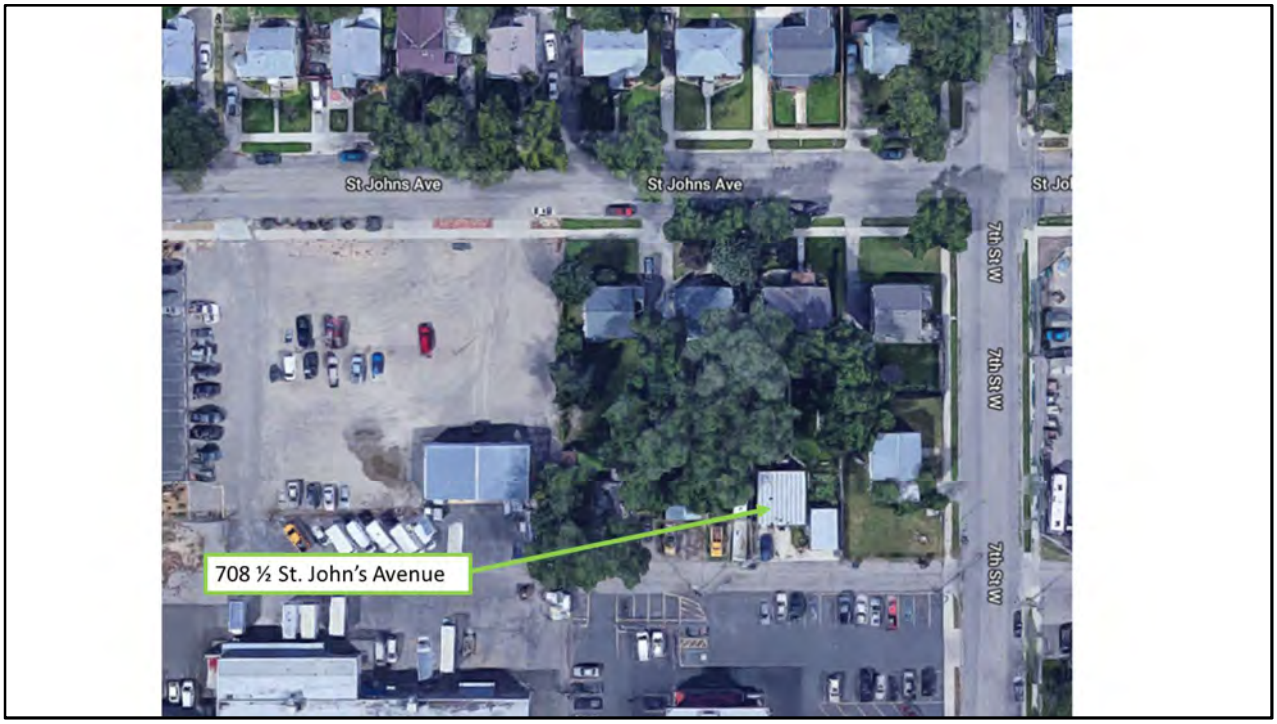
Description of Sample Locations (s):



Location Sketch:







ADDRESS: 708 ½ St. John's Avenue – Billings, MT

NOTES: OUTSIDE OF STRUCTURE – RESIDENTIAL VI SAMPLE STRUCTURE

ADDRESS: 708 ½ St. John's Avenue – Billings, MT

NOTES: OUTSIDE OF STRUCTURE – RESIDENTIAL VI SAMPLE STRUCTURE

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Pam Jackson

Physical Address of property under investigation: 708 St. John's, Billings MT

Mailing Address: same

Phone (optional): —

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/8/2018	Indoor Air-main	20180208-708STJOHN-04	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/9/2018	Sub slab vapor	20180209-708STJOHN-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
			Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*

*OTHER (specify analysis) Indoor Air - VOCs, Petroleum / Sub-slab - VOCs, Petroleum, Fixed Gases Helium

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample. NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

Signature: on behalf DEQ

Printed Name: S. SEITZ (TRIHYDRO)

Telephone #: 406-558-4850

Date: 2/11/18

Property owner/operator copy = white DEQ copy = yellow

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

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Property Owner/Operator Information:

Name: Pam Jackson

Physical Address of property under investigation: 708 St Johns, Billings MT

Mailing Address: same

Phone (optional): —

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/8/18	Indoor Air - CRAWL	20180208-708STJOHN-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/8/18	Indoor Air - Basement	20180208-708STJOHN-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/8/18	Indoor Air - CRAWL	20180208-708STJOHN-03	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*

*OTHER (specify analysis) VOCs (TO-15), Petroleum (APH)

The above referenced samples have been collected in accordance with a sampling and analysis plan:

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DEQ representative:

S. Seitz on behalf DEQ — Signature

S. SEITZ (TRI HYDRO) — Printed Name

Telephone #: 406-558-4850

Date: 2/8/18

Property owner/operator copy = white DEQ copy = yellow

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	708 St. John's		
Project Name:	BPCE	PID (model/serial #):	PID RAE 3000 / 594-903838
Sample location:	Subslab Port	Helium Detector (model/serial #):	Dielectric / 8628
Date:	2/9/18	Weather:	~~40~~ Snowy
Field Personnel:	ST, MO	Air Temp:	~~40~~ 4°F
Recorded by:	ST	Atmospheric Pressure:	30.5

Slab Data

Surface/slab Type:	Concrete
Surface/slab Thickness (inches):	Unknown
Slab/subsurface substrate comments:	Unk.
Depth of hole through the slab:	Unk.
Length of sampling train (feet):	Assume 5 ft. (conservative)

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 150 ml

Helium Tracer Leak Test Field Data / **Sample Collection Data**

Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
2/9/18	0922	50	21.8	22.1				
	0923	100	21.2	21.5				
	0924	150	21.0	23.4				
	0925	200	22.7	22.8				
0926	0925	250	22.5	22.5				
		300	22.2	22.4	175 ppm			

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
2/9/18	0928	1009	20180209-708STJOHNS-01	1530	1204		-29.0	-3.5

Comments:

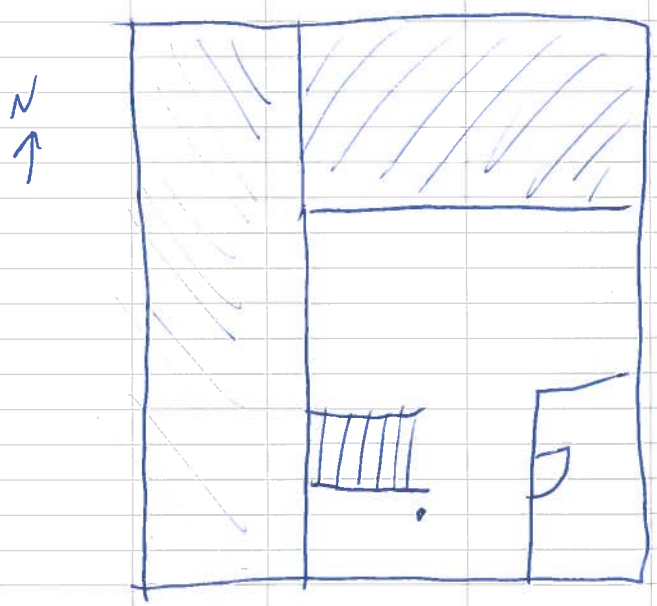
207 ppb on PID @ 4 ft above floor at base of stairs.
0 ppb in subslab.
19.9% O_2 in subslab. ~~All other~~ CO, LEL, H_2S all 0.

Sub-Slab Soil Vapor Sampling Field Data Sheet

Project Name:	Sample Location/ ID:
Date:	

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

Location Sketch:



\\\\ - Crawlspace

• - Sample Location

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	708 St John + 708 1/2	Start Weather:	Overcast / freezing rain
		Start Outdoor Air Temp:	19°F
Project Name:	Billings	Start Atmospheric Pressure:	29.9
Sample Location:	Crawl space / basement		
Date:	2/8/18	End Weather:	Overcast, snowy
Field Personnel:	ST / MO	End Outdoor Air Temp:	3°F
Recorded by:	MO	End Atmospheric Pressure:	30.24

Canister and Sample Information

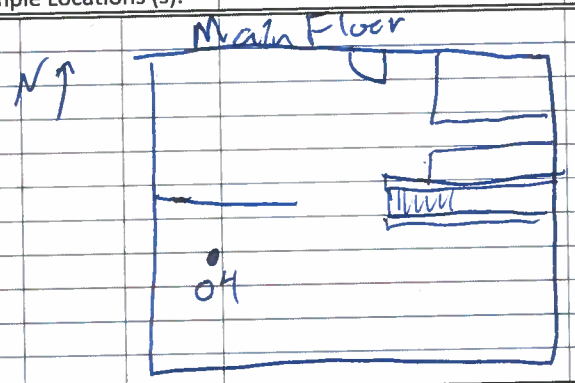
Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
								TAKE PICTURES			
2/8/18	0904	2/9/18	0852	20180208-708ST JOHN-01	~~2018~~ 3351	0763		26	-0.5	68°F	68°F
2/8/18	0906	2/9/18	0855	20180208-708ST JOHN-02	1729	1021		26	-3.5	↓	68°F
2/8/18	0908	2/9/18	0856	20180208-708ST JOHN-03	1069 ~~1069~~	0259		26	-2.5	↓	68°F
2/8/18	0910	2/9/18	0901	20180208-708ST JOHN-04 ~~20180208-708 1/2 ST JOHN~~	1081	1391		27.5	-2.5	↓	68°F
2/8/18	0916	2/9/18	0907	20180208-708 1/2 ST JOHN-01	3344	0867		28	-2.5	70°/70	
2/8/18	0918	2/9/18	0905	20180208-708 1/2 ST JOHN-02	0361	1088		28	-3	65/65	

Comments:

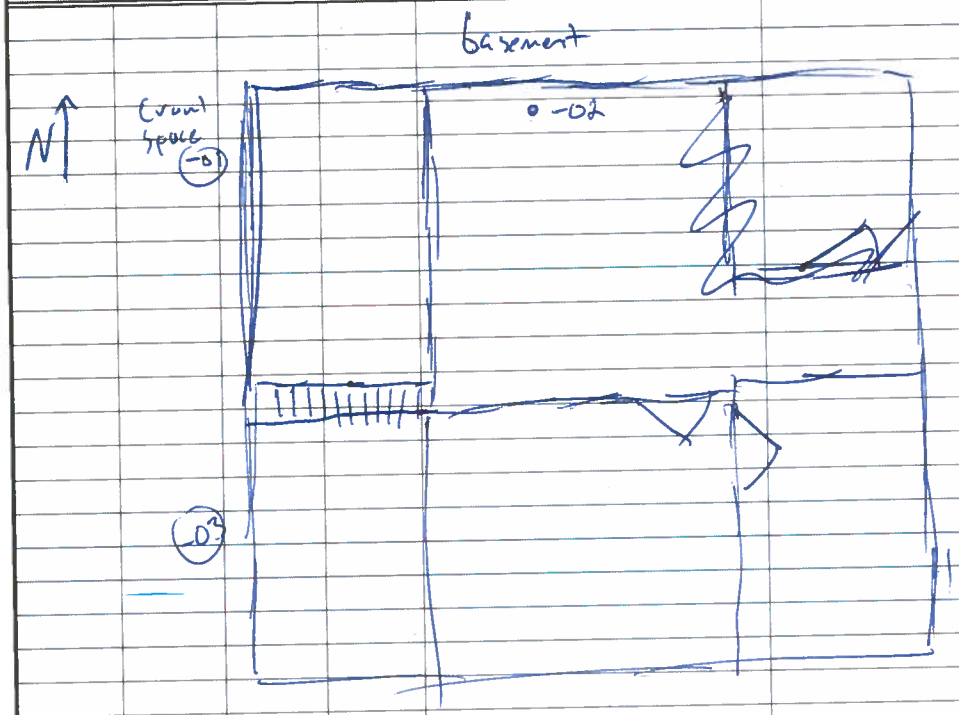
01 - Crawl space north
02 - ~~Crawl sp~~ basement
03 - Crawl space south
04 - Kitchen table 708 1/2
708 1/2 ST JOHN-01 - Kitchen table @ 708 1/2
-02 - Crawl space

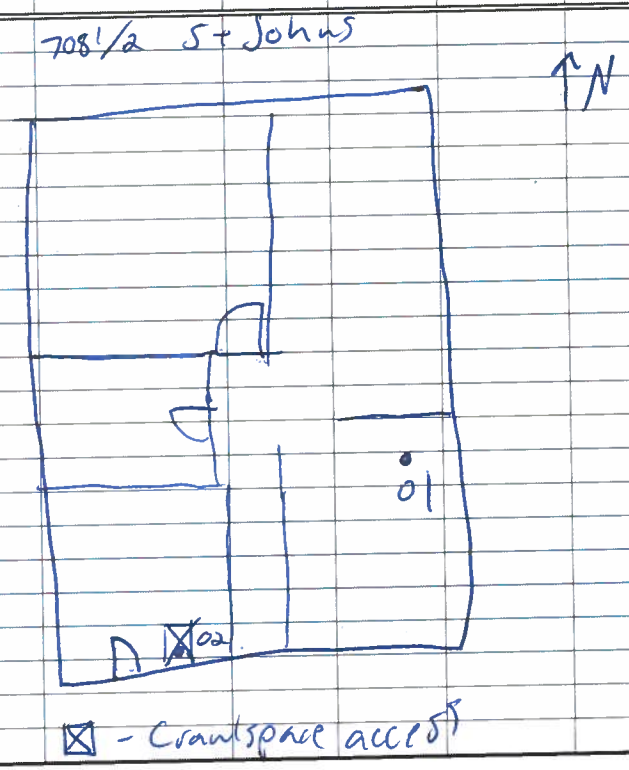
Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):



Location Sketch:





OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 2/2/18

1. Name: Pam Jackson

   Address: 708 St. John's Ave

   Home Phone: 406-670-0508 Work Phone: _____

2. What is the best time to call to speak with you? _____ At: Work☐ or Home☐ ?

3. Are you the Owner☑, Renter☐, Other☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:
   Bear creek Mining area - moved from there to this location & added in the attic

4. Total number of occupants/persons at this location? 2 - 3 adults + dog/turtle
   Number of Children — Ages adults

5. How long have you lived at this location? about 35 years

General Home Description

6. Type of Home/Structure (check only one): Single Family Home☑, Duplex☐, Apartment☐, Townhouse☐ Other _____

7. Home/Structure Description:
   Number of floors: Main floor & basement
   Basement☑
   Crawlspace☐
   Partial Crawlspace/Basement☑ % of each 2/3 basement - crawl space/living/dining accessible only windows -
   Slab On Grade☐
   Other☐ _____

8. Age of Home/Structure: 1945 years, Not Sure/Unknown☐

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood☑, Brick☑, Concrete☐, Cement block☐, Other☐ _____
   Garage: ☑Attached ☐Detached ☐None

facade

10. Foundation Construction (check all that apply):
    Concrete Slab☑ hole w/sub slab part ← in basement
    Fieldstone☐
    Concrete Block☐
    Elevated Above Ground/Grade☐
    Other☐ _____

11. Do you have Private Well ☒ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____

No pump - unused after "funky" about 20 yrs ago

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? city water city sewer
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☒

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☐ Unfinished ☐ Partially Finished ☒ Partial Crawlspace ☐?

15. If finished, how many rooms are in the basement? 1 @ times when home from work
What are rooms used for? Bedrooms ☒ Family Room ☐ Storage ☒ utility
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☒

17. Is the basement floor (check all that apply) Concrete ☒, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☒, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☒

Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☒

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐,
Floor Drain ☒, Other Hole/Opening In Floor ☐
Describe _____

no sump
floor drain only

22. Are any of the following used or stored in the basement (check all that apply):
- [x] Paint
- [ ] Solvents (degreasers, paint thinner, etc.)
- [ ] Fuels/Oils (gasoline, diesel, used oil)
- [x] Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- [ ] Pesticides

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes [ ] No [x]
If yes, specify what was done, where in the home, and what month:

24. Have you installed new carpeting in your home within the last year? Yes [ ] No [x]
If yes, when and where? _____

Planning to remodel soon - within a year

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) [ ]
Yes, use dry-cleaning infrequently (monthly or less) [ ]
Yes, work at a dry cleaning service [ ]
No [ ]

26. Does anyone in your home use solvents at work? and fuel @ airport career
Yes [x] If yes, how many persons?
No [ ] If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes [x] No [ ]

28. Where is the washer/dryer located?
Basement [x]
Upstairs Utility Room [ ]
Kitchen [ ]
Garage [ ]
Use a Laundromat [ ]
Other, please specify [ ] _____

29. If you have a dryer, is it vented to the outdoors? Yes [x] No [ ]

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas [x], Oil [ ], Electric [ ], Wood [ ], Coal [ ],
Other [ ] _____

Heat conveyance system:
- Forced Hot Air [x]
- Forced Hot Water [ ]
- Steam [ ]
- Radiant Floor Heat [ ]
- Wood Stove [ ]
- Coal Furnace [ ]
- Fireplace [ ]
- Other [ ] _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? _____
NO known fuel tank in past
How is/was the tank filled? _____
Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☐ No ☒
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☐
Other (please specify) _____

33. Do you use any of the following? Room Fans ☐, Ceiling Fans ☒, Attic Fan ☐

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☐ Unknown ☐
If yes, please specify type of pest controlled _____
And approximate date of service _____

36. Water heater type: Gas ☒, Electric ☐, by Furnace ☐,
Other (please describe) _____

37. Water heater location: Basement ☒, Upstairs Utility Room ☐, Garage ☐,
Other (please specify) _____

38. What type of cooking appliance do you have? Electric ☒, Gas ☐
Other (please describe) _____

39. Is there a stove exhaust hood present? Yes ☐ No ☒
Does it vent to the outdoors? Yes ☐ No ☐

40. Smoking in Home:
None ☒, Rare (only guests) ☐, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐

41. If yes to question 40, what is smoked?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☐ No ☐

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____
NO

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation: _____
NO

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

45. Please check weekly household cleaning practices:

Dusting ☐

Dry Sweeping ☐

Vacuuming ☐

Polishing (furniture, etc.) ☐

Washing/Waxing Floors ☐

Other (describe) ☐ _____

46. Other comments:

_____

_____

_____

_____

_____

_____

_____

_____

_____

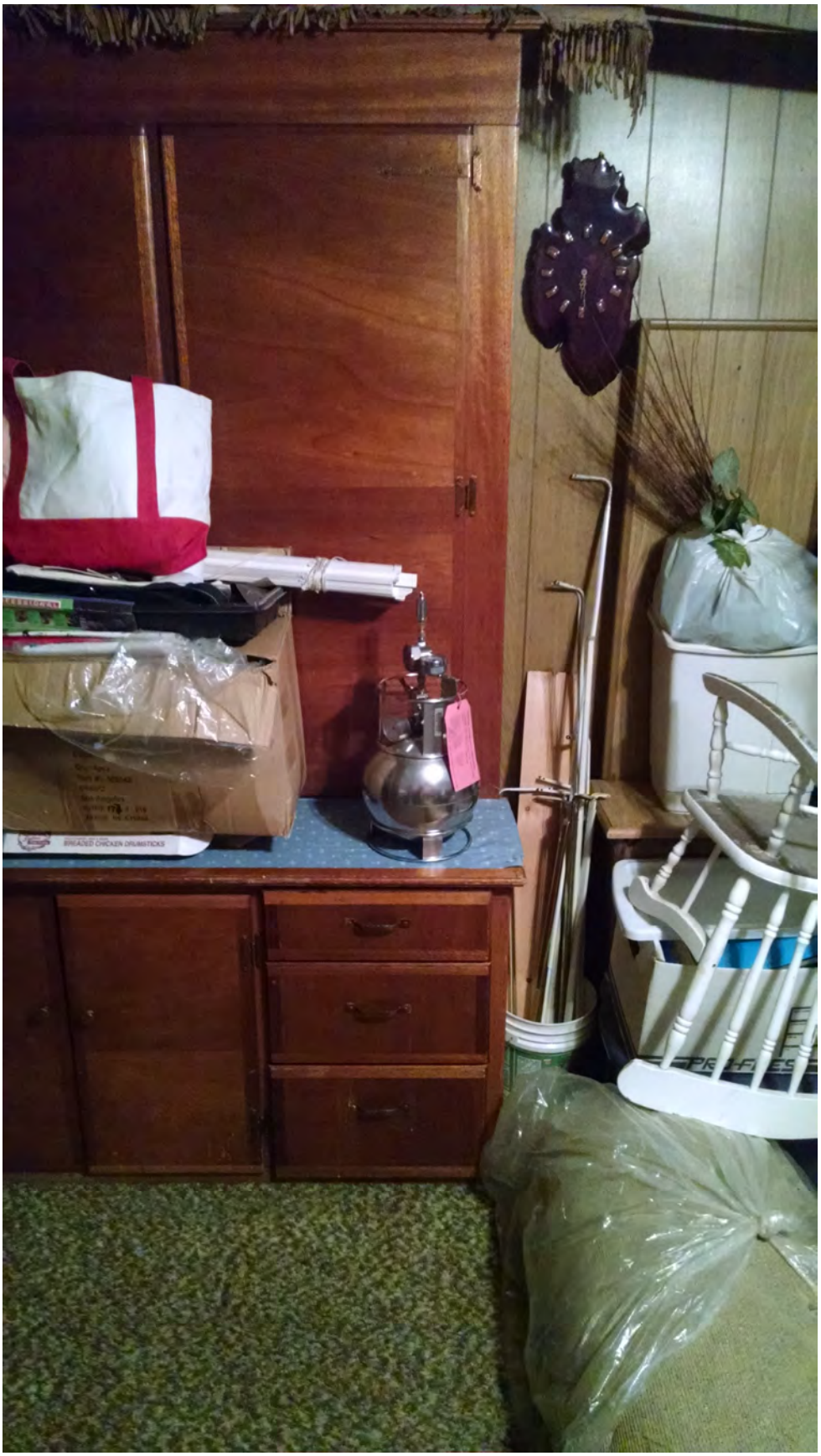
47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

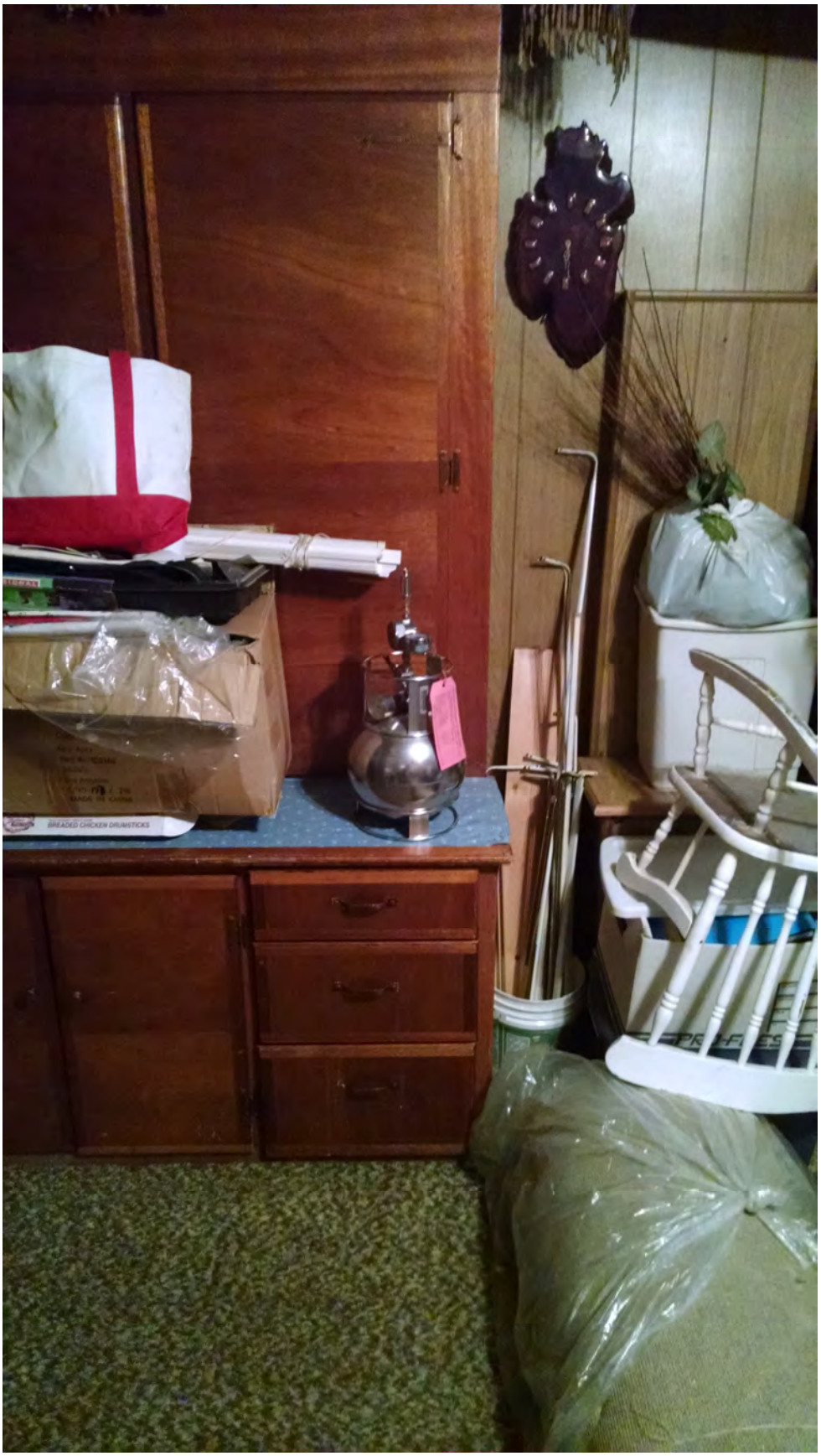
VI Sample: 708 St Johns Ave_Crawlspace

VI Sample: 708 St Johns Ave_Crawlspace

VI Sample: 708 St Johns Ave_Basement



VI Sample: 708 St Johns Ave_Basement



VI Sample: 708 St Johns Ave_Crawlspace

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Property Owner/Operator Information:

Name: Jerry Ray

Physical Address of property under investigation: 711 Central, Billings MT

Mailing Address: Same

Phone (optional): —

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/7/18	Indoor Air	20180207-711CENTRAL-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
"	"	20180207-711CENTRAL-02 *	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
"	"	20180207-711CENTRAL-03	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*

*OTHER (specify analysis) TO-15 (VOCS), APH (Petroleum)

* Duplicate 20180207-A

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DEQ representative:

S. Seitz on behalf DEQ — Signature

S. SEITZ (TRI HYDRO) — Printed Name

Telephone #: 406-558-4850

Date: 2/11/18

Property owner/operator copy = white DEQ copy = yellow

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Property Owner/Operator Information:

Name: Jerry Rau

Physical Address of property under investigation: 711 ~~Billings~~ Central Ave. Billings MT

Mailing Address: 711 Central, Billings MT

Phone (optional): —

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/7/18	Indoor Air	20180207-711CENTRAL -04	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
"	"	20180207-711CENTRAL -05	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
"	"	20180207-711CENTRAL -06	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*

*OTHER (specify analysis) TO-15 (VOCs); APH (Petroleum)

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DEQ representative:

S. Seitz on behalf DEQ
Signature

S. SEITZ (TRIHYDRO)
Printed Name

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Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Jerry Ray

Physical Address of property under investigation: 711 Central, Billings MT

Mailing Address: 711 Central

Phone (optional): —

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/7/18	Sub slab vapor	20180207-711Central -07	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/7/18	"	20180207-711Central -08	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
			Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*

*OTHER (specify analysis) TO-15 (VOCs), APH (Petroleum), Fixed Gases, Helium

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample. NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

S/S on behalf DEQ — Signature

S. SEITZ (TRIHYDRO) — Printed Name

Telephone #: 406-558-4850

Date: 2/11/18

Property owner/operator copy = white DEQ copy = yellow

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	711 Central Ave, Billings MT		
Project Name:	MT DEQ Billings PCE	**PID (model/serial #):**	ppbRAE 3000 / 12875
Sample location:	~~20180207-711Central-08~~ → Basement boiler room sub slab	**Helium Detector (model/serial #):**	MGD-2002 / R11189
Date:	02/07/2018	**Weather:**	
Field Personnel:	Joel & Cameron	**Air Temp:**	
Recorded by:	Joel Riebli	**Atmospheric Pressure:**	

Slab Data

Surface/slab Type:	Concrete, crack 4' away from sample port
Surface/slab Thickness (inches):	assume 12", Cracks in floor
Slab/subsurface substrate comments:	
Depth of hole through the slab:	assume 12"
Length of sampling train (feet):	3'

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 90

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	**Time**	**Cumulative volume purged (ml)**	**Helium Beneath Shroud (%) min**	**Helium Beneath Shroud (%) max**	**Helium in Probe (ppm or %)**	**PID reading in probe (ppb)**	**Helium Beneath Shroud (%) min**	**Helium Beneath Shroud (%) max**
	1754		22.8	23.3				
2/7/18	~~1752~~ SP	100 mL	~~21.1~~ SP	~~21.8~~ SP				
	1755	200	22.4	22.8		Failed See back page for Retest		
	1755	300	21.8	22.4				
	1756	400	21.1	21.8				
	1756	500	21.4	21.1	3.7 %			

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
2/7/18	1808	1848	20180207-711Central-08	#2362	FC 1236		-28.8	-4.0

Comments:

PID = 61.4 ppm in the sump behind the boiler

PID = 533 ppb reading in the sub slab crack 5' from sub slab sample port.

Date	time	Vol	He min	He max
2/7/18	1803	100	22.8	~~24.3~~ 23.6
	1804	200	21.8	22.8
	1804	300	20.5	21.8
	1805	400	23.2	24.1
	1806	500	22.4	23.2

He
3,950 ppm

PID
38.12ppm

4 GAS =

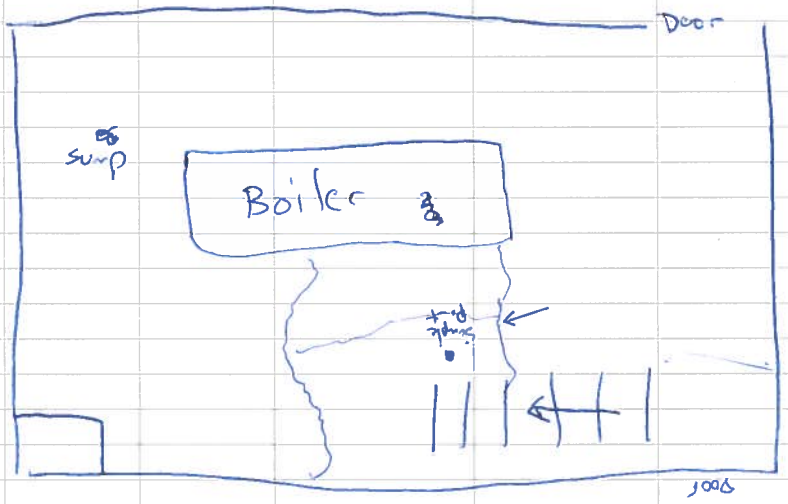
CO = 0
H_2S = 0
Oxy = 20.1
LEL = 0%

Sub-Slab Soil Vapor Sampling Field Data Sheet

Project Name:	Sample Location/ ID:
Date:	

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

Location Sketch:



Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	711 Central		
Project Name:	Billings PCE	PID (model/serial #):	ppbRAE3000 / 594-903835
Sample location:	Sub slab // Home Church	Helium Detector (model/serial #):	Dielectric / 8628
Date:	2/7/18	Weather:	~~36°F~~ Overcast
Field Personnel:	ST/MG	Air Temp:	36°F
Recorded by:	MG	Atmospheric Pressure:	30.08 inHg

Slab Data

Surface/slab Type:	carpet / concrete
Surface/slab Thickness (inches):	unk.
Slab/subsurface substrate comments:	in occupied area; church
Depth of hole through the slab:	?
Length of sampling train (feet):	5' assumed ~ 150mL

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft =

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
2/7/18	1743	50	24.8	25.0				
2/7/18	1748	100	24.4	24.8				
2/7/18	1749	150	22.6	22.9				
2/7/18	1749	200	21.5	21.7				
2/7/18	1750	250	20.4	20.7				

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

2/7/8	1751	300	17.6	19.8	325ppm	~~325~~

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
2/7/18	1756	1834	~~1681~~ 20180207-711CENTRAL-07	0333	2825	—	-26.8	-3.5

Comments:

PID Reading after sample: 11.45 ppm (ppm)

4 gas CO: 0ppm LEL: 0ppm O_2 = 20.9% H_2S: 0 ppm

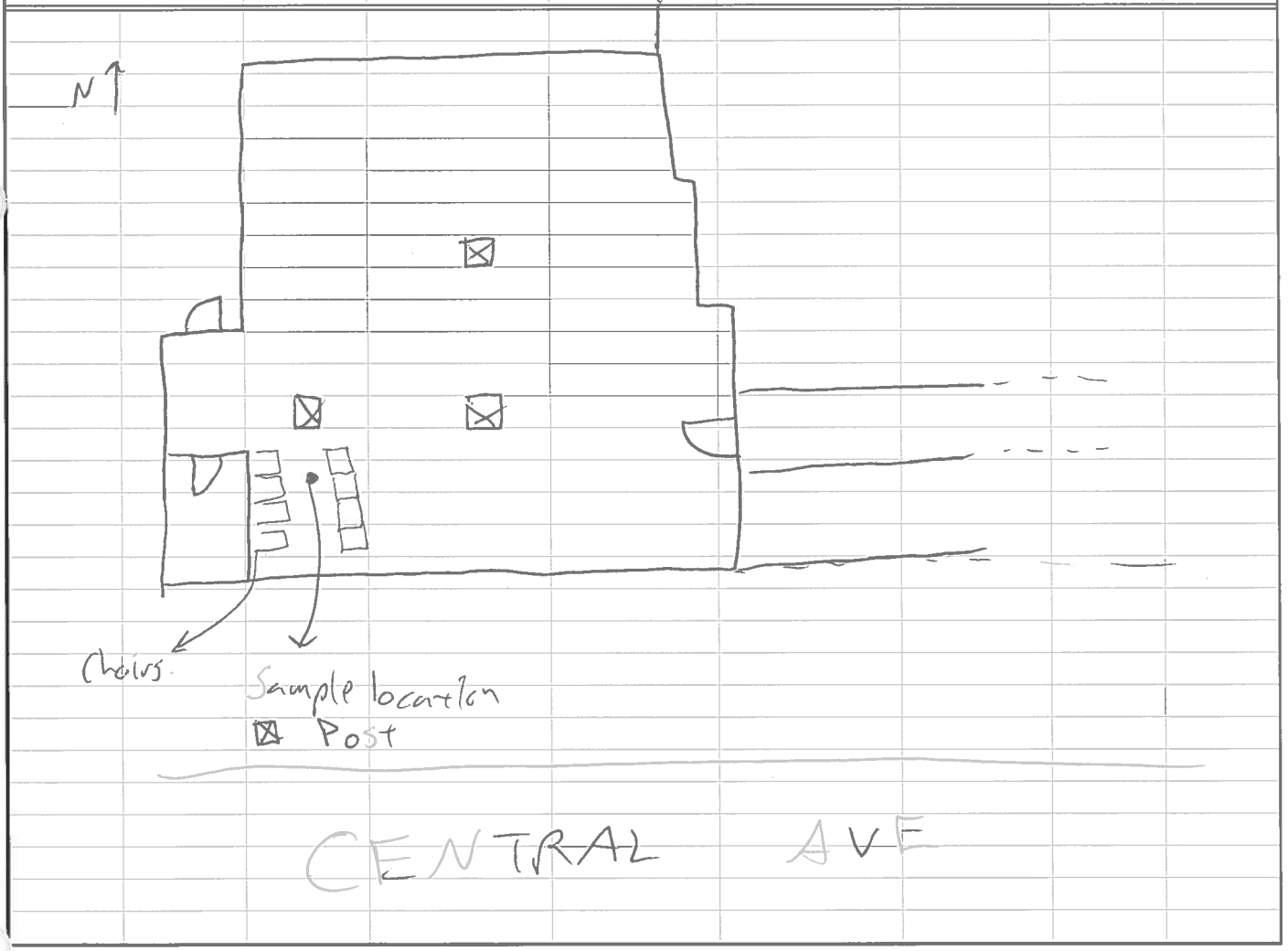
Sub-Slab Soil Vapor Sampling Field Data Sheet

Project Name:	Sample Location/ ID:
Date:	

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

In HOME Church Sanctuary, SW wall.

Location Sketch:



Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	711 Central Ave	Start Weather:	Overcast
		Start Outdoor Air Temp:	27°F
Project Name:	BPCE	Start Atmospheric Pressure:	30.03 in Hg
Sample Location:	Basement + 1st Floor		
Date:	2/7/18	End Weather:	Overcast, slight precip, snow on ground
Field Personnel:	ST, SS, MO, M Gipson	End Outdoor Air Temp:	35 °F
Recorded by:	ST	End Atmospheric Pressure:	30.08 in Hg

6801 ppb In Boiler Sump.

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
2/7/18	0929	2/7/18	1720	20180207-711CENTRAL-01	2705	0400		-26	-3	67°F	67°F
2/7/18	0933	2/7/13	1733	20180207-711CENTRAL-02	3322	0332		-29	-4.5	67°F	
2/7/18	0933	2/7/18	1733	20180207-A	1681	0370		-27	-5.5	67°F	
2/7/18	0937	2/7/18	1737	20180207-711Central-03	3318	0405		-27.5	-4.0	~72°F	
2/7/18	0940	2/7/18	1740	20180207-711Central-04	1481	0887		-27.0	-5.0	69°F	
2/7/18	0944	2/7/18	1744	20180207-711Central-05	0843	0394		-26.0	-8.5	72°F	
2/7/18	0946	2/7/18	1746	20180207-711Central-06	3416	0334		-27.0	-4.0	72°F	

Comments:

01 - Basement Hallway
02 - HOME Church, Rear SS port
A - Duplicate of 02
03 - Indoor Air - mechanical room on 4th Step
04 - Indoor Air - C Wing Basement
05 - Indoor Air - West Wing by HVAC system, 1st Floor
06 - Indoor Air - East Wing 1st Floor

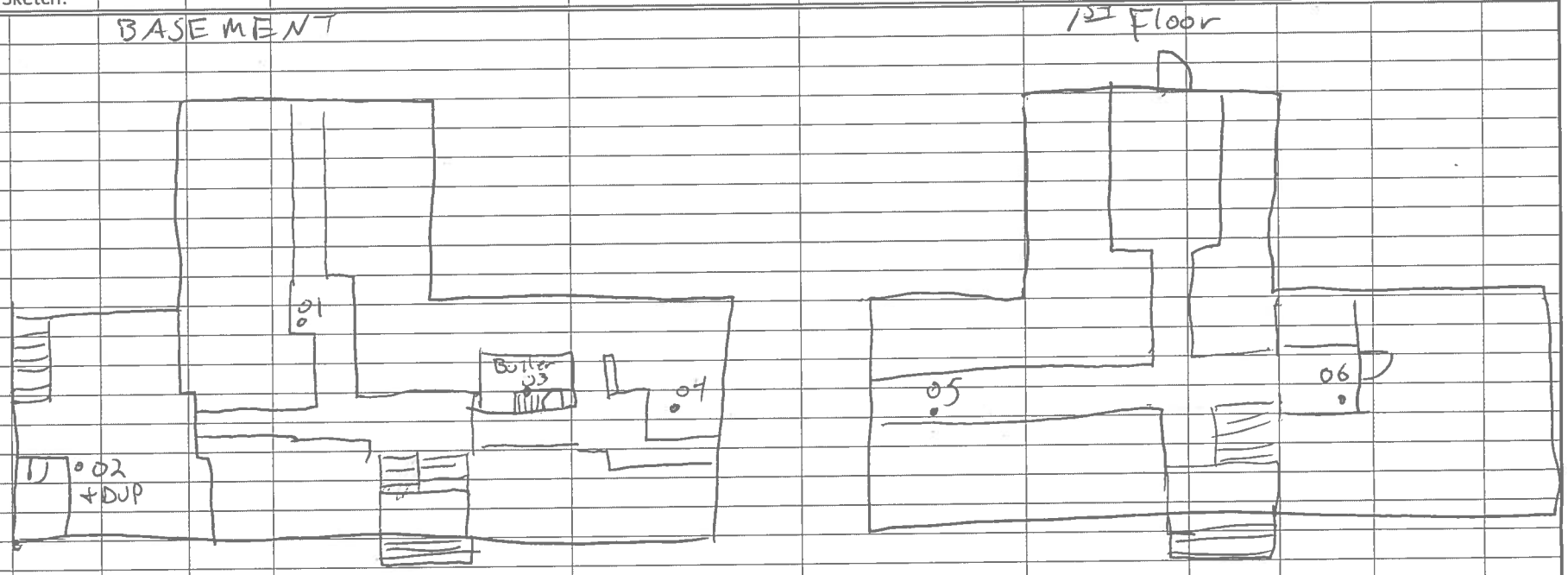
2/7 8AM Shut-in tests Pass?

25.5	25.5	✓
29.5	29.5	✓
28	28	✓
27.5	28.0	✓
27.5	27.5	✓
26	26	✓
27	27	✓

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

Location Sketch:



OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 11/3/17

1. Name: Woody Brien (pastor) Home Church

   Address: 711 Central (most west basement location)

   Home Phone: _____ Work Phone: 406-860-1033

2. What is the best time to call to speak with you? _____ At: Work☐ or Home☐ ?

3. Are you the Owner☐, Renter☑, Other☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

4. Total number of occupants/persons at this location? N/A Church/business
   Number of Children _____ Ages _____

5. How long have you lived at this location? >10 yrs.

General Home Description

6. Type of Home/Structure (check only one): Single Family Home☐, Duplex☐, Apartment☐, Townhouse☐ Other _____

7. Home/Structure Description:
   Number of floors: _____
   Basement☐
   Crawlspace☐
   Partial Crawlspace/Basement☐ % of each _____
   Slab On Grade☐
   Other☐ _____

8. Age of Home/Structure: _____years, Not Sure/Unknown☐

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood☐, Brick☐, Concrete☐, Cement block☐, Other☐ _____
   Garage: ☐Attached ☐Detached ☐None

10. Foundation Construction (check all that apply):
    Concrete Slab☐
    Fieldstone☐
    Concrete Block☐
    Elevated Above Ground/Grade☐
    Other☐ _____

11. Do you have Private Well ☐ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____
_____
_____

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☐

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☐ Unfinished ☐ Partially Finished ☐ Partial Crawlspace ☐?

15. If finished, how many rooms are in the basement? _____
What are rooms used for? Bedrooms ☐ Family Room ☐ Storage ☐
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐

17. Is the basement floor (check all that apply) Concrete ☐, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☐, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

Describe the moisture problem _____
_____
_____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐,
Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe_____

22. Are any of the following used or stored in the basement (check all that apply):
☐ Paint
☐ Solvents (degreasers, paint thinner, etc.)
☐ Fuels/Oils (gasoline, diesel, used oil)
☐ Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
☐ Pesticides
Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____
_____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☐ No ☐
If yes, specify what was done, where in the home, and what month:
_____
_____

24. Have you installed new carpeting in your home within the last year? Yes ☐ No ☐
If yes, when and where? _____

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
No ☐

26. Does anyone in your home use solvents at work?
Yes ☐ If yes, how many persons?
No ☐ If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes ☐ No ☐

28. Where is the washer/dryer located?
Basement ☐
Upstairs Utility Room ☐
Kitchen ☐
Garage ☐
Use a Laundromat ☐
Other, please specify ☐ _____

29. If you have a dryer, is it vented to the outdoors? Yes ☐ No ☐

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas ☐, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐_____

Heat conveyance system:
Forced Hot Air ☐
Forced Hot Water ☐
Steam ☐
Radiant Floor Heat ☐
Wood Stove ☐
Coal Furnace ☐
Fireplace ☐
Other ☐ _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? _____
_____
How is/was the tank filled? _____
_____
Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☐ No ☐
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☐
Other (please specify) _____

33. Do you use any of the following? Room Fans ☐, Ceiling Fans ☐, Attic Fan ☐

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☐ Unknown ☐
If yes, please specify type of pest controlled _____
And approximate date of service _____

36. Water heater type: Gas ☐, Electric ☐, by Furnace ☐,
Other (please describe)_____

37. Water heater location: Basement ☐, Upstairs Utility Room ☐, Garage ☐,
Other (please specify) _____

38. What type of cooking appliance do you have? Electric ☐, Gas ☐
Other (please describe) _____

39. Is there a stove exhaust hood present? Yes ☐ No ☐
Does it vent to the outdoors? Yes ☐ No ☐

40. Smoking in Home:
None ☐, Rare (only guests) ☐, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐

41. If yes to question 40, what is smoked?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☐ No ☐

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____
_____
_____

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation: _____
_____
_____
_____

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

45. Please check weekly household cleaning practices:

Dusting ☐

Dry Sweeping ☐

Vacuuming ☐

Polishing (furniture, etc.) ☐

Washing/Waxing Floors ☐

Other (describe) ☐ _____

46. Other comments:

_____

_____

_____

_____

_____

_____

_____

_____

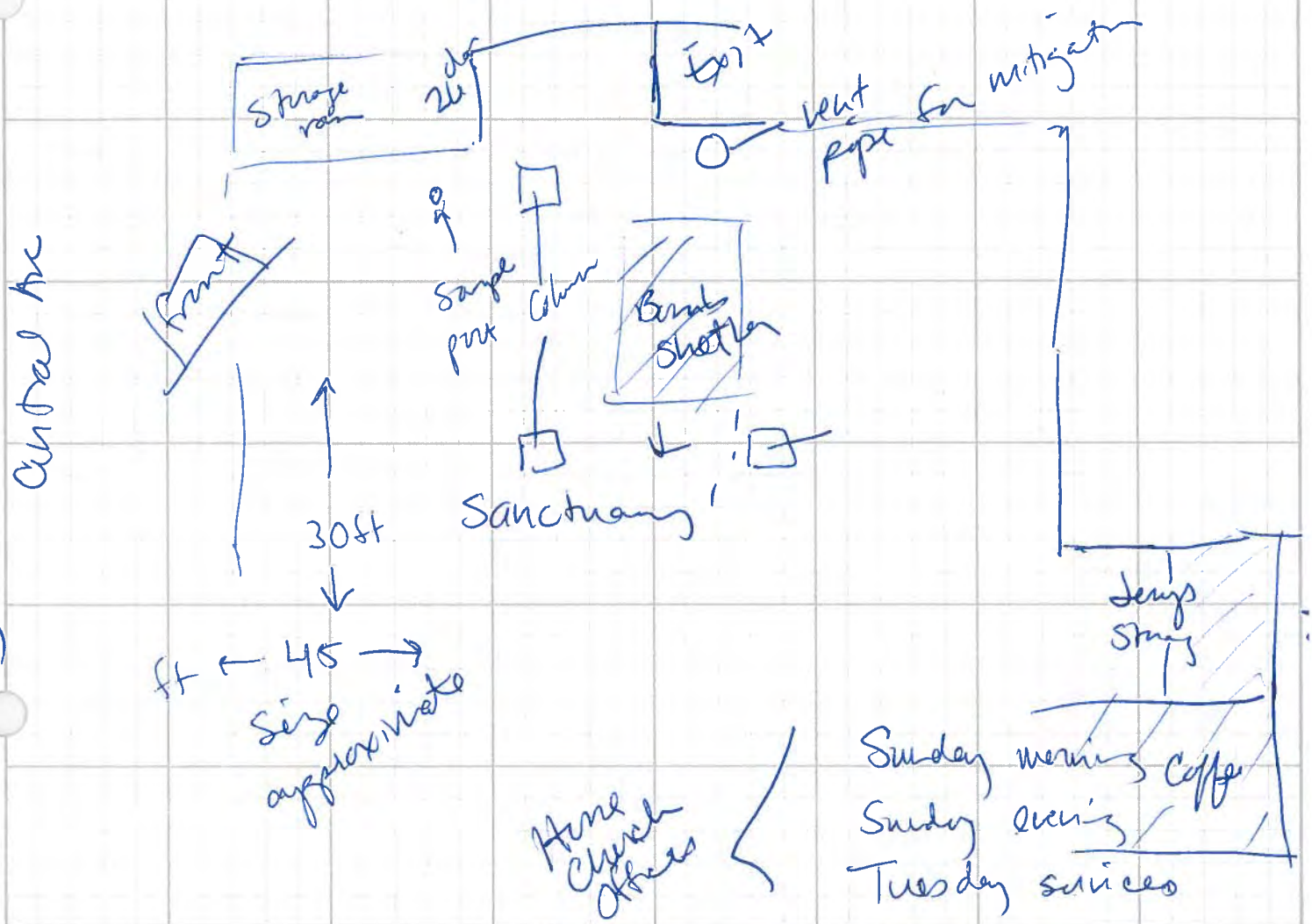
_____

47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

E

TITLE Home Church	
Woody	11-13-2017



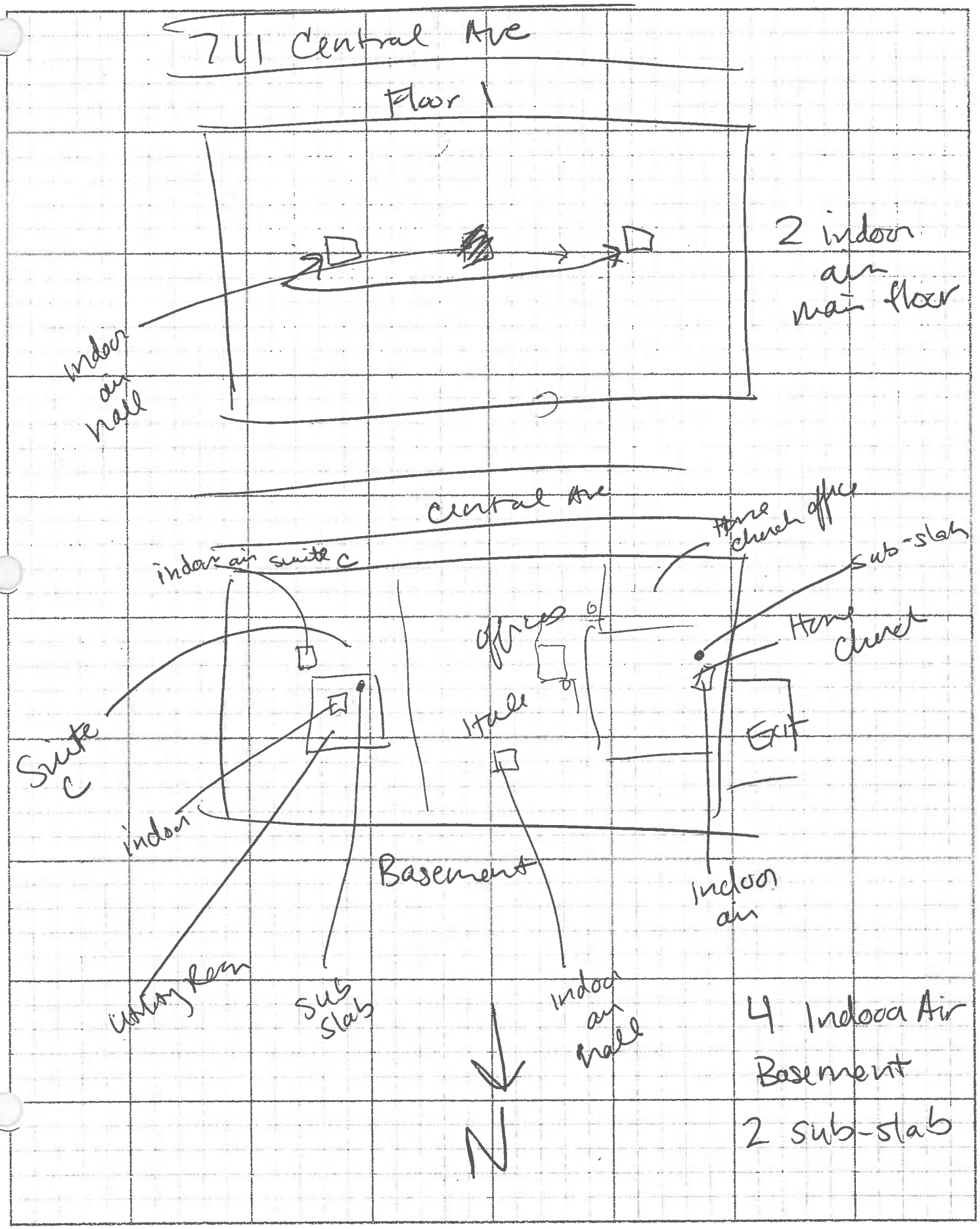
Monday or Wednesday best for Sample for 8 hr.

Sub slab - 30 min

Copy

* Note - basement mechanic Room sample port @ base of stairs

TITLE Planning samples	
SJS	2/2018



Department of Environmental Quality
Hazardous Waste Site Cleanup Bureau P.O. Box 200901 Helena MT 59620-0901 (406) 841-5000

COMMERCIAL / INDUSTRIAL BUILDING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: Feb 2018 Survey / questionnaire completed by: S. Seitz @ Tribyte

1. Contact Name: Jerry Ray 711 Central Ave
   Address: office on site City: Billings State: MT Zip: _____
   Phone 1: NA Phone 2: _____ Cell Phone: _____

2. What is the best time to call to speak with you? Did not talk directly to Jerry – he told me to look around and "do what I need"

3. Are you the Owner ☑, Renter ☐, Other ☐ (please specify) _____ of this Building/Structure? If you are not the owner, please provide owner contact information
   Owner Name: Jerry Ray (JEM LLC)
   Address: 711 Central City: Billings State: MT Zip: _____
   Phone 1: Mail 2640 Grand Ave. Stc 1 Phone 2: _____ Cell Phone: _____ 8/8

4. Total number of occupants/persons at this location? Unknown > 10 offices occupied by Home Church
   Number of Children _____ Ages _____

5. How long have you occupied this location? Unknown
   How many days per week is the building occupied? Typically 5 days/week
   How many hours per day is the building occupied? 8am-5pm (observed)

General Building / Structure Description

6. Type of Building/Structure (check only one): Single Business ☐, Multiple Businesses ☑,
   Other Built 1950 according to cadastral

7. Building/Structure Description:
   Number of floors: 3 Area /square footage of main or ground floor: 11,078 square feet (main is ½ story off street grade)
   Basement ☑ Area /square footage of Basement: 8789 square feet
   Crawlspace ☐ NA Area /square footage of Crawlspace: _____ square feet
   Partial crawlspace/basement ☑ NA % of each _____
   Slab on grade ☐ Area /square footage of Slab on grade: _____ square feet
   Other ☑ 2nd floor is 1.5 story off grade = 11,181 sq ft.

8. Age of Building/Structure: 1950 years, Not sure/Unknown ☐ Cadastral

9. General Above-Ground Building/Structure construction (check all that apply):
   Wood ☐, Brick ☐, Concrete ☐, Cement Block ☑, Other ☐ _____

10. Foundation Construction (check all that apply): observed in basement boiler room
Concrete Slab ☑
Fieldstone ☐
Concrete Block ☐
Elevated Above Ground/Grade ☐
Other ☐ _____

11. Do you have a Private Well ☐ or Cistern ☐?
If yes, please describe location, use, and current condition NO, but a sump is open to subsurface (concrete, but cracked, in basement boiler room

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? NA city water/sewer
Where is it located? _____
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your Building? (pond, ditch, etc.) Yes ☐ No ☐
unknown

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☑ or Unfinished ☐?

15. If finished, how many rooms are in the basement? church & offices
What are rooms used for? Office ☑, Shop ☐, Storage ☐,
Other Boiler Room

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐

17. Is the basement floor (check all that apply) Concrete ☐, Tile ☐, Carpeted ☐, Dirt ☐, NA
Other ☐ _____

18. Are the basement walls Poured Concrete ☑, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐ unknown
Yes, rarely (less that 1 time/year) ☐
No ☐

Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐ unknown
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

21. Does the basement have any of the following? Floor Cracks ☑, Wall Cracks ☐, Sump ☑, Floor Drain ☑, Other Hole/Opening In Floor ☐
Describe in boiler room & Fall out Shelter beneath Home Church on west side of building

22. Are any of the following used or stored in the basement (check all that apply):
Paint ☐, Paint Stripper/Remover ☐, Paint Thinner ☐, Metal Degreaser/Cleaner ☐,
Gasoline ☐, Diesel Fuel ☐, Solvents ☐, Glue ☐, Laundry Spot Removers ☐,
Drain Cleaners ☐, Pesticides ☐,
Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.) ☐,
Other products with/containing Volatile Organic Compounds, describe: _____
unknown

23. Has the Building / structure recently (within the last six months) had any painting or remodeling?
Yes ☐ No ☐
If yes, specify what was done, where in the Building, and what month:
unknown

24. Has new carpeting been installed in the Building / Structure within the last year? Yes ☐ No ☐
If yes, when and where? unknown

25. Do any occupants / employees regularly conduct or work in the beauty / hair-dressing business?
Yes, work at a beauty / hair-dressing business ☐
Yes, store supplies for beauty / hair-dressing business ☐ Distance to sample point: _____
Yes, building contains beauty / hair-dressing business ☐ Distance to sample point: _____
Yes, building is near beauty / hair-dressing business ☐ Distance to sample point: _____
No ☑ likely no - none observed

26. Do any occupants / employees / anyone regularly use or work or conduct a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
Yes, building contains or is near dry cleaning service ☐ Distance to sample point: _____
No ☑ likely no - next door is former Dry Cleaner (BSL) & current laundry

27. Do any occupants / employees / anyone in the Building / structure use solvents at work?
Yes ☐ If yes, how many persons?
No ☐ If no, go to question 28 unknown

28. If yes for question 26, are the work clothes washed at Building? Yes ☐ No ☐ unknown

29. Does Building / Structure contain a washer/dryer? Yes ☐ No ☐
Where are they located? unknown none observed
Basement ☐
Upstairs ☐
Ground floor ☐
Garage ☐
Other, please specify ☐ _____

30. If Building / Structure contains a dryer, is it vented to the outdoors? Yes ☐ No ☐ unknown

31. What type(s) of Building heating do you have (check all that apply)
Fuel type: Gas ☑, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ Boiler

Heat conveyance system: Forced Hot Air ☐ Forced Hot Water ☑ Steam ☐
Radiant Floor Heat ☐ Wood Stove ☐ Coal Furnace ☐ Fireplace ☐
Other ☐ _____

32. Does Building / Structure have (or had in the past) a storage tank for storage of Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? unknown — none of file w/ DEQ

How is/was the tank filled? _____

Is there staining near the tank? Yes ☐ No ☐

33. Does Building / Structure have air conditioning? Yes ☑ No ☐
Central Air Conditioning ☑
Window Air Conditioning Unit(s) ☐
Other (please specify) central

34. Does Building / Structure have any: Room Fans ☐, Ceiling Fans ☐, Attic Fan ☐ only in offices

35. Does Building / Structure ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐ unknown

36. Has Building / Structure had termite or other pesticide treatment? Yes ☐ No ☐ Unknown ☐
If yes, please specify type of pest controlled _____
And approximate date of service unknown

37. Water heater type: Gas ☑, Electric ☐, by Furnace ☐,
Other (please describe) _____

38. Water heater location: Basement ☑, Upstairs ☐, Ground Floor ☐, Attic ☐,
Other (please specify) utility room

39. Does Building / Structure have any cooking appliances? Electric ☐, Gas ☐
Other (please describe) unknown

40. Is there a stove exhaust hood present? Yes ☐ No ☐
Does it vent to the outdoors? Yes ☐ No ☐ unknown

41. Smoking in Building / Structure:
None ☑, Rare (only guests) ☐, Moderate (occupants, light smokers) ☐,
Heavy (at least one heavy smoker in Building / Structure) ☐ not observed

42. If yes to question 41, what do they smoke?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐ NA

43. Does Building / Structure regularly contain/use air fresheners? Yes ☐ No ☐ unknown

44. Does anyone in the Building have indoor Building hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ unknown

45. General Building / Structure use of industrial / office / consumer products (circle as appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

unknown

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol Deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window Cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuel	Never	Hardly ever	Occasionally	Regularly	Often

46. Please check weekly Building / Structure maintenance, janitorial, and cleaning practices:

Dusting ☐

Dry Sweeping ☐

Vacuuming ☐

Polishing (furniture, etc.) ☐

Washing/Waxing Floors ☐

Other (describe) ☐

unknown by office - likely - pretty clean

47. Other comments including items / subjects not covered in this questionnaire yet an issue or concern for the Building / Structure:

I also talked w/ Woody Brien, pastor of HOME Church and a different questionnaire - attached

48. **Chemical Inventory/Summary**

Chemical/Chemical Product (consumer name)	Amount present in Building / Structure
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

completed by S. Sitz @ Tribyte

Date: 11/3/17

1. Name: Woody Brien (pastor) Home Church

   Address: 711 Central (most west basement location)

   Home Phone: _____ Work Phone: 406-860-1033

2. What is the best time to call to speak with you? _____ At: Work☐ or Home☐ ?

3. Are you the Owner☐, Renter☑, Other☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

4. Total number of occupants/persons at this location? N/A Church/business
   Number of Children_____ Ages_____

5. How long have you lived at this location? >10 yrs.

General Home Description

6. Type of Home/Structure (check only one): Single Family Home☐, Duplex☐, Apartment☐, Townhouse☐ Other☑ commercial building - Home church occupies western basement area

7. Home/Structure Description:
   Number of floors: 3
   Basement☑
   Crawlspace☐
   Partial Crawlspace/Basement ☐ % of each _____
   Slab On Grade☑ typically for furnace room only
   Other☑ Basement occupied by tenants & fall out shelter in Home church under carpet/floor

8. Age of Home/Structure: _____years, Not Sure/Unknown ☐

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood☐, Brick☐, Concrete☐, Cement block☐, Other☐ _____
   Garage: ☐Attached ☐Detached ☐None

10. Foundation Construction (check all that apply):
    Concrete Slab☑
    Fieldstone☐
    Concrete Block☐
    Elevated Above Ground/Grade☐
    Other☐ _____

11. Do you have Private Well ☐ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____
NA

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? City water/sewer
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☑

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☑ Unfinished ☐ Partially Finished ☐ Partial Crawlspace ☐?

15. If finished, how many rooms are in the basement? Home Church has church + 2-3 office areas
What are rooms used for? Bedrooms ☐ Family Room ☐ Storage ☐
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☑

17. Is the basement floor (check all that apply) Concrete ☐, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☑, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☑

Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☑

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐,
Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe _____

Woodwork rotted fallout
Shelter under church
in other areas
may/may not be sealed well?

22. Are any of the following used or stored in the basement (check all that apply):
- [x] Paint (v. little)
- [ ] Solvents (degreasers, paint thinner, etc.)
- [ ] Fuels/Oils (gasoline, diesel, used oil)
- [x] Other Cleaners (drain cleaners, laundry spot treatment, other solvents) cleaners not solvents
- [ ] Pesticides

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☐ No ☑
If yes, specify what was done, where in the home, and what month:

24. Have you installed new carpeting in your home within the last year? Yes ☐ No ☑
If yes, when and where? _____

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
No ☐ NA

26. Does anyone in your home use solvents at work?
Yes ☐ If yes, how many persons?
No ☐ If no, go to question 28 NA

27. If yes for question 26, are the work clothes washed at home? Yes ☐ No ☐ NA

28. Where is the washer/dryer located? NA
Basement ☐
Upstairs Utility Room ☐
Kitchen ☐
Garage ☐
Use a Laundromat ☐
Other, please specify ☐ _____

29. If you have a dryer, is it vented to the outdoors? Yes ☐ No ☐

30. What type (s) of home heating do you have (check all that apply) Boiler for building
Fuel type: Gas ☐, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system:
- Forced Hot Air ☐
- Forced Hot Water ☑
- Steam ☐
- Radiant Floor Heat ☐
- Wood Stove ☐
- Coal Furnace ☐
- Fireplace ☐
- Other ☐ _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? unknown by Wesley

How is/was the tank filled?

Is there staining near the tank? Yes ☑ No ☐

32. Do you have air conditioning? Yes ☑ No ☐
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☐ central w/ building
Other (please specify)

33. Do you use any of the following? Room Fans ☑, Ceiling Fans ☐, Attic Fan ☐

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☑

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☐ Unknown ☑
If yes, please specify type of pest controlled
And approximate date of service

36. Water heater type: Gas ☐, Electric ☐, by Furnace ☐, unknown
Other (please describe)

37. Water heater location: Basement ☐, ~~Upstairs~~ Utility Room ☐, Garage ☐,
Other (please specify) Basement laser

38. What type of cooking appliance do you have? Electric ☑, Gas ☐ NA
Other (please describe)

39. Is there a stove exhaust hood present? Yes ☐ No ☑
Does it vent to the outdoors? Yes ☐ No ☐ NA

40. Smoking in Home:
None ☑, Rare (only guests) ☐, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐ NA

41. If yes to question 40, what is smoked?
Cigarettes ☐ NA Cigars ☐
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☐ No ☑

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ NA - church

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation:

yes - EPA installed system, but no access to locked storage on 2nd floor to check if operating S/B

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

not fully filled out

NA

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

45. Please check weekly household cleaning practices:

- Dusting ☐
- Dry Sweeping ☐
- Vacuuming ☐
- Polishing (furniture, etc.) ☐
- Washing/Waxing Floors ☐
- Other (describe) ☐ _____

yes weekly by cleaning church volunteers & workers

46. Other comments:

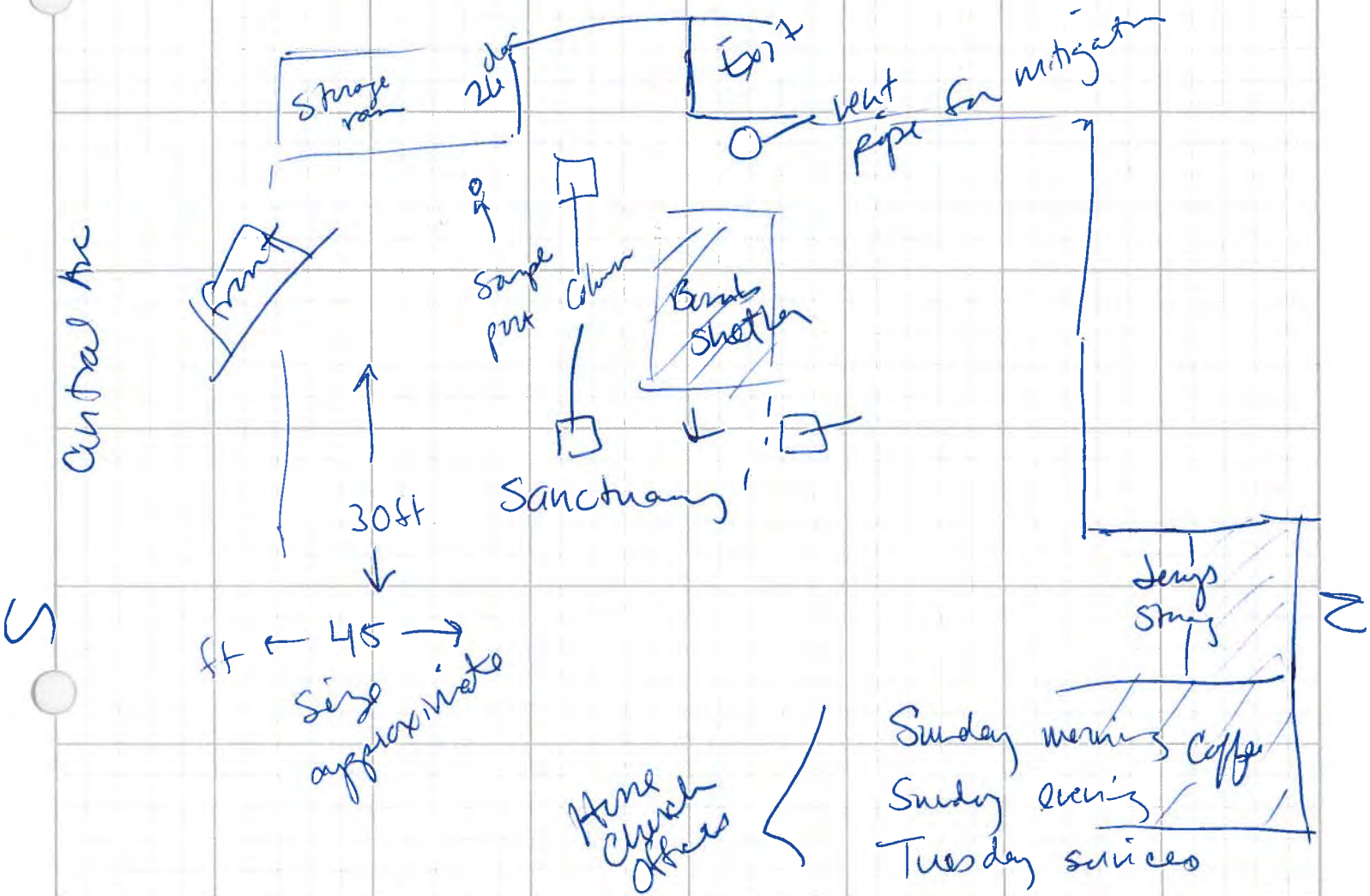
_____
_____
_____
_____
_____
_____
_____
_____
_____

47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

E

TITLE Home Church	
Woody	11-13-2017



Monday or Wednesday best for sample for 8 hr.

Sub slab - 30 min

Copy

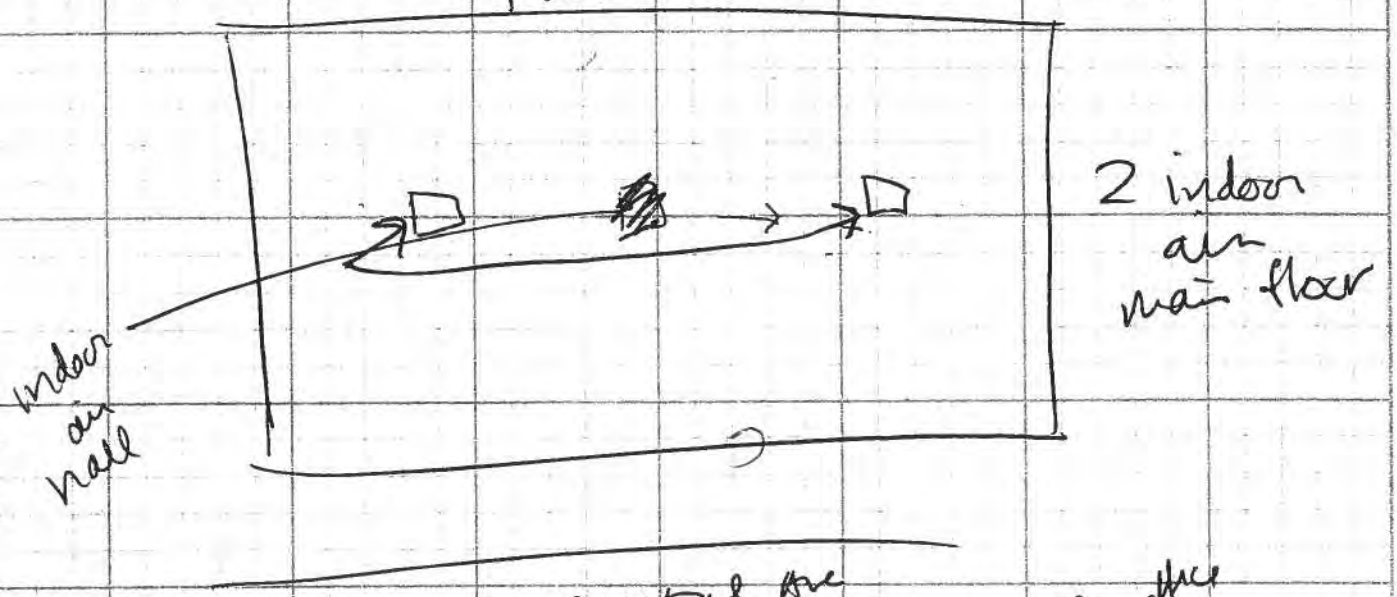
* Note - basement mechanic Room sample port @ base of stairs

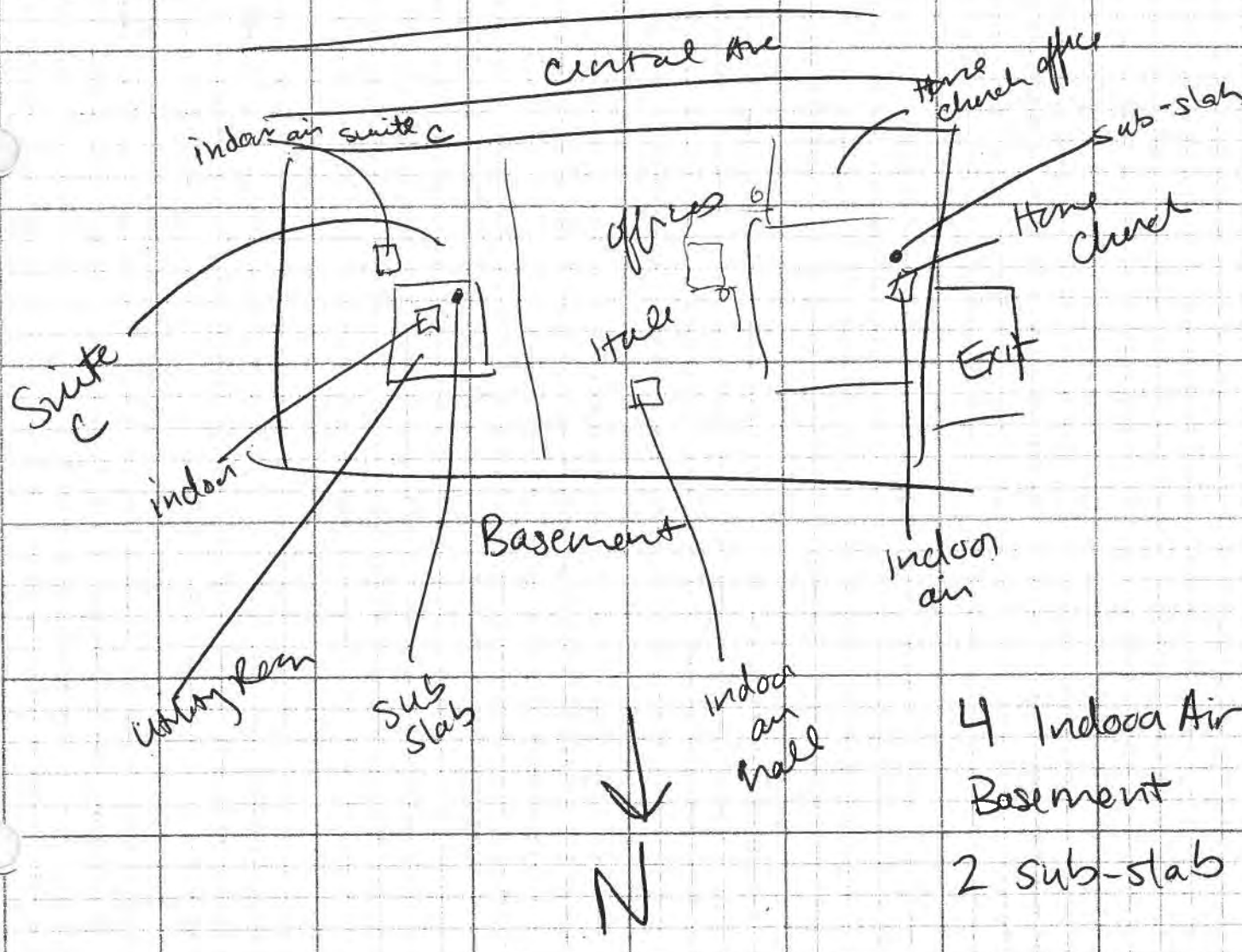
[T]

TITLE Planning samples	
SJS	2/2018

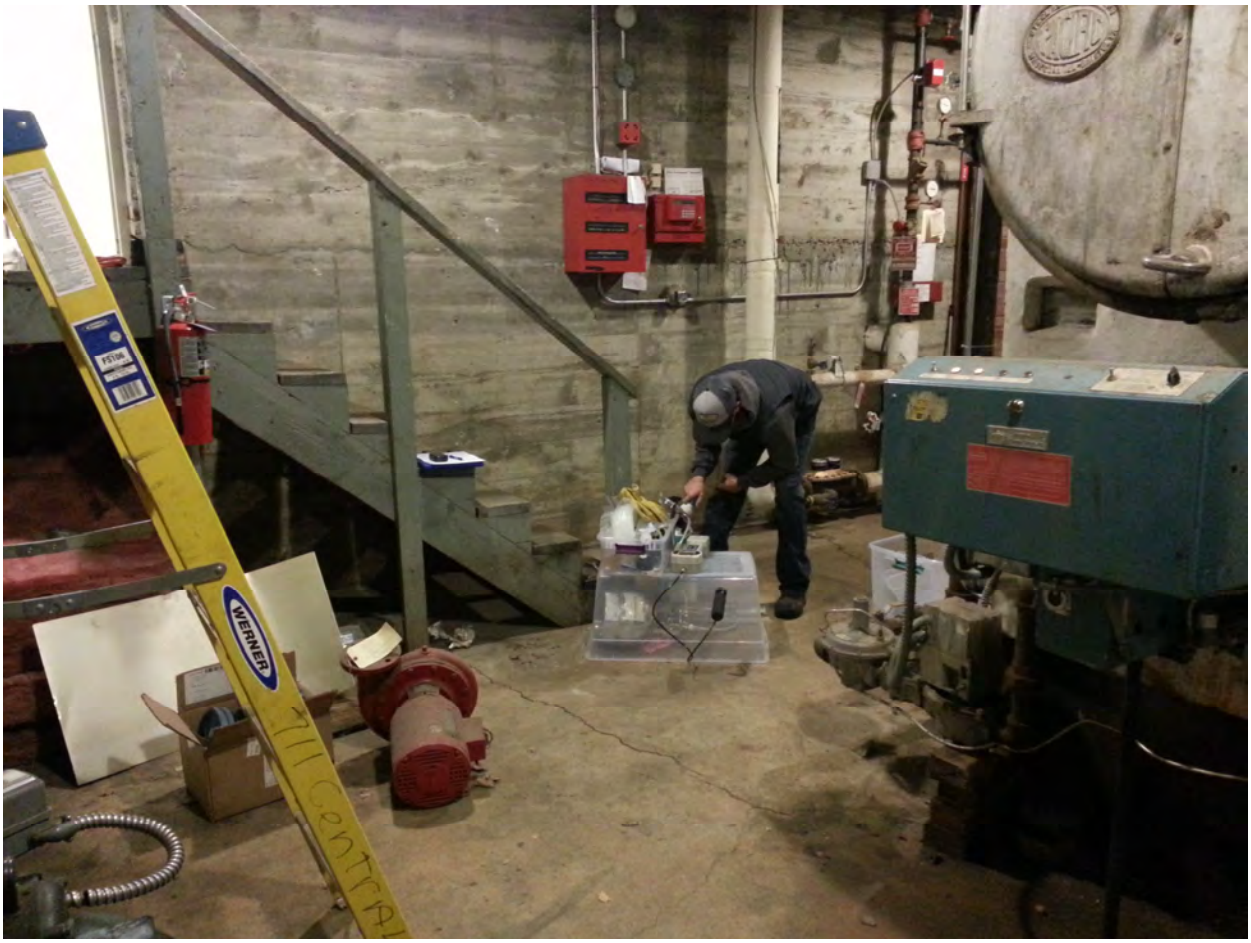
711 Central Ave

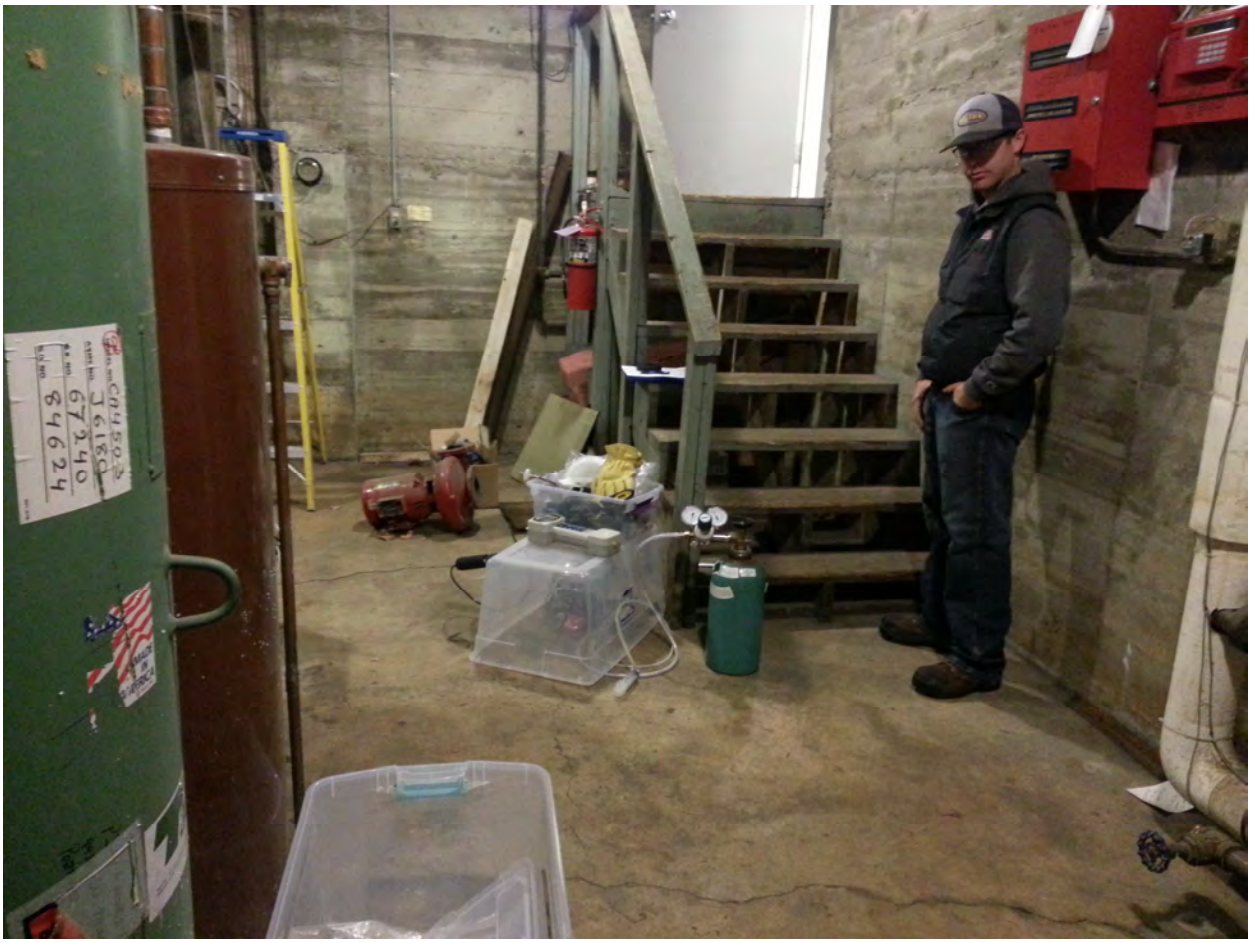
Floor 1





4 Indoor Air
Basement
2 sub-slab


WERNER
711 Centra


CH4502
J61800
67240
84624

TO-Can

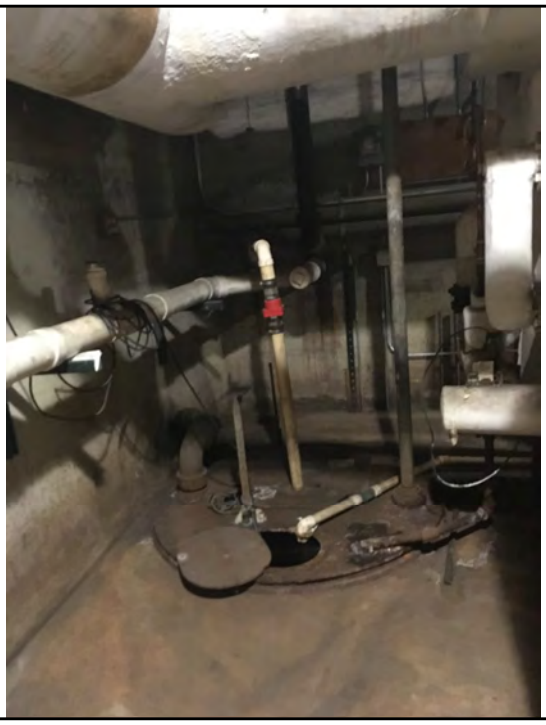
Fire Alarm Panel

EXIT
5719

SilcoCan

ADDRESS: 711 CENTRAL AVE

NOTES:
LAYOUT

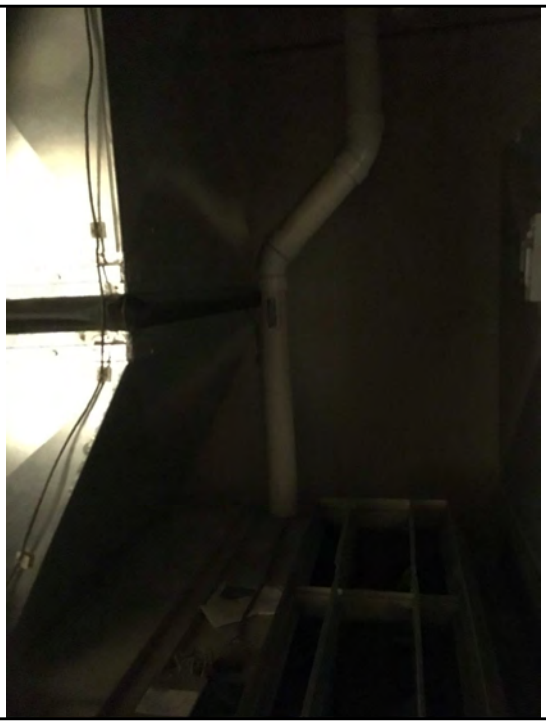


ADDRESS: 711 CENTRAL AVE

NOTES:
BOILER ROOM SUMP

ADDRESS: 711 CENTRAL AVE

NOTES:
BOILER ROOM SUBSLAB SAMPLE LOCATION



ADDRESS: 711 CENTRAL AVE

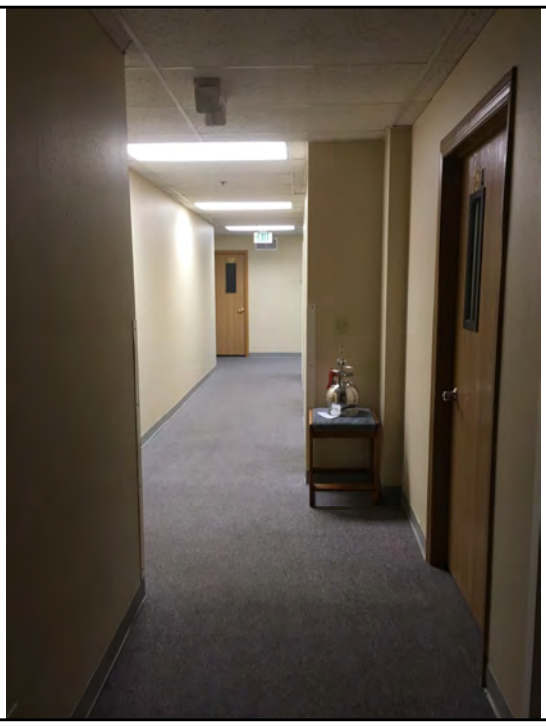
NOTES:
MITIGATION SYSTEM PIPING

ADDRESS: 711 CENTRAL AVE

NOTES:
MITIGATION SYSTEM PIPING

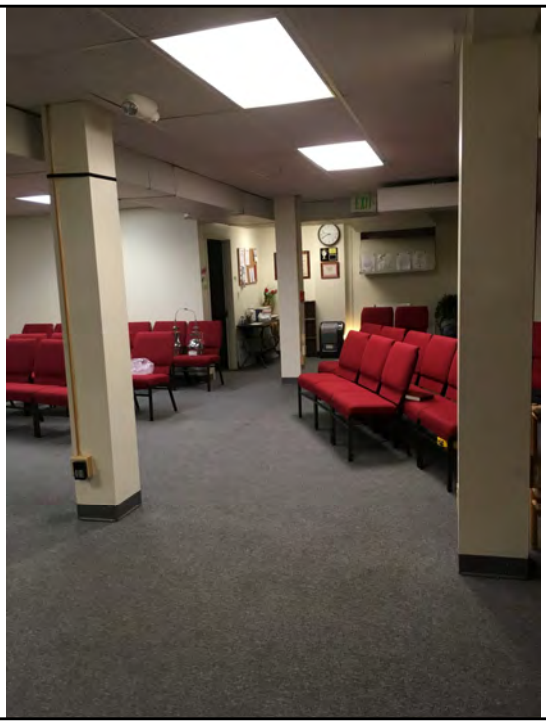
ADDRESS: 711 CENTRAL AVE

NOTES:
SIGN OUTSIDE



ADDRESS: 711 CENTRAL AVE

NOTES:
INDOOR AIR BASEMENT HALLWAY SAMPLE LOCATION



ADDRESS: 711 CENTRAL AVE

NOTES:
INDOOR AIR BASEMENT CHURCH SAMPLE LOCATION

ADDRESS: 711 CENTRAL AVE

NOTES:
INDOOR AIR BASEMENT CHURCH SAMPLE LOCATION

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Rob Cline

Physical Address of property under investigation: 715 Central Ave, Billings MT

Mailing Address: —

Phone (optional): —

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/12/18	Indoor Air (east process)	20180212-715CENTRAL-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/12/18	Indoor Air (mid process)	20180212-715CENTRAL-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/12/18	Indoor Air (office)	20180212-715CENTRAL-03	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*

*OTHER (specify analysis) Indoor Air: VOCs (TO-15), Petroleum (APH)

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample. NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

S. Seitz on behalf DEQ
Signature

S. SEITZ (TRI HYDRO)
Printed Name

Telephone #: 406-558-4850

Date: 2/13/18

Property owner/operator copy = white DEQ copy = yellow

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Rob Cline

Physical Address of property under investigation: 715 Central, Billings, MT

Mailing Address: —

Phone (optional): —

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/12/18	Sub slab vapor	20180212-715CENTRAL -04	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/12/18	"	20180212-715CENTRAL -05 *	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/12/18	"	20180212-715CENTRAL -06	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/12/18	"	20180212-715CENTRAL-07	

*OTHER (specify analysis) SUB SLAB: VOCs (TO-15), Petroleum (APH), Fixed Gases, Helium

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

* Duplicate 20180212 – A

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample. NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

S. Seitz on behalf DEQ — Signature

S. SEITZ (TRIAD DRO) — Printed Name

Telephone #: 406-558-4850

Date: 2/13/18

Property owner/operator copy = white DEQ copy = yellow

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	719 Central Lobby substab		
Project Name:	BPCE	PID (model/serial #):	
Sample location:	BIG SKY LINEN	Helium Detector (model/serial #):	Dielectric / R11189.
Date:	~~2/9/18~~ 2/12/18	Weather:	Sunny, N 3mph
Field Personnel:	ST, mo, SS	Air Temp:	5°F
Recorded by:	ST	Atmospheric Pressure:	30.21 inHg.

2/12/18

Slab Data

Surface/slab Type:	Concrete
Surface/slab Thickness (inches):	~~10 1/4"~~ 8"
Slab/subsurface substrate comments:	Concrete w/ sand aggregate
Depth of hole through the slab:	10 1/4"
Length of sampling train (feet):	10 1/4" + 39" = 49 1/4" ~ 4.5 ft. x 3 x 10 = 135 ml

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 135 ml

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
2/12/18	1432	50	28.0	28.4				
	1432	100	27.7	28.0				
	1433	150	27.4	27.6				
	1433	200	26.9	27.2				
	1434	250	26.4	26.7				

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

1435	25.9	26.1	0 ppm	

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
2/12/18	1437	1521	~~20180212-715CENTRAL-01~~ 20180242-715CENTRAL-04 (Mo)	0334	1587		-28.0	-3.0

Comments:

134 ppb Indoor Air – Air freshener nearby.
545 ppb peak in subslab

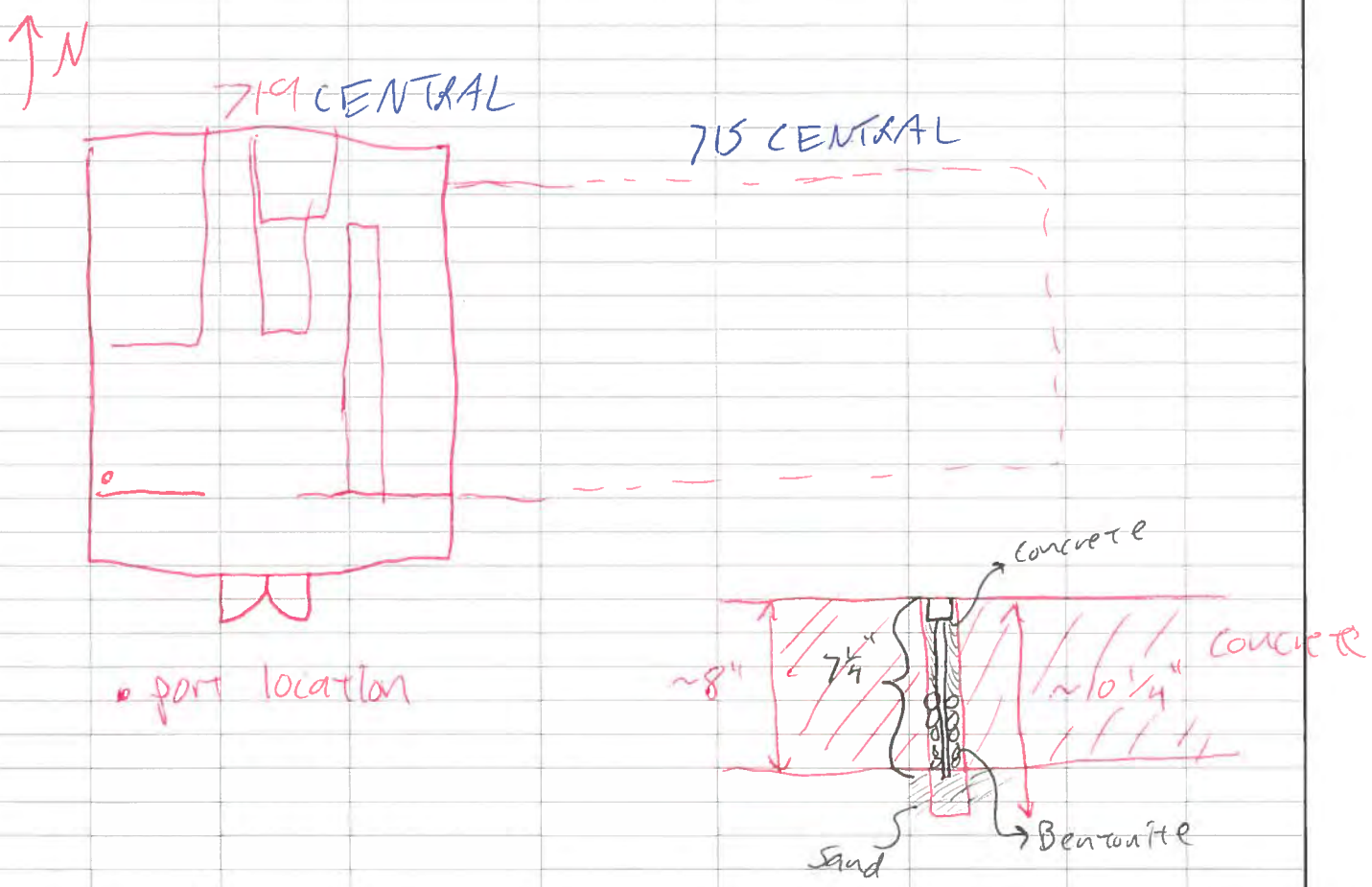
H_2S, LEL, CO all Ø, O_2 20.9.

Sub-Slab Soil Vapor Sampling Field Data Sheet

Project Name:	Sample Location/ ID:
Date:	

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

Location Sketch:



Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	715 Central		
Project Name:	Billings PCE	PID (model/serial #):	
Sample location:	Sub Slab NE	Helium Detector (model/serial #):	
Date:	2/12/18	Weather:	P. Sunny
Field Personnel:	SS/MO	Air Temp:	70
Recorded by:	MO	Atmospheric Pressure:	30.4

Slab Data

Surface/slab Type:	EPA installed
Surface/slab Thickness (inches):	unknown
Slab/subsurface substrate comments:	
Depth of hole through the slab:	
Length of sampling train (feet):	

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft =

Helium Tracer Leak Test Field Data / **Sample Collection Data**

Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
2/12/18	1453	50	26.5	26.6				
	1454	100	26.1	26.1				
	1455	150	26.0	26.1				
	1455	200	26.0	26.1				
	1456	250	25.5	25.7				

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

	1456	300	25.2	25.2				
	1458	350	24.9	25.2				
	1457	400	24.4	24.9	0			

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
2/12/18	1459	~~1459~~	20180212-715CENTRAL-~~02~~ -05	3447	0721		27.5	3.5
2/12/18		~~1457~~	20180212-A	1742	2835		27.0	3.5

Comments:

-02 NE corner near count in area, production area (EPA well)
-A duplicate (photo taken on MO phone)

He up to 32%
PID ambient @ 190 ppb

Subslab PID 10000 ppb* (8021 to >10000 ppb over ~3 min)

4-gas O2 20.9%
others 0%

*may have been diluted (MO)

41.2
2:55 pm

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	715 CENTRAL		
Project Name:	BPCE	PID (model/serial #):	Dielectric / R11189
Sample location:	North side of process area	Helium Detector (model/serial #):	RAE ppb 3000 / 12875
Date:	2/12/18	Weather:	Sunny, N 5 mph
Field Personnel:	ST	Air Temp:	7°F
Recorded by:	ST	Atmospheric Pressure:	30.4 inHg

Slab Data

Surface/slab Type:	Concrete
Surface/slab Thickness (inches):	Unk.
Slab/subsurface substrate comments:	Unk.
Depth of hole through the slab:	Unk.
Length of sampling train (feet):	~5 ft = 150 ml

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 150

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
2/12/18	1543	50	25.4	26.2				
	1544	100	24.9	25.2				
	1544	150	24.2	24.6				
	1545	200	23.6	24.0				
	1545	250	22.8	23.0				

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

↓	1546	30	21.9	22.2	0 ppm

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
2/12/18	1548	1627	20.20212-715CENTRAL~~-07~~ -06 (MO)	/ 017	0615		-26.5	-2.5

Comments:

112 ppb subslab PID (32 ambient)

O – H_2S, LEL + CO, O_2 @ 20.9.

Sub-Slab Soil Vapor Sampling Field Data Sheet

Project Name:	Sample Location/ ID:
Date:	

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

Location Sketch:

• - Sample Location

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

ST 2/12/18

Site ID:	715 CENTRAL ST		
Project Name:	BPCE	PID (model/serial #):	
Sample location:	715 CENTRAL, SE ~~SW~~ CORNER	Helium Detector (model/serial #):	
Date:	2/12/18	Weather:	Sunny, cold, N 5mph
Field Personnel:	ST, MO	Air Temp:	70°F
Recorded by:	ST	Atmospheric Pressure:	30.4

Slab Data

Surface/slab Type:	~~Un~~ Concrete
Surface/slab Thickness (inches):	Unkt.
Slab/subsurface substrate comments:	Unkt.
Depth of hole through the slab:	Unkt.
Length of sampling train (feet):	~5' × 3 × 10 = 150ml

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 150

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
2/12/18	1559	50	23.4	23.4				
↓	1559	100	23.0	23.3				
	1600	150	22.5	22.8				
	1601	200	22.0	22.4				
	1601	250	21.2	21.7				

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

↓	1602	300	20.5	20.9

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
2/8/18	1606	1644	20180212-715CENTRAL ~~04~~	-07 (MO)	0618		-27.5	3.0

Comments:

PID 107.5 ppm & climbing after ~~@~~ ~5 min

4-gas O_2 19.6

others 0

Note background 243 ppb in process area

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	Billings PCE GW Facility	Start Weather:	-3°F, Cloudy, cold, wind N 10 mph, 87% humidity
		Start Outdoor Air Temp:	-3°F
Project Name:	VI Investigation	Start Atmospheric Pressure:	30.6 in Hg
Sample Location:	715 Central Ave		
Date:	2-12-18	End Weather:	
Field Personnel:	SS	End Outdoor Air Temp:	
Recorded by:	SS	End Atmospheric Pressure:	

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
2/12/18	0622	2/12/18	1422	20180212-715CENTRAL-01	2088	0105	—	-27.0	-1.0	≅ 65°F	≅ 65°F
2/12/18	0620	2/12/18	1420	20180212-715CENTRAL-02	2656	0276	—	-27.5	-4.0	≅ 65°F	≅ 65°F
2/12/18	0625			20180212-715CENTRAL-03	1240	0215	—	-27.5	-4*	≅ 70°F	≅ 72°F

Comments:

Indoor Air

-01 - Passed shut-in 2/11/18; Far east side of process area
-02 - Passed shut in 2/11/18; Mid area of process area
-03 - Passed Shut in 2/11/18; West in entrance of 719 Central near offices/drop off counter

*Analog vac gauge not working, digital gauge indicated -4.0

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
A. Excavation-site planning:		
1. The local One Call regulations have been checked for local utility-notification requirements (e.g., 48 hours vs. 72 hours).	2/9/18	S.T.
2. Per the local One Call regulations, list the responsible party (generally the excavation/drilling contractor) for requesting and verifying completion of utility locates below: Trihydro	2/9/18	ST
3. The property owner and/or business owner has been notified of the excavation schedule.	2/9/18	S.T.
4. Each proposed excavation site or "area of interest" has been delineated for utility-line locators using white spray paint and/or wooden stakes/lathes with white flagging.	NA	
5. Public-utility locates have been requested by calling One Call at least 48 hours (72 hours in some states) before work is scheduled to begin, and the request includes depths, as available.	2/9/18	S.T.
6. Each utility company has been notified of the excavation schedule and invited to review the proposed excavation sites.	2/9/18	S.T.
7. On-site meetings have been scheduled with the appropriate representatives of critical utility facilities (e.g., gas/oil pipelines, high-voltage cables, fiber-optic lines).	2/9/18	S.T.
8. Private-utility locates—including fuel lines; tanks; and water, sewer, gas, electricity, and other utilities—have been requested.	NA	—
9. The property owner was contacted to determine if he/she knows of privately owned subsurface facilities within 5 feet of the proposed excavation sites. (Review locations with the manager/owner.) Examples of privately owned facilities that are not commonly marked on private property include:		
a) Water and sewer laterals	2/9/18	S.T.
b) Gas lines	2/9/18	S.T.
c) Power lines (including those for landscape/yard lighting, pool and spa lines, and "out building" lines)	2/9/18	S.T.
d) Irrigation lines	2/9/18	S.T.
e) Communication lines (cable, telephone, Internet)	2/9/18	S.T.
f) Propane tank lines	NA	NA
10. The proposed excavation sites have been reviewed by the appropriate stakeholders (e.g., owner, tenant, driller, excavator) and the Trihydro project manager.	2/9/18	ST
11. Proposed excavation sites have been visually inspected, and available plans and aerial photos have been reviewed for evidence of potential utilities.	2/9/18	ST
12. A scaled site plan showing the proposed excavation sites relative to subsurface utilities has been prepared and is available for stakeholder/Management review.	NA	NA
13. The basis for each buried utility line's location and the accuracy of the data defining the utility location are documented on the site plan.	NA	NA
14. The proposed excavation sites are at least 5 feet from subsurface utilities shown on the building plans.	NA	NA
15. The proposed excavation sites are at least 5 feet from subsurface utilities shown on public right-of-way / street-improvement plans. [Note: Work with utility companies to determine if they require a representative present during excavation activities.]	2/9	ST
16. The proposed excavation sites are at least 7 feet from the pad surrounding underground storage tanks (USTs) shown on the building plans.	NA	NA
17. The utility-locate ticket number is available on site.	2/9	S.T.
18. A traffic-control plan has been prepared if appropriate. Note: If the project area encompasses a public street or right of way, the local and/or state authority must approve the traffic-control plan before fieldwork begins.	NA	NA
19. Arrangements have been made to contact the appropriate personnel if utility-line repairs are needed. (Who must be contacted if a line is unexpectedly damaged?)	2/9	S.T.
20. Contact information is in place and readily available with the driller, excavator, and other project stakeholders.	2/9	S.T.
21. The client and other relevant stakeholders (if any) have been notified of the excavation planning/pre-planning steps and results.	2/9	ST
22. A detailed work scope was developed by the project team and reviewed by the Project Director and Contracting Team.	2/9	ST
Project Director (excavation-site planning tasks):		

715 Central Big Sky Lines

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
B. Utility-line marking:		
1. Electrical circuits are energized during utility-line marking for subsurface power lines (e.g., circuits on timers or light-sensing switches).	2/9	ST
2. Public-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	~~2/9~~	~~ST~~ NA
3. Private-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	NA	NA
4. Verify that One Call locators marked their facilities in the designated excavation area or provided notification that they do not have any facilities near the proposed excavation sites.	2/9	ST
5. One Call was contacted to request a "refresh" if utility-locate markings are missing, difficult to see, or more than 14 days old (7 days in some states). "Refresh" markings must be performed by the original marking organization.	2/9	ST
Project Director (utility-line marking tasks):		
C. Job walk:		
1. Visual verification that each proposed excavation site does not lie on a line connecting two similar-looking manhole covers (e.g., sanitary sewers or storm drains). (Consider having the line snaked to confirm their locations.)	2/9	ST
2. Visual verification that each proposed excavation site does not lie on a line with any water, gas, electrical meters, utility cleanouts, or other utility boxes in the surrounding areas.	2/9	ST
3. Visual verification that the pavement near each proposed excavation site has not subsided or give the appearance it may be covering a previous excavation (e.g., linear cracks or sagging curbs).	2/9	ST
4. Visual verification that each proposed excavation has adequate overhead clearance for the excavation equipment (e.g., at least 10 feet from overhead-utility lines and/or reasonable distance from canopies).	2/9	ST
5. Fences and fields have been checked for markers, signs, posts, valves, stub outs, etc.	2/9	ST
6. Surface structures such as tank batteries, wells, valves, phone pedestals, and electrical junction boxes have been checked for evidence of subsurface utilities.	NA	NA
7. Observed evidence of subsurface utilities has been photographed, sketched, or otherwise documented.	2/9	ST
8. Proposed excavation sites have been "walked"/reviewed by the excavation contractor, Trihydro project manager, and other stakeholders (e.g., client representative, property owner, tenant).	2/9	ST
9. Proposed excavation sites are located at least 5 feet from marked utilities (i.e., the "tolerance zone"), or written approval to excavate within the 5-foot tolerance zone has been obtained from the appropriate utility owner. In no case shall a proposed excavation be located closer than 2 feet from the outside edge of a marked utility. (Note: The tolerance zone is measured from the outside edge of a subsurface structure—not its centerline.)	2/9	ST
10. Verify that the excavation contractor (with help from appropriate utility-line locators, if part of the client-approved work scope) has walked each proposed excavation site to verify all expected utility-line markings are present.	2/9	ST
11. Traffic-control devices, safety barricades, caution tape, and other safety-management devices are in place as needed to protect project personnel.	NA	NA
Project Director (job-walk tasks):		
D. Daylighting / potholing / "soft digging":		
1. The proposed excavation sites located within the "tolerance zone" (and sites located outside the "tolerance zone" when required by the client) have been potholed to a depth below the anticipated utility zone using "minimally intrusive excavation methods" such as vacuum excavation (either air-entrainment or water-jet) and careful hand-tool use.		
2. Monitoring and emergency equipment is available on site when hazardous atmospheres are expected to be encountered in the potholing excavations.		
3. A list of emergency-contact names/numbers is maintained at the potholing excavation site.		
4. The project health and safety plan addresses potential hazards and safety-performance requirements related to utility-clearance operations.		
5. The location of and directions to the nearest hospital are known by all members of the project team.		
6. Representatives of utility owners that requested to be on site for utility locates are present.		

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
7. Pothole excavations have been visually checked with a flashlight by the excavation contractor, Trihydro project manager, or her/his designee.		
8. Utilities adjacent to the excavation or that cross the excavation have been daylighted using "minimally intrusive excavation methods."		
9. The area~~l extent~~ of the excavation-clearance pothole has been verified to extend at least 120% beyond the outside diameter of the largest-diameter down-hole tool to be used in the borehole, or at least 2 feet on each side of daylighted/exposed lines, whichever is greater.		
10. If vacuum excavation (e.g., air knife, air vac, hydro-vac) is not available to daylight utility lines, verify that the non-conductive probe method was used as follows: Scratch the ground no more than 10 inches deep above the utility and then probe the scratched area. If the utility isn't found in the scratched area, repeat the first step until the utility is located. Once the utility is found, its depth must be continually verified with the probe until 2 feet of soil remain above the utility. Carefully hand dig the remaining overburden to expose the utility.		
11. The soil encountered in the excavation-clearance pothole has been verified to be free of bedding material (e.g., clean gravel, clean sand, aggregate base [gravelly sand with ~10% fines], or other non-native-looking material) that could indicate the presence of a previously installed utility line.		NA
12. Excavation work within 2 feet of an underground utility was "hand dug."		
13. Once the utility lines were exposed and the excavations were safe to enter, the exposed lines (including their protective coating) was examined for damage.		
14. The condition of each utility line exposed during daylighting was documented, and the documentation was forwarded to the Trihydro project manager to place in the project file.		
15. If a utility line was damaged in any way, it was reported to the utility owner and Trihydro project manager and documented in the project file.		
16. Damage to a utility line was documented and repaired before it was reburied. The utility owner signed off on the repairs.		
17. Employees entering the excavation followed the procedures described in the Trihydro "Trenching and Excavation Program" and used the Trihydro "Daily Excavation/Trench Inspection Report" to document excavation condition.		
18. The location of daylighted utilities was documented and photographed after daylighting was completed and before the pothole excavation was backfilled.		
19. Locations for hand digging within the "tolerance zone" were noted.		
Project Director (daylighting/potholing tasks):		
E. Excavation (including drilling):		
1. The appropriate permits have been obtained for the work (e.g., hot-work permits, entry permits).	NA	NA
2. The utility-owner and/or agency representatives that requested to be on site during excavation work are present. (Trihydro Utility Locate Acknowledgement Form)	ST	2/9
3. A safety kickoff meeting was conducted with the excavation contractor to review roles/responsibilities, work activities, anticipated hazards, this checklist, and emergency-response procedures before starting excavation work the site. The safety kickoff meeting was documented in the project file.	2/9	ST
4. A daily tailgate safety meeting was conducted and documented in the project file. Verify weather conditions, safety hazards, PPE requirements, job duties, communication, hand signals, etc.	2/9	ST
5. JSAs covering the work to be done are in place and have been reviewed, "marked up" where appropriate, and acknowledged by the excavation project-team members.	2/9	ST
6. Site workers have been reminded to look for hazardous conditions, processes, and activities, and that they are authorized to stop work if they see an unsafe condition.	2/9	ST
7. The emergency-response plan has been reviewed by all excavation project-team members (e.g., contact numbers, evacuation muster points, hospital routes).	2/9	ST
8. The excavation contractor has checked the excavation sites relative to overhead utilities, subsurface-utility locates, and adjacent surface structures.	2/9	ST
9. The excavation contractor has acknowledged the potential location of each subsurface utility marked in the excavation areas.	2/9	ST
10. Proper traffic control and exclusion zones have been established.	2/9	ST
11. The excavation equipment (e.g., drill rig, backhoe) has been inspected for proper operation and condition.	2/9	ST
12. Emergency equipment (fire extinguisher, first aid kit, emergency shut-off switch, etc.) has been checked, is readily available, and is in working order.	2/9	ST
13. Excavation project-team members are wearing appropriate PPE per the Trihydro HASP and client/site-specific requirements.	2/9	ST
14. Power in the excavation area has been de-energized, if possible. If power cannot be de-energized, the excavation contractor was advised of the hazard.	NA	NA

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
Project Director (excavation/drilling tasks):		
F. If an unmarked utility line is discovered:		
1. Verify the One Call utility-locate request was made correctly.		
2. Identify the owner/operator of the unmarked utility line and contact One Call (dial "811") to request a "No Response" ticket. If the owner/operator fails to respond again, seek a third-party locating service to mark the utility before: a) excavation work begins, or b) advancing the excavation further.		
3. Contact the owner/operator of non-locatable utilities to request they be taken out of service before excavation begins.		
4. If possible, a representative of the unmarked utility line should be on site when the unmarked utility is daylighted.		
Project Director (unmarked utility line tasks):		

Note:

-- If an item doesn't apply, please insert an "NA" in the "**Date**" column and provide an explanation in the "**Project Notes**" section below.

Project Manager	Field Manager / Team Members	Date Reviewed
Client / Project Name / Location	Excavator/Driller Name	Date Action Items Completed

Project Notes: [Please cross reference to the appropriate checklist-item number[s] when possible.]

Department of Environmental Quality
Hazardous Waste Site Cleanup Bureau P.O. Box 200901 Helena MT 59620-0901 (406) 841-5000

COMMERCIAL / INDUSTRIAL BUILDING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 2/13/18 Survey / questionnaire completed by: S. SEITZ *

1. Contact Name: Rob Cline (owner); George (Manager)
   Address: 715 Central City: Billings State: MT Zip: 59101
   Phone 1: 406-252-5178 Phone 2: _____ Cell Phone: _____
   Carey Ratzlaff (manager)
2. What is the best time to call to speak with you? _____
3. Are you the Owner ☒, Renter ☐, Other ☒ (please specify) managers of this Building/Structure? If you are not the owner, please provide owner contact information
   Owner Name: see above
   Address: _____ City: _____ State: _____ Zip: _____
   Phone 1: _____ Phone 2: _____ Cell Phone: _____
4. Total number of occupants/persons at this location? Employees 10 - 20
   Number of Children _____ Ages _____
5. How long have you occupied this location? Since 1960's
   Days per week the building is occupied 5 Hours per day the building is occupied 8 hrs - some drivers/process longer
   Describe typical shifts and types of labor (office, light labor, heavy labor, etc.)
   Office 40 hrs M-F
   Process 4 10 hrs - T-F 40 hr week week

General Building / Structure Description

6. Type of Building/Structure (check only one): Single Business ☒, Multiple Businesses ☐,
   Other _____
7. Building/Structure Description:
   Number of floors: 1 Area /square footage of main or ground floor: _____ square feet
   Basement ☐ Area /square footage of Basement: _____ square feet
   Crawlspace ☐ Area /square footage of Crawlspace: _____ square feet
   Partial crawlspace/basement ☐ % of each _____
   Slab on grade ☒ Area /square footage of Slab on grade: all square feet
   Other ☐ _____
8. Age of Building/Structure: 1960 / 2010 west office years, Not sure/Unknown ☐
   older east
9. General Above-Ground Building/Structure construction (check all that apply):
   Wood ☒, Brick ☐, Concrete ☐, Cement Block ☒, Other ☐ _____

* filled out after multiple conversations and walk-through w/ George & Shawn

10. Foundation Construction (check all that apply):
Concrete Slab ☑
Fieldstone ☐
Concrete Block ☐
Elevated Above Ground/Grade ☐
Other ☐ _____

11. Do you have a Private Well ☐ or Cistern ☐?
If yes, please describe location, use, and current condition NO
_____
_____

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____
When was the last time it was serviced? city water city sewer
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your Building? (pond, ditch, etc.) Yes ☐ No ☑

Basement Description (please check all boxes that apply): NA

14. Is the basement Finished ☐ or Unfinished ☐?

15. If finished, how many rooms are in the basement? _____
What are rooms used for? Office ☐, Shop ☐, Storage ☐,
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐

17. Is the basement floor (check all that apply) Concrete ☐, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☐, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

Describe the moisture problem _____
_____
_____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐, Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe NA

22. Are any of the following used or stored in the ~~basement~~ in building (check all that apply):

Paint ☒, Paint Stripper/Remover ☐, Paint Thinner ☐, Metal Degreaser/Cleaner ☐, Gasoline ☐, Diesel Fuel ☐, Solvents ☒, Glue ☐, Laundry Spot Removers ☒, Drain Cleaners ☐, Pesticides ☐,
Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.) ☐,
Other products with/containing Volatile Organic Compounds, describe: _____

23. Has the Building / structure recently (within the last six months) had any painting or remodeling?
Yes ☐ No ☒
If yes, specify what was done, where in the Building, and what month:

24. Has new carpeting been installed in the Building / Structure within the last year? Yes ☐ No ☒
If yes, when and where? _____

25. Do any occupants / employees regularly conduct or work in the beauty / hair-dressing business?
Yes, work at a beauty / hair-dressing business ☐
Yes, store supplies for beauty / hair-dressing business ☐ Distance to sample point: _____
Yes, building contains beauty / hair-dressing business ☐ Distance to sample point: _____
Yes, building is near beauty / hair-dressing business ☐ Distance to sample point: _____
No ☒

26. Do any occupants / employees / anyone regularly use or work or conduct a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☒
Yes, building contains or is near dry cleaning service ☐ Distance to sample point: _____
No ☐

Building was the dry cleaner

27. Do any occupants / employees / anyone in the Building / structure use solvents at work?
Yes ☒ If yes, how many persons? dry cleaning / landry
No ☐ If no, go to question 28

28. If yes for question 26, are the work clothes washed at Building? Yes ☒ No ☐ (all clothes)

29. Does Building / Structure contain a washer/dryer? Yes ☒ No ☐
Where are they located?
Basement ☐
Upstairs ☐
Ground floor ☒
Garage ☐
Other, please specify ☐ _____

30. If Building / Structure contains a dryer, is it vented to the outdoors? Yes ☒ No ☐

Only since in industrial dryers

31. What type(s) of Building heating do you have (check all that apply)
Fuel type: Gas ☐, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ Boiler

Heat conveyance system: Forced Hot Air ☐ Forced Hot Water ☒ Steam ☒
Radiant Floor Heat ☐ Wood Stove ☐ Coal Furnace ☐ Fireplace ☐
Other ☐ _____

32. Does Building / Structure have (or had in the past) a storage tank for storage of Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? UPD see DSR
How is/was the tank filled? _____
Is there staining near the tank? Yes ☐ No ☐

33. Does Building / Structure have air conditioning? Yes ☑ No ☐
Central Air Conditioning ☑
Window Air Conditioning Unit(s) ☐
Other (please specify) _____

34. Does Building / Structure have any: Room Fans ☐, Ceiling Fans ☐, Attic Fan ☐

35. Does Building / Structure ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐

36. Has Building / Structure had termite or other pesticide treatment? Yes ☐ No ☐ Unknown ☐
If yes, please specify type of pest controlled _____
And approximate date of service _____

37. Water heater type: Gas ☑, Electric ☐, by Furnace ☐,
Other (please describe) _____

38. Water heater location: Basement ☐, Upstairs ☐, Ground Floor ☑, Attic ☐,
Other (please specify) _____

39. Does Building / Structure have any cooking appliances? Electric ☐, Gas ☐
Other (please describe) NA

40. Is there a stove exhaust hood present? Yes ☐ No ☐ NA
Does it vent to the outdoors? Yes ☐ No ☐

41. Smoking in Building / Structure:
None ☑, Rare (only guests) ☐, Moderate (occupants, light smokers) ☐,
Heavy (at least one heavy smoker in Building / Structure) ☐

42. If yes to question 41, what do they smoke?
Cigarettes ☐ Cigars ☐ NA
Pipe ☐ Other ☐

43. Does Building / Structure regularly contain/use air fresheners? Yes ☑ No ☐ in office

44. Does anyone in the Building have indoor Building hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____
Building was active dry-cleaner
now wet cleaner w/laundry detergents
and degreasers for stains.

45. General Building / Structure use of industrial / office / consumer products (circle as appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol Deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window Cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuel	Never	Hardly ever	Occasionally	Regularly	Often

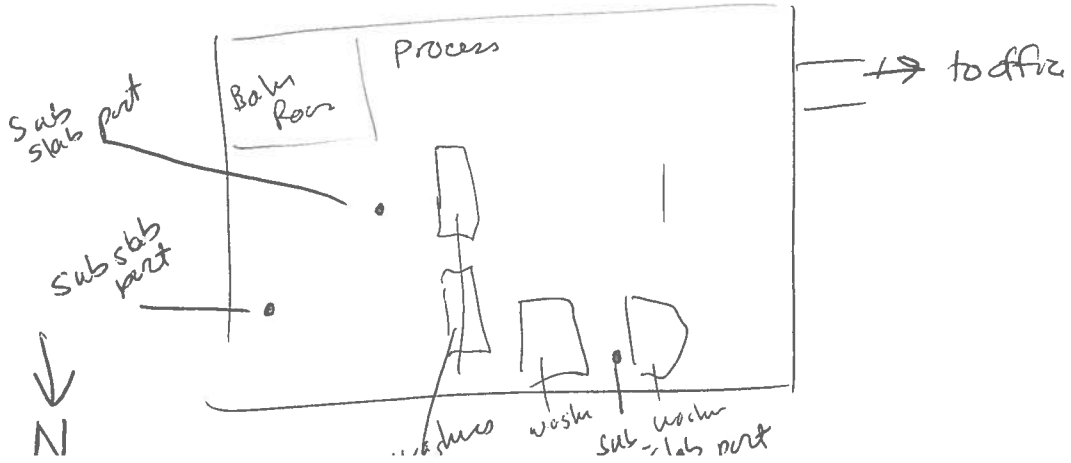
46. Please check weekly Building / Structure maintenance, janitorial, and cleaning practices:

- Dusting ☐
- Dry Sweeping ☐
- Vacuuming ☐
- Polishing (furniture, etc.) ☐
- Washing/Waxing Floors ☐
- Other (describe) ☐ _____

janitorial service

47. Other comments including items / subjects not covered in this questionnaire yet an issue or concern for the Building / Structure:

Found 3 existing EPA sub-slab investigation points to use



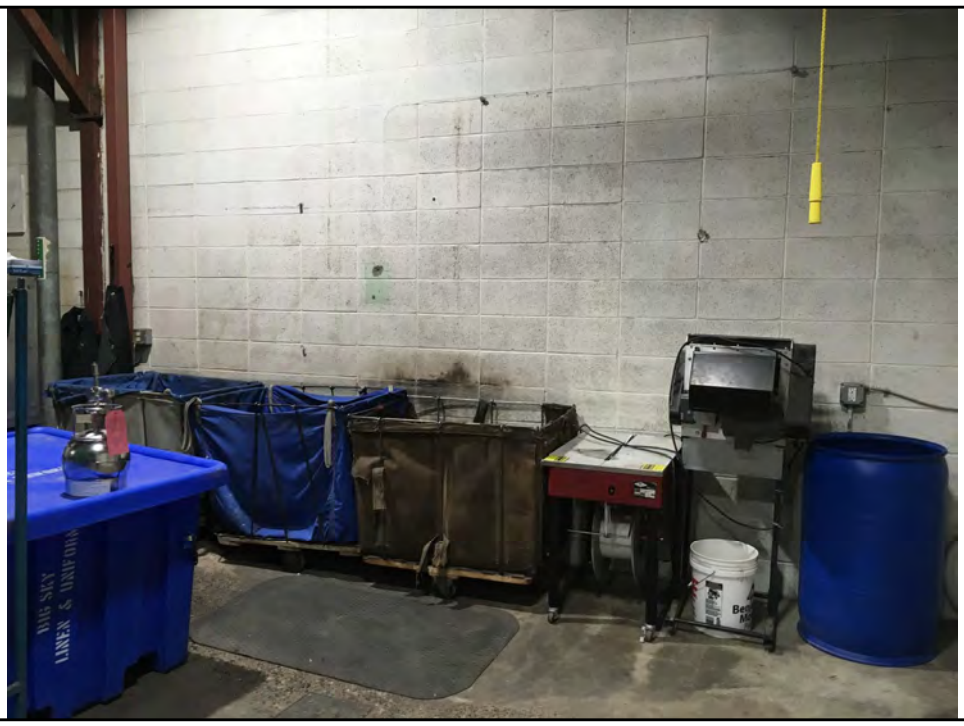
48. **Chemical Inventory/Summary**

Chemical/Chemical Product (consumer name)	Amount present in Building / Structure
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

VI Sample: 715 Central Ave Subslab NE with Duplicate

VI Sample: 715 Central Ave Subslab port NE

VI Sample: 715 Central Ave Subslab SE corner of process area



ADDRESS: 715 CENTRAL AVE

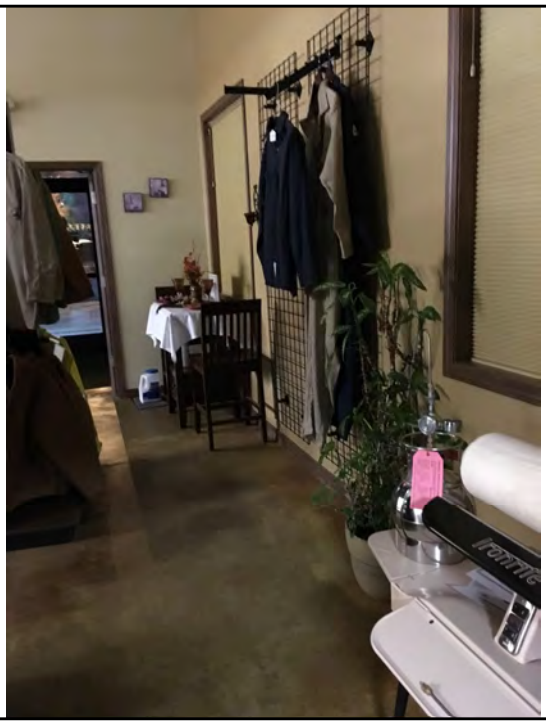
NOTES:
INDOOR AIR PROCESS EAST SAMPLE LOCATION

ADDRESS: 715 CENTRAL AVE

NOTES:
INDOOR AIR PROCESS EAST SAMPLE LOCATION DIFFERENT ANGLE

ADDRESS: 715 CENTRAL AVE

NOTES:
INDOOR AIR PROCESS CENTRAL SAMPLE LOCATION



ADDRESS: 715 CENTRAL AVE

NOTES:
INDOOR AIR OFFICE WEST SAMPLE LOCATION

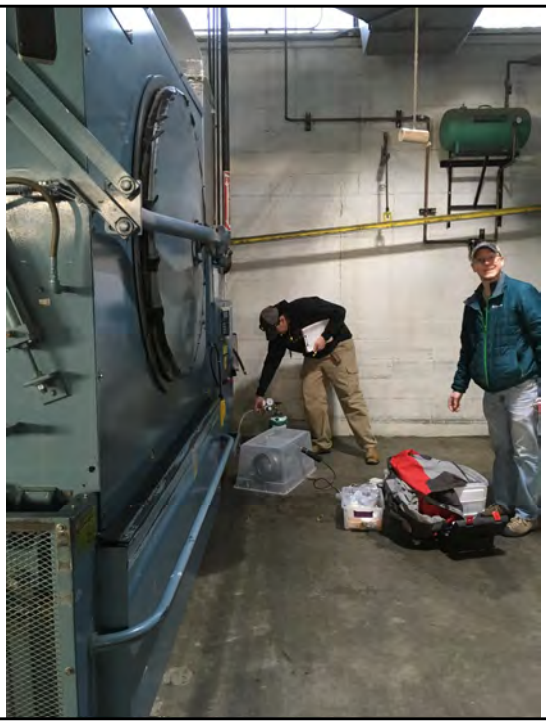
Subslab sample port is located under table in picture at south west corner of entrance to lobby

ADDRESS: 715 CENTRAL AVE

NOTES:
FORMER REX LAUNDRY BIN AT BSL PROCESS AREA

ADDRESS: 715 CENTRAL AVE

NOTES:
FORMER REX LAUNDRY BIN AT BSL PROCESS AREA



ADDRESS: 715 CENTRAL AVE

NOTES:
SUBLAB SAMPLE PORT NORTH SIDE OF PROCESS AREA

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Sandra (Sandy) Petesch

Physical Address of property under investigation: 820 Division St., Billings MT

Mailing Address: —

Phone (optional): —

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/12/18	20180212-820 Division -01	Indoor Air (main)	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/12/18	20180212-820 Division -02	Indoor Air (basement)	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
			Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*

*OTHER (specify analysis) _____

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample. NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason: _____

DEQ representative:

SSeitz on behalf DEQ — Signature

S. SEITZ (TRIHYDRO) — Printed Name

Telephone #: 406-558-4850

Date: 2/13/18

Property owner/operator copy = white DEQ copy = yellow

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	Billings PCE GW Facility	Start Weather:	-4°F, Cloudy, cold, Wind - N 8 mph, 86% Humidity
		Start Outdoor Air Temp:	-4°F
Project Name:	VI Investigation	Start Atmospheric Pressure:	30.6 in Hg
Sample Location:	820 Division St.		
Date:	2/12/18	End Weather:	6°F Sunny, cold, wind W-6 mph
Field Personnel:	SS	End Outdoor Air Temp:	6°F
Recorded by:	SS	End Atmospheric Pressure:	30.5 in Hg

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
2/12/18	0800	2/12/18	1600	20180212-820DIVISION -01	3355	1065	—	-30	-4.0	≅ 70°F	Same
2/12/18	0805	2/12/18	1605	20180212-820DIVISION -02	2753	0117	—	-27	-3.5	≅ 65°F	Same

Comments:

-01 Passed Shut in test 2/11/18 - Placed in upstairs office on N side

-02 Passed Shut in test 2/11/18 - Placed in basement utility room near open floor to dirt. Only 2-2½ ft above ground (lower than typical). Basement utility room floor sealed/painted in last few weeks - some odor and

Department of Environmental Quality
Hazardous Waste Site Cleanup Bureau P.O. Box 200901 Helena MT 59620-0901 (406) 841-5000

COMMERCIAL / INDUSTRIAL BUILDING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 2/13/18 Survey / questionnaire completed by: S. SEITZ

1. Contact Name: Sandy Petesch
   Address: 820 Division City: Billings State: MT Zip: 59101
   Phone 1: — Phone 2: _____ Cell Phone: _____

2. What is the best time to call to speak with you? —

3. Are you the Owner ☐, Renter ☐, Other ☑ (please specify) _____ of this Building/Structure? If you are not the owner, please provide owner contact information
   Owner Name: Big Sky Psychiatric Services
   Address: same City: _____ State: _____ Zip: _____
   Phone 1: _____ Phone 2: _____ Cell Phone: _____

4. Total number of occupants/persons at this location? various ages - patients & therapists
   Number of Children yes Ages _____

5. How long have you occupied this location? _____
   Days per week the building is occupied 4 Hours per day the building is occupied 7am - 5pm
   Describe typical shifts and types of labor (office, light labor, heavy labor, etc.) _____
   light labor / office

General Building / Structure Description

6. Type of Building/Structure (check only one): Single Business ☑, Multiple Businesses ☐,
   Other _____

7. Building/Structure Description: including basement
   Number of floors: 3 Area /square footage of main or ground floor: _____ square feet
   Basement ☑ Area /square footage of Basement: _____ square feet
   Crawlspace ☐ Area /square footage of Crawlspace: _____ square feet
   Partial crawlspace/basement ☐ % of each _____
   Slab on grade ☐ Area /square footage of Slab on grade: _____ square feet
   Other ☐ _____

8. Age of Building/Structure: 100 + years, Not sure/Unknown ☑

9. General Above-Ground Building/Structure construction (check all that apply):
   Wood ☑, Brick ☐, Concrete ☐, Cement Block ☐, Other ☑ Rock

* filled out after visits and conversations w/ Sandy Petesch

10. Foundation Construction (check all that apply):
Concrete Slab ☒
Fieldstone ☐
Concrete Block ☐
Elevated Above Ground/Grade ☐
Other ☐ _____

11. Do you have a Private Well ☐ or Cistern ☐?
If yes, please describe location, use, and current condition _____
unknown

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____ city water city sewer
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your Building? (pond, ditch, etc.) Yes ☐ No ☒

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☒ or Unfinished ☒?

15. If finished, how many rooms are in the basement? 2-3 office/meeting
What are rooms used for? Office ☒, Shop ☐, Storage ☐,
Other some storage/utility for 1/2 of basement

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐

17. Is the basement floor (check all that apply) Concrete ☒, Tile ☐, Carpeted ☒, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☒, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☒

Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☒

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐, Floor Drain ☐, Other Hole/Opening In Floor ☑
Describe access for utilities open to dirt in utility room

22. Are any of the following used or stored in the basement (check all that apply):
Paint ☑, Paint Stripper/Remover ☐, Paint Thinner ☐, Metal Degreaser/Cleaner ☐, Gasoline ☐, Diesel Fuel ☐, Solvents ☐, Glue ☐, Laundry Spot Removers ☐, Drain Cleaners ☐, Pesticides ☐,
Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.) ☐,
Other products with/containing Volatile Organic Compounds, describe: _____
basement utility room floor sealed / painted ~~recently~~ recently

23. Has the Building / structure recently (within the last six months) had any painting or remodeling?
Yes ☑ No ☐
If yes, specify what was done, where in the Building, and what month:
see above - basement utility floor

24. Has new carpeting been installed in the Building / Structure within the last year? Yes ☐ No ☐
If yes, when and where? unknown

25. Do any occupants / employees regularly conduct or work in the beauty / hair-dressing business?
Yes, work at a beauty / hair-dressing business ☐
Yes, store supplies for beauty / hair-dressing business ☐ Distance to sample point: _____
Yes, building contains beauty / hair-dressing business ☐ Distance to sample point: _____
Yes, building is near beauty / hair-dressing business ☐ Distance to sample point: _____
No ☑

26. Do any occupants / employees / anyone regularly use or work or conduct a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
Yes, building contains or is near dry cleaning service ☐ Distance to sample point: _____
No ☑

27. Do any occupants / employees / anyone in the Building / structure use solvents at work?
Yes ☐ If yes, how many persons?
No ☑ If no, go to question 28

28. If yes for question 26, are the work clothes washed at Building? Yes ☐ No ☑

29. Does Building / Structure contain a washer/dryer? Yes ☐ No ☑
Where are they located?
Basement ☐
Upstairs ☐
Ground floor ☐
Garage ☐
Other, please specify ☐ _____

30. If Building / Structure contains a dryer, is it vented to the outdoors? Yes ☐ No ☐ NA

31. What type(s) of Building heating do you have (check all that apply)
Fuel type: Gas ☑, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system: Forced Hot Air ☑ Forced Hot Water ☐ Steam ☐
Radiant Floor Heat ☐ Wood Stove ☐ Coal Furnace ☐ Fireplace ☐
Other ☐ _____

32. Does Building / Structure have (or had in the past) a storage tank for storage of Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? likely not
How is/was the tank filled?
Is there staining near the tank? Yes ☐ No ☐

33. Does Building / Structure have air conditioning? Yes ☒ No ☐
Central Air Conditioning ☒
Window Air Conditioning Unit(s) ☐
Other (please specify)

34. Does Building / Structure have any: Room Fans ☐, Ceiling Fans ☐, Attic Fan ☐

35. Does Building / Structure ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐

36. Has Building / Structure had termite or other pesticide treatment? Yes ☐ No ☐ Unknown ☒
If yes, please specify type of pest controlled
And approximate date of service

37. Water heater type: Gas ☒, Electric ☐, by Furnace ☐,
Other (please describe)

38. Water heater location: Basement ☒, Upstairs ☐, Ground Floor ☐, Attic ☐,
Other (please specify)

39. Does Building / Structure have any cooking appliances? Electric ☐, Gas ☐
Other (please describe) unknown

40. Is there a stove exhaust hood present? Yes ☐ No ☐
Does it vent to the outdoors? Yes ☐ No ☐ NA

41. Smoking in Building / Structure:
None ☒, Rare (only guests) ☐, Moderate (occupants, light smokers) ☐,
Heavy (at least one heavy smoker in Building / Structure) ☐

42. If yes to question 41, what do they smoke?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐ NA

43. Does Building / Structure regularly contain/use air fresheners? Yes ☐ No ☒

44. Does anyone in the Building have indoor Building hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐
NO

45. General Building / Structure use of industrial / office / consumer products (circle as appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol Deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window Cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuel	Never	Hardly ever	Occasionally	Regularly	Often

46. Please check weekly Building / Structure maintenance, janitorial, and cleaning practices:

Dusting ☐
Dry Sweeping ☐
Vacuuming ☐
Polishing (furniture, etc.) ☐
Washing/Waxing Floors ☐

} rentinely no polishing

Other (describe) ☐ _____

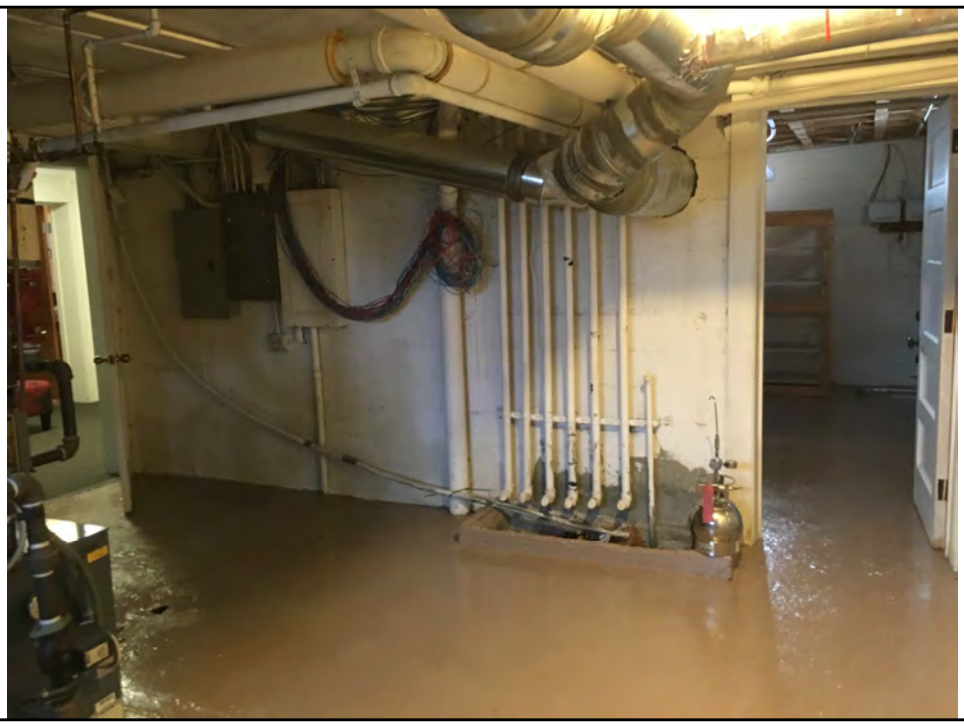
47. Other comments including items / subjects not covered in this questionnaire yet an issue or concern for the Building / Structure:

_____
_____
_____
_____
_____
_____
_____
_____
_____

48. **Chemical Inventory/Summary**

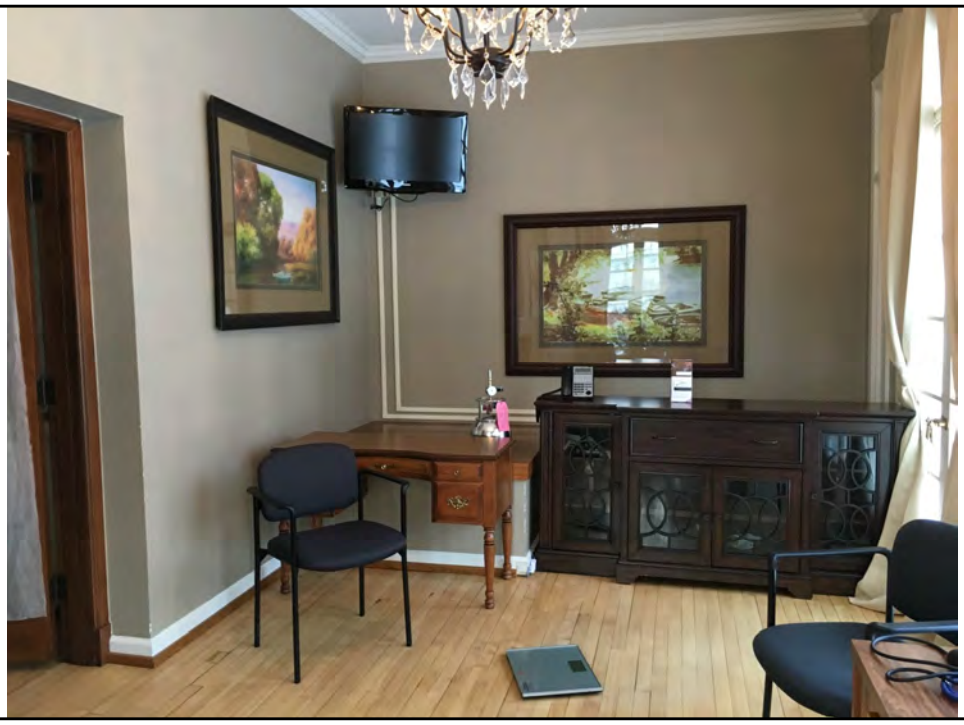
Chemical/Chemical Product (consumer name)	Amount present in Building / Structure
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

VI Sample: 820 Division St_Basement



ADDRESS: 820 DIVISION ST

NOTES:
INDOOR AIR BASEMENT SAMPLE LOCATION



ADDRESS: 820 DIVISION ST

NOTES:
INDOOR AIR SAMPLE LOCATION - BASEMENT OPEN TO DIRT FLOOR SECTION

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Cathy Fiene

Physical Address of property under investigation: 1020 Cook Ave, Billings, MT

Mailing Address: same

Phone (optional): —

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/8/18	Indoor Air - crawl space	20180208-1020Cook -01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/8/18	Indoor Air - crawl space	20180208-1020Cook -02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2-8-18	Indoor Air	20180208-1020Cook-03	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2-8-18	Indoor Air	20180208-1020Cook-04	

*OTHER (specify analysis) VOCs, Petroleum Air (APH)

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.

NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

Signature: on behalf DEQ

Printed Name: S. SEITZ (TRI HYDRO)

Telephone #: 406-558-4850

Date: 2/11/18

Property owner/operator copy = white DEQ copy = yellow

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	1020 COOK AVE -	Start Weather:	~~19~~ Cloudy, Freezing Rain
		Start Outdoor Air Temp:	19°F
Project Name:	BPCE	Start Atmospheric Pressure:	29.9
Sample Location:	Indoor Air / Crawlspace		
Date:	2/8/18	End Weather:	Snow ending, sunny
Field Personnel:	ST, MO, SS	End Outdoor Air Temp:	60
Recorded by:	ST	End Atmospheric Pressure:	30.5

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
2/8/18	1008	2/9	0957	20180208-1020COOK-01	3367	0404	—	-26.5	-1		70°
2/8/18	1010	2/9/18	0957	20180208-1020COOK-02	0539	1378	—	-27.5	~~-3~~ -3.5		70°
2/8/18	1017 ~~1015~~	2/9/18	1003	20180208-1020COOK-03	1649	0268	—	-26	-2.0		70°
2/8/18	1015	2/9/18	1005	20180208-1020Cook-04	3364	0128	—	-27	-2.5		70°

Comments:

Building 5880 sq ft.

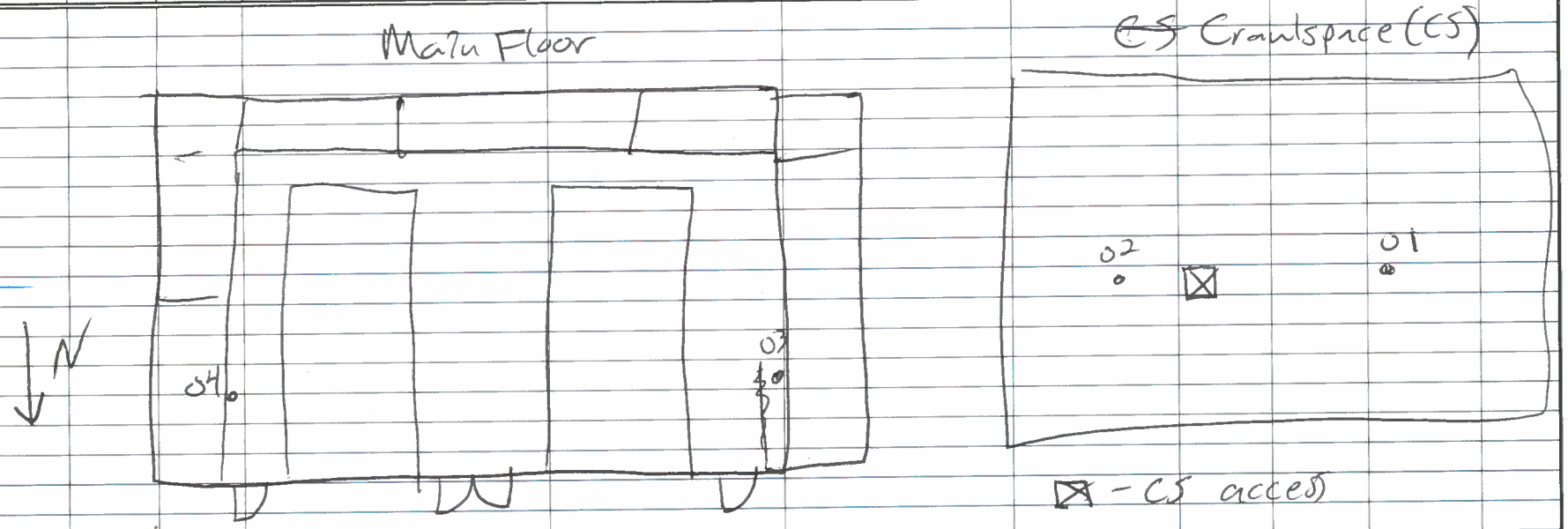
01- WEST CRAWLSPACE
02- EAST CRAWLSPACE
03- WEST Hall main floor
04- East hall main floor

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

Start in test on 0539 ✓ 2 min @ -27.5 passed
" 0649 ✓ 2 min passed @ -26

Location Sketch:



Department of Environmental Quality
Hazardous Waste Site Cleanup Bureau P.O. Box 200901 Helena MT 59620-0901 (406) 841-5000

COMMERCIAL / INDUSTRIAL BUILDING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 2/8/18 Survey / questionnaire completed by: S. Seitz (Trihydro)

1. Contact Name: Cathy Fiene
   Address: 1020 Cook City: Billings State: MT Zip: _____
   Phone 1: _____ Phone 2: _____ Cell Phone: _____

2. What is the best time to call to speak with you? _____

3. Are you the Owner ☐, Renter ☐, Other ☐ (please specify) _____ of this Building/Structure? If you are not the owner, please provide owner contact information
   Owner Name: _____
   Address: _____ City: _____ State: _____ Zip: _____
   Phone 1: _____ Phone 2: _____ Cell Phone: _____

4. Total number of occupants/persons at this location? see below
   Number of Children 40 Ages birth to 3 yrs, 17 staff adults

5. How long have you occupied this location? Since 2007, 11 years
   Days per week the building is occupied 5 Hours per day the building is occupied 7am - 4pm
   Describe typical shifts and types of labor (office, light labor, heavy labor, etc.) _____
   Typical 40 hrs work week

General Building / Structure Description

6. Type of Building/Structure (check only one): Single Business ☑, Multiple Businesses ☐,
   Other Head Start / Young Families Support 5880 sq ft.

7. Building/Structure Description:
   Number of floors: 1 Area /square footage of main or ground floor: 5880 square feet
   Basement ☐ Area /square footage of Basement: _____ square feet
   Crawlspace ☑ Area /square footage of Crawlspace: 5880 square feet
   Partial crawlspace/basement ☐ % of each _____
   Slab on grade ☐ Area /square footage of Slab on grade: _____ square feet
   Other ☐ _____

8. Age of Building/Structure: 11 years, Not sure/Unknown ☐

9. General Above-Ground Building/Structure construction (check all that apply):
   Wood ☑, Brick ☐, Concrete ☐, Cement Block ☐, Other ☐ _____

10. Foundation Construction (check all that apply):
Concrete Slab ☑
Fieldstone ☐
Concrete Block ☐
Elevated Above Ground/Grade ☐
Other ☐ _____

11. Do you have a Private Well ☐ or Cistern ☐?
If yes, please describe location, use, and current condition NO

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? city water city sewer
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your Building? (pond, ditch, etc.) Yes ☑ No ☐
near sidewalk on corners for drainage rain

Basement Description (please check all boxes that apply): NA

14. Is the basement Finished ☐ or Unfinished ☐?

15. If finished, how many rooms are in the basement? _____
What are rooms used for? Office ☐, Shop ☐, Storage ☐,
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐

17. Is the basement floor (check all that apply) Concrete ☐, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☐, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐, Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe_____

22. Are any of the following used or stored in the basement (check all that apply):

Paint ☐, Paint Stripper/Remover ☐, Paint Thinner ☐, Metal Degreaser/Cleaner ☐, Gasoline ☐, Diesel Fuel ☐, Solvents ☐, Glue ☐, Laundry Spot Removers ☐, Drain Cleaners ☐, Pesticides ☐,
Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.) ☐,
Other products with/containing Volatile Organic Compounds, describe: _____
_____

23. Has the Building / structure recently (within the last six months) had any painting or remodeling?
Yes ☐ No ☐
If yes, specify what was done, where in the Building, and what month:
_____
_____

24. Has new carpeting been installed in the Building / Structure within the last year? Yes ☐ No ☐
If yes, when and where? _____

25. Do any occupants / employees regularly conduct or work in the beauty / hair-dressing business?
Yes, work at a beauty / hair-dressing business ☐
Yes, store supplies for beauty / hair-dressing business ☐ Distance to sample point: _____
Yes, building contains beauty / hair-dressing business ☐ Distance to sample point: _____
Yes, building is near beauty / hair-dressing business ☐ Distance to sample point: _____
No ☐

26. Do any occupants / employees / anyone regularly use or work or conduct a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
Yes, building contains or is near dry cleaning service ☐ Distance to sample point: _____
No ☒

27. Do any occupants / employees / anyone in the Building / structure use solvents at work?
Yes ☐ If yes, how many persons?
No ☒ If no, go to question 28

28. If yes for question 26, are the work clothes washed at Building? Yes ☐ No ☒

29. Does Building / Structure contain a washer/dryer? Yes ☐ No ☐
Where are they located?
Basement ☐
Upstairs ☒ Main Floor
Ground floor ☒
Garage ☐
Other, please specify ☐ _____

30. If Building / Structure contains a dryer, is it vented to the outdoors? Yes ☒ No ☐

31. What type(s) of Building heating do you have (check all that apply)
Fuel type: Gas ☐, Oil ☐, Electric ☒, Wood ☐, Coal ☐,
Other ☐_____

Heat conveyance system: Forced Hot Air ☒ Forced Hot Water ☐ Steam ☐
Radiant Floor Heat ☐ Wood Stove ☐ Coal Furnace ☐ Fireplace ☐
Other ☐ _____

32. Does Building / Structure have (or had in the past) a storage tank for storage of Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? NA
How is/was the tank filled?
Is there staining near the tank? Yes ☐ No ☐

33. Does Building / Structure have air conditioning? Yes ☒ No ☐
Central Air Conditioning ☒
Window Air Conditioning Unit(s) ☐
Other (please specify)

34. Does Building / Structure have any: Room Fans ☐, Ceiling Fans ☐, Attic Fan ☐ NA

35. Does Building / Structure ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐ NA

36. Has Building / Structure had termite or other pesticide treatment? Yes ☒ No ☐ Unknown ☐
If yes, please specify type of pest controlled
And approximate date of service Twice per year – usually spring/fall

37. Water heater type: Gas ☒, Electric ☐, by Furnace ☐,
Other (please describe)

38. Water heater location: Basement ☐, Upstairs ☐, Ground Floor ☒, Attic ☐,
Other (please specify)

39. Does Building / Structure have any cooking appliances? Electric ☒, Gas ☐
Other (please describe)

40. Is there a stove exhaust hood present? Yes ☒ No ☐
Does it vent to the outdoors? Yes ☒ No ☐

41. Smoking in Building / Structure:
None ☒, Rare (only guests) ☐, Moderate (occupants, light smokers) ☐,
Heavy (at least one heavy smoker in Building / Structure) ☐

42. If yes to question 41, what do they smoke?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐

43. Does Building / Structure regularly contain/use air fresheners? Yes ☐ No ☒ diaper pail only

44. Does anyone in the Building have indoor Building hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐
NA

45. General Building / Structure use of industrial / office / consumer products (circle as appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol Deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window Cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuel	Never	Hardly ever	Occasionally	Regularly	Often

in utility room

46. Please check weekly Building / Structure maintenance, janitorial, and cleaning practices:

- Dusting ☒
- Dry Sweeping ☒
- Vacuuming ☒
- Polishing (furniture, etc.) ☐
- Washing/Waxing Floors ☒
- Other (describe) ☐ _____

Twice wk

47. Other comments including items / subjects not covered in this questionnaire yet an issue or concern for the Building / Structure:

_____
_____
_____
_____
_____
_____
_____
_____
_____

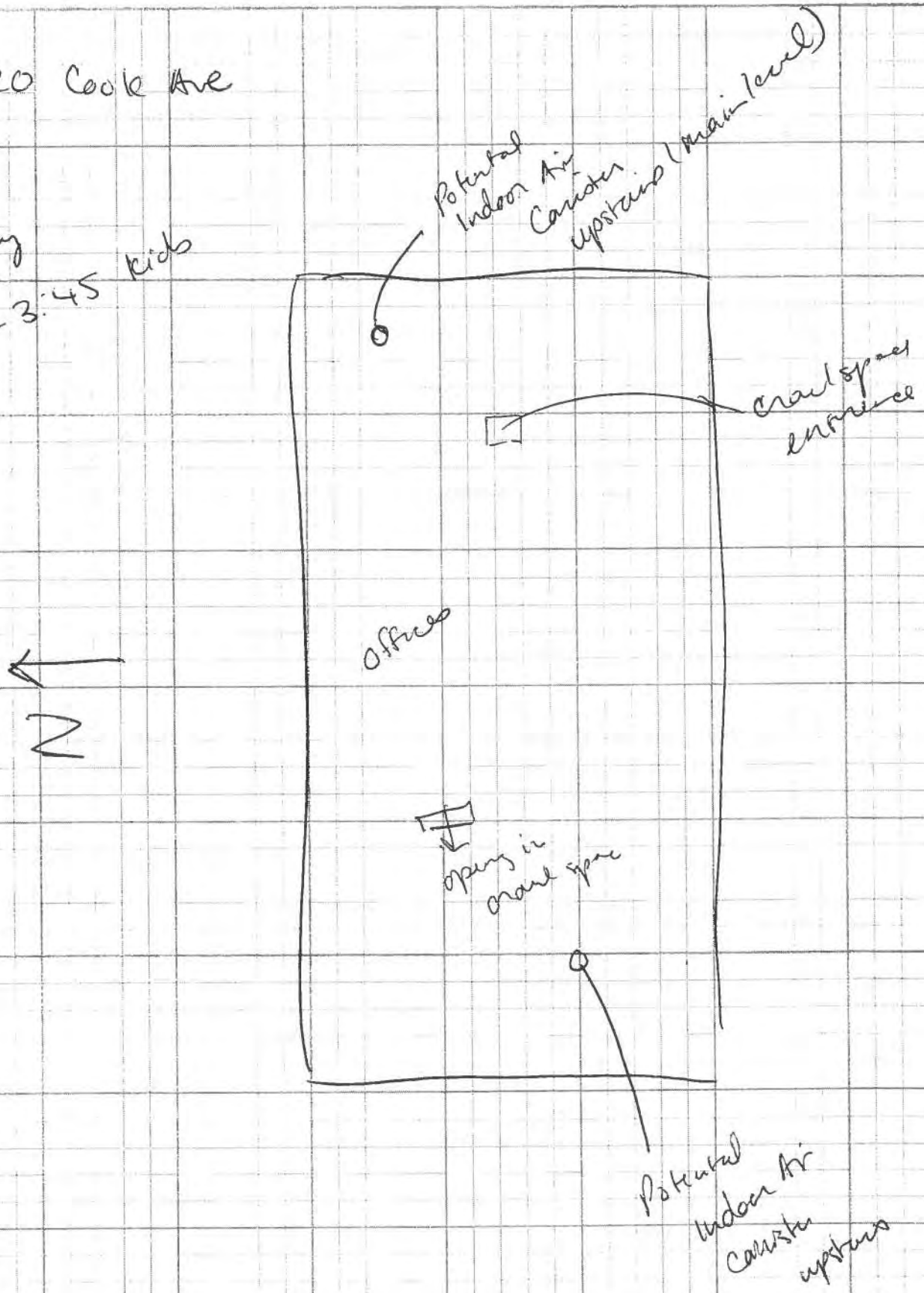
48. **Chemical Inventory/Summary**

Chemical/Chemical Product (consumer name)	Amount present in Building / Structure
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

TITLE	

1020 Cook Ave

Kathy
M-F
7:15-3:45 kids



Entrance to 1020 Cook Avenue
Looking south (east to left in photo, west to right in photo)

ADDRESS: 1020 Cook Avenue

NOTES: OUTSIDE OF STRUCTURE – SCHOOL/PRESCHOOL AT VI SAMPLE STRUCTURE

ADDRESS: 1020 Cook Avenue

NOTES: OUTSIDE OF STRUCTURE – SCHOOL/PRESCHOOL AT VI SAMPLE STRUCTURE

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Scott Reiter

Physical Address of property under investigation: 1044 Cook Ave, Billings MT 59101

Mailing Address: —

Phone (optional): —

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/11/18	Indoor Air (east main)	20180211-1044Ccok -01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/11/18	Indoor Air (west main)	20180211-1044Ccok -02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/11/18	Indoor Air - east crawl	20180211-1044Ccok -03	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*

*OTHER (specify analysis) VOCs (TO-15), Petroleum (APH)

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample. NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

S. Seitz on behalf DEQ — Signature

S. SEITZ (TRIHYDRO) — Printed Name

Telephone #: 406-558-4850

Date: 2/13/18

Property owner/operator copy = white DEQ copy = yellow

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

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Property Owner/Operator Information:

Name: Scott Peiter

Physical Address of property under investigation: 1044 Cook Ave, Billings MT

Mailing Address: —

Phone (optional): —

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/11/18	Indoor Air (west crawl)	20160211-1044cook-04	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/11/18	Indoor Air (Boiler Room)	20160211-1044cook-05	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/11/18	Indoor Air (Annex)	20160211-1044cook-06	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*

*OTHER (specify analysis) VOCs (TO-15) and Petroleum (APH)

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample. NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

~~SSeitz~~ on behalf DEQ — Signature

S. SEITZ (TRIHYDRO) — Printed Name

Telephone #: 406-558-4850

Date: 2/13/18

Property owner/operator copy = white DEQ copy = yellow

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

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Property Owner/Operator Information:

Name: Scott Reiter

Physical Address of property under investigation: 1044 Cook Ave., Billings, MT

Mailing Address: —

Phone (optional): —

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
02/12/18	Sub slab vapor	20180212-1044COOK-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
			Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
			Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*

*OTHER (specify analysis) VOCs (TO-15), Petroleum (APH), Fixed gases, Helium

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

[signature] on behalf DEQ — Signature

S. SETZ (TRIHYDRO) — Printed Name

Telephone #: 406-559-4850

Date: 2/13/18

Property owner/operator copy = white DEQ copy = yellow

1800384

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	Billings PCE	Start Weather:	Partly Cloudy, cold breeezy
		Start Outdoor Air Temp:	17°F
Project Name:	BPCE VI Sampling	Start Atmospheric Pressure:	30.0 in Hg
Sample Location:	1044 Cook - Washington Elem		
Date:	2/11/18	End Weather:	Sunny, Clear NNE 5mph
Field Personnel:	ST, MG, SJ	End Outdoor Air Temp:	2°F
Recorded by:	ST	End Atmospheric Pressure:	30.24 in Hg

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
2/11/18	1208	2/12/18	1208	20180211-1044COOK-01	2466	0313	—	-25.9	-1.5	65	70
2/11/18	1211	2/12/18	1211	20180211-1044COOK-02	1637	~~1637~~ 0712	—	-27.0	0		
2/11/18	1219	2/12/18	1215	20180211-1044COOK-03	0952	0520	—	-26.5	-2		
2/11/18	1224	2/12/18	1219	20180211-1044COOK-04	2121	0018	—	-25	-16		
2/11/18	1226	2/12/18	1220	20180211-1044COOK-05	2680	0299	—	-26.5	-1		
2/11/18	1229	2/12/18	1226	20180211-1044COOK-06	2817	0954	—	-25.5	-4		

Comments:

Note - East Crawlspace - 900 ppb on crawl entrance, no LEL/H2S/ and 20.9% O2
West Crawlspace
-01 Main office area hall - main floor
-02 East wing hall - main floor
-03 East wing crawl space (on stool)
-04 West wing crawl space
-05 Boiler Room/basement indoor air (west side of building)
-06 Annex indoor air in hall to southeast near subslab port

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	Billings PCE GW Facility VI Investigation		
Project Name:		PID (model/serial #):	ppb RAE 3000 / 12875
Sample location:	1044 Cook	Helium Detector (model/serial #):	Dielectric / 8628
Date:	2/12/14	Weather:	Sunny Clear, NNE 5mph
Field Personnel:	ST, MO, SS	Air Temp:	2°F
Recorded by:	ST	Atmospheric Pressure:	30.2 in Hg.

Slab Data

Surface/slab Type: Concrete Slab

Surface/slab Thickness (inches): 5+"

Slab/subsurface substrate comments: N/A

Depth of hole through the slab: 8.5"

Length of sampling train (feet): 39 + 8 = 47.5 ≈ 4ft × 3 × 10 = 120ml

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 120

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
2/12/18	1236	50	24.3	24.5				
2/12/18	1236	100	23.7	24.1				
2/12/18	1237	150	23.2	23.4				
2/12/18	1237	200	22.5	22.7				
2/12/18	1238	250	22.0	22.3				

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

2/12/18	1239	300	21.6	21.8	275 ppm	

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
2/12/18	1241	1321	20180212-1044COOK-01	0705	1574	-3.0	28.0	

Comments: PID → 189 ppb ~gas

O_2 20.9

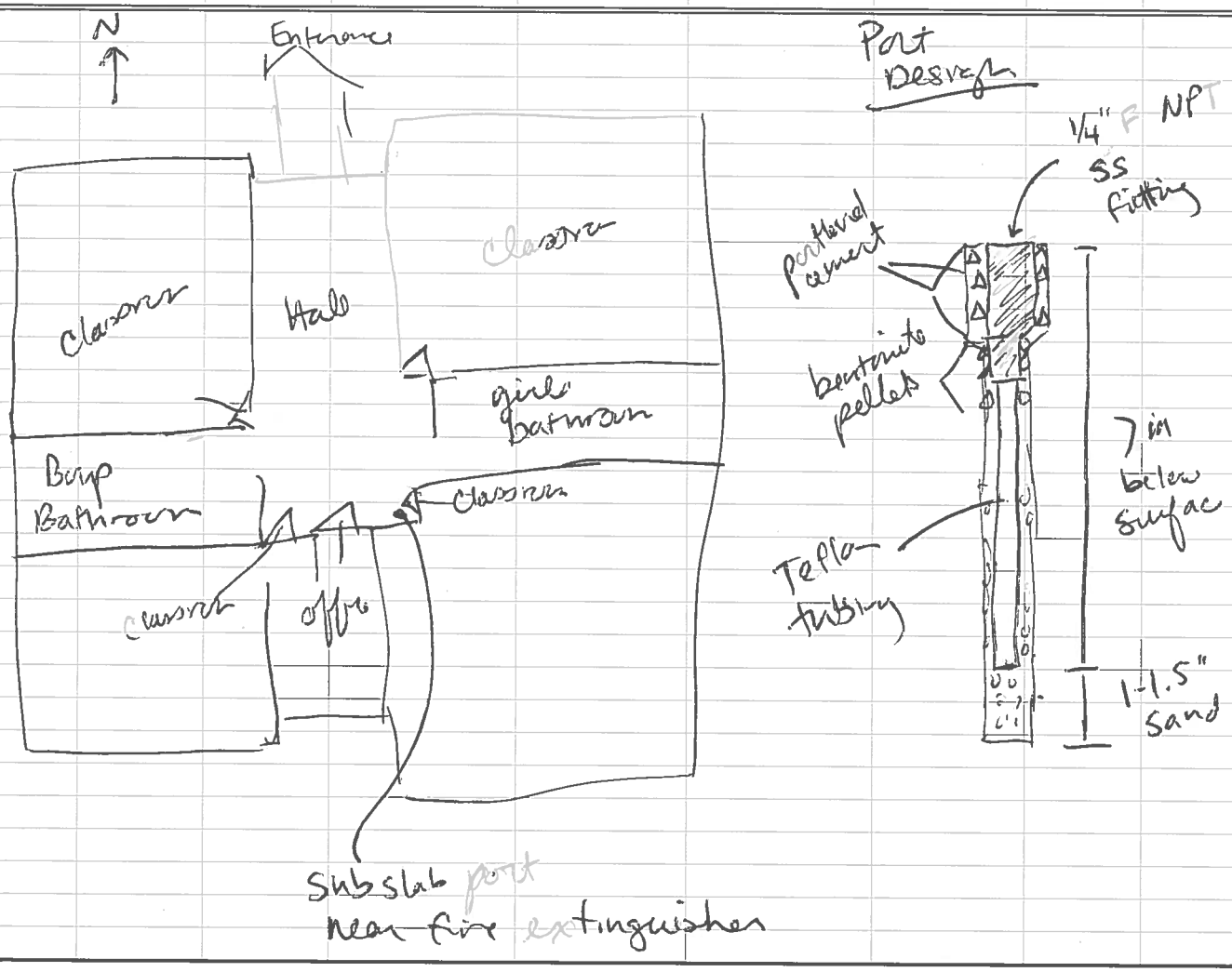
others 0

Sub-Slab Soil Vapor Sampling Field Data Sheet

Project Name: Billing PCE GW
Date: 2/9/18
Sample Location/ ID:

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

Location Sketch:



Department of Environmental Quality
Hazardous Waste Site Cleanup Bureau P.O. Box 200901 Helena MT 59620-0901 (406) 841-5000

COMMERCIAL / INDUSTRIAL BUILDING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 2/6/18 Survey / questionnaire completed by: S. Sentz during discussion

1. Contact Name: Scott Reiter (Maint Manager), Dennis Stellingwerff (Maintenance), Dee Dee Larson (principal)
   Address: _____ City: _____ State: _____ Zip: _____

   Phone 1: _____ Phone 2: _____ Cell Phone: _____

2. What is the best time to call to speak with you? _____

3. Are you the Owner ☒, Renter ☐, Other ☐ (please specify) School District Reps
   this Building/Structure? If you are not the owner, please provide owner contact information
   Owner Name: Billings Public School

   Address: _____ City: _____ State: _____ Zip: _____

   Phone 1: _____ Phone 2: _____ Cell Phone: _____

4. Total number of occupants/persons at this location? —
   Number of Children yes Ages School aged K - 5th

5. How long have you occupied this location? built by School District
   Days per week the building is occupied 5 Hours per day the building is occupied 7-3
   Describe typical shifts and types of labor (office, light labor, heavy labor, etc.) _____

General Building / Structure Description

6. Type of Building/Structure (check only one): Single Business ☐, Multiple Businesses ☐,
   Other School — Elementary

7. Building/Structure Description:
   Number of floors: 1 Area /square footage of main or ground floor: _____ square feet
   Main Building — Basement ☒ Area /square footage of Basement: 800 square feet one area near boiler
   Crawlspace ☒ Area /square footage of Crawlspace: _____ square feet under main build
   Partial crawlspace/basement ☐ % of each _____
   Annex — Slab on grade ☒ Area /square footage of Slab on grade: _____ square feet
   Other ☐ _____

8. Age of Building/Structure: _____ years, Not sure/Unknown ☐

9. General Above-Ground Building/Structure construction (check all that apply):
   Wood ☒, Brick ☐, Concrete ☐, Cement Block ☐, Other ☒ stone

10. Foundation Construction (check all that apply):
Concrete Slab ☒
Fieldstone ☐
Concrete Block ☐
Elevated Above Ground/Grade ☐
Other ☐ _____

11. Do you have a Private Well ☐ or Cistern ☐?
If yes, please describe location, use, and current condition yes - irrigation

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? City water / city sewer
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐ NA
If yes, when was the last application? _____

13. Do you have standing water outside of your Building? (pond, ditch, etc.) Yes ☐ No ☒

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☐ or Unfinished ☒? Boiler Room only no true basement

15. If finished, how many rooms are in the basement? _____
What are rooms used for? Office ☐, Shop ☒, Storage ☐,
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐

17. Is the basement floor (check all that apply) Concrete ☐, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☒, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☒

Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☒

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐, Floor Drain ☑, Other Hole/Opening In Floor ☐
Describe _____

22. Are any of the following used or stored in the basement (check all that apply):

Paint ☐, Paint Stripper/Remover ☐, Paint Thinner ☐, Metal Degreaser/Cleaner ☐, Gasoline ☐, Diesel Fuel ☐, Solvents ☐, Glue ☐, Laundry Spot Removers ☐, Drain Cleaners ☐, Pesticides ☐,
Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.) ☐,
Other products with/containing Volatile Organic Compounds, describe: _____
_____

23. Has the Building / structure recently (within the last six months) had any painting or remodeling?
Yes ☐ No ☐
If yes, specify what was done, where in the Building, and what month:
_____
_____

24. Has new carpeting been installed in the Building / Structure within the last year? Yes ☐ No ☐
If yes, when and where? _____

25. Do any occupants / employees regularly conduct or work in the beauty / hair-dressing business?
Yes, work at a beauty / hair-dressing business ☐
Yes, store supplies for beauty / hair-dressing business ☐ Distance to sample point: _____
Yes, building contains beauty / hair-dressing business ☐ Distance to sample point: _____
Yes, building is near beauty / hair-dressing business ☐ Distance to sample point: _____
No ☑

26. Do any occupants / employees / anyone regularly use or work or conduct a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
Yes, building contains or is near dry cleaning service ☐ Distance to sample point: _____
No ☑

27. Do any occupants / employees / anyone in the Building / structure use solvents at work?
Yes ☐ If yes, how many persons?
No ☑ If no, go to question 28 (Not rentals)

28. If yes for question 26, are the work clothes washed at Building? Yes ☐ No ☐

29. Does Building / Structure contain a washer/dryer? Yes ☐ No ☐
Where are they located?
Basement ☐
Upstairs ☐
Ground floor ☐
Garage ☐
Other, please specify ☐ _____

30. If Building / Structure contains a dryer, is it vented to the outdoors? Yes ☐ No ☐

31. What type(s) of Building heating do you have (check all that apply)
Fuel type: Gas ☐, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system: Forced Hot Air ☐ Forced Hot Water ☐ Steam ☐
Radiant Floor Heat ☐ Wood Stove ☐ Coal Furnace ☐ Fireplace ☐
Other ☐ _____

32. Does Building / Structure have (or had in the past) a storage tank for storage of Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? _____
_____
How is/was the tank filled? _____
_____
Is there staining near the tank? Yes ☐ No ☐

33. Does Building / Structure have air conditioning? Yes ☐ No ☐
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☐
Other (please specify) _____

34. Does Building / Structure have any: Room Fans ☑ (as needed), Ceiling Fans ☐, Attic Fan ☐

35. Does Building / Structure ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐

36. Has Building / Structure had termite or other pesticide treatment? Yes ☐ No ☐ Unknown ☐
If yes, please specify type of pest controlled _____
And approximate date of service _____

37. Water heater type: Gas ☐, Electric ☐, by Furnace ☐,
Other (please describe) _____

38. Water heater location: Basement ☐, Upstairs ☐, Ground Floor ☐, Attic ☐,
Other (please specify) _____

39. Does Building / Structure have any cooking appliances? Electric ☐, Gas ☐
Other (please describe) _____ NO

40. Is there a stove exhaust hood present? Yes ☐ No ☐
Does it vent to the outdoors? Yes ☐ No ☐ NA

41. Smoking in Building / Structure:
None ☑, Rare (only guests) ☐, Moderate (occupants, light smokers) ☐,
Heavy (at least one heavy smoker in Building / Structure) ☐

42. If yes to question 41, what do they smoke?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐ NA

43. Does Building / Structure regularly contain/use air fresheners? Yes ☐ No ☑

44. Does anyone in the Building have indoor Building hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____
_____ NA nope
_____

45. General Building / Structure use of industrial / office / consumer products (circle as appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol Deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window Cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuel	Never	Hardly ever	Occasionally	Regularly	Often

46. Please check weekly Building / Structure maintenance, janitorial, and cleaning practices:

Dusting ☐

Dry Sweeping ☐

Vacuuming ☐

Polishing (furniture, etc.) ☐

Washing/Waxing Floors ☐

Other (describe) ☐ _____

47. Other comments including items / subjects not covered in this questionnaire yet an issue or concern for the Building / Structure:

_____

_____

_____

_____

_____

_____

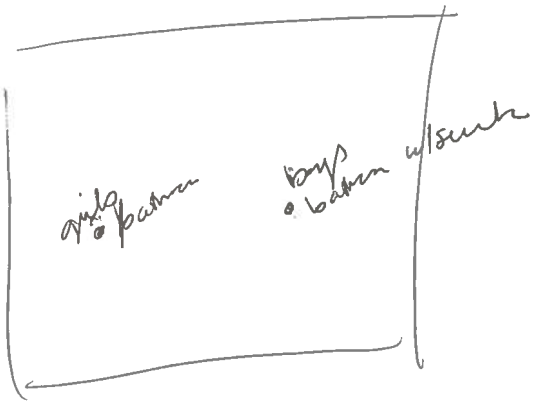
_____

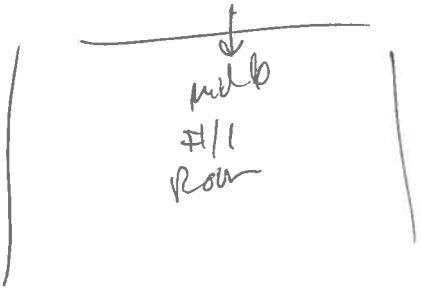
_____

_____

48. **Chemical Inventory/Summary**

Chemical/Chemical Product (consumer name)	Amount present in Building / Structure
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

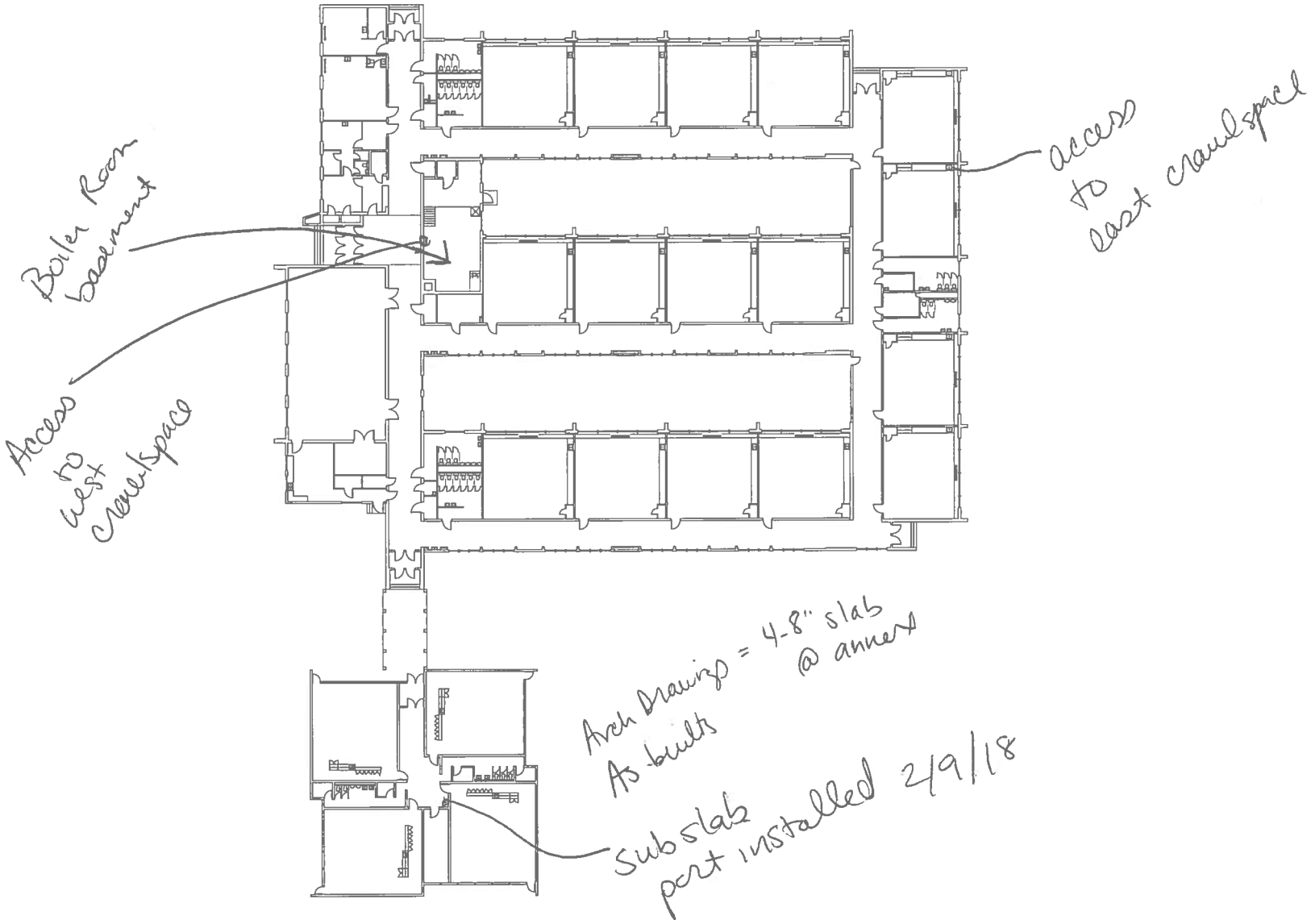




Friday @ 9:30 am install - Come then
Dee Dee 698-5706

[2:30]

WASHINGTON
SCALE : 1/16"



Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
A. Excavation-site planning:		
1. The local One Call regulations have been checked for local utility-notification requirements (e.g., 48 hours vs. 72 hours).	2/9/18	SJS
2. Per the local One Call regulations, list the responsible party (generally the excavation/drilling contractor) for requesting and verifying completion of utility locates below: TRihydro	2/9/18	SJS
3. The property owner and/or business owner has been notified of the excavation schedule. ✓	2/9/18	SJS
4. Each proposed excavation site or "area of interest" has been delineated for utility-line locators using white spray paint and/or wooden stakes/lathes with white flagging. NA	—	insch
5. Public-utility locates have been requested by calling One Call at least 48 hours (72 hours in some states) before work is scheduled to begin, and the request includes depths, as available.	2/9/18	SJS
6. Each utility company has been notified of the excavation schedule and invited to review the proposed excavation sites.	2/9/18	SJS
7. On-site meetings have been scheduled with the appropriate representatives of critical utility facilities (e.g., gas/oil pipelines, high-voltage cables, fiber-optic lines). EAM 2/9/18	✓	SJS
8. Private-utility locates—including fuel lines; tanks; and water, sewer, gas, electricity, and other utilities—have been requested. NA	—	—
9. The property owner was contacted to determine if he/she knows of privately owned subsurface facilities within 5 feet of the proposed excavation sites. (Review locations with the manager/owner.) Examples of privately owned facilities that are not commonly marked on private property include: Scott Reiter Facilities	2/9/18	SJS
a) Water and sewer laterals ✓	—	—
b) Gas lines ✓	—	—
c) Power lines (including those for landscape/yard lighting, pool and spa lines, and "out building" lines) ✓	—	—
d) Irrigation lines NA	—	—
e) Communication lines (cable, telephone, Internet) ✓	—	—
f) Propane tank lines NA	—	—
10. The proposed excavation sites have been reviewed by the appropriate stakeholders (e.g., owner, tenant, driller, excavator) and the Trihydro project manager. ✓	2/9/18	SJS
11. Proposed excavation sites have been visually inspected, and available plans and aerial photos have been reviewed for evidence of potential utilities.		
12. A scaled site plan showing the proposed excavation sites relative to subsurface utilities has been prepared and is available for stakeholder/Management review. NA	—	—
13. The basis for each buried utility line's location and the accuracy of the data defining the utility location are documented on the site plan. NA	—	—
14. The proposed excavation sites are at least 5 feet from subsurface utilities shown on the building plans.	2/9/18	SJS
15. The proposed excavation sites are at least 5 feet from subsurface utilities shown on public right-of-way / street-improvement plans. [Note: Work with utility companies to determine if they require a representative present during excavation activities.] NA insch		
16. The proposed excavation sites are at least 7 feet from the pad surrounding underground storage tanks (USTs) shown on the building plans.	NA	
17. The utility-locate ticket number is available on site. 18003782 ✓	2/9/18	SJS
18. A traffic-control plan has been prepared if appropriate. Note: If the project area encompasses a public street or right of way, the local and/or state authority must approve the traffic-control plan before fieldwork begins.	NA	
19. Arrangements have been made to contact the appropriate personnel if utility-line repairs are needed. (Who must be contacted if a line is unexpectedly damaged?)	NA	
20. Contact information is in place and readily available with the driller, excavator, and other project stakeholders.	NA	
21. The client and other relevant stakeholders (if any) have been notified of the excavation planning/pre-planning steps and results.	~~2/9/18~~	SJS
22. A detailed work scope was developed by the project team and reviewed by the Project Director and Contracting Team. NA		
Project Director (excavation-site planning tasks):	2/9/18	SJS

1044 Cook - Washington Elementary

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
B. Utility-line marking:		
1. Electrical circuits are energized during utility-line marking for subsurface power lines (e.g., circuits on timers or light-sensing switches).	✓	
2. Public-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	See below	
3. Private-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	NA	
4. Verify that One Call locators marked their facilities in the designated excavation area or provided notification that they do not have any facilities near the proposed excavation sites.	✓	S/S
5. One Call was contacted to request a "refresh" if utility-locate markings are missing, difficult to see, or more than 14 days old (7 days in some states). "Refresh" markings must be performed by the original marking organization.	NA	
Project ~~Director~~ (utility-line marking tasks):	2/9/18	S/S
C. Job walk:		
1. Visual verification that each proposed excavation site does not lie on a line connecting two similar-looking manhole covers (e.g., sanitary sewers or storm drains). (Consider having the line snaked to confirm their locations.)	✓	S/
2. Visual verification that each proposed excavation site does not lie on a line with any water, gas, electrical meters, utility cleanouts, or other utility boxes in the surrounding areas.	✓	S/S
3. Visual verification that the pavement near each proposed excavation site has not subsided or give the appearance it may be covering a previous excavation (e.g., linear cracks or sagging curbs).	✓	S/S
4. Visual verification that each proposed excavation has adequate overhead clearance for the excavation equipment (e.g., at least 10 feet from overhead-utility lines and/or reasonable distance from canopies).	NA	
5. Fences and fields have been checked for markers, signs, posts, valves, stub outs, etc.	NA	
6. Surface structures such as tank batteries, wells, valves, phone pedestals, and electrical junction boxes have been checked for evidence of subsurface utilities.	NA	
7. Observed evidence of subsurface utilities has been photographed, sketched, or otherwise documented.	NA	on site
8. Proposed excavation sites have been "walked"/reviewed by the excavation contractor, Trihydro project manager, and other stakeholders (e.g., client representative, property owner, tenant).	NA	
9. Proposed excavation sites are located at least 5 feet from marked utilities (i.e., the "tolerance zone"), or written approval to excavate within the 5-foot tolerance zone has been obtained from the appropriate utility owner. In no case shall a proposed excavation be located closer than 2 feet from the outside edge of a marked utility. (Note: The tolerance zone is measured from the outside edge of a subsurface structure—not its centerline.)	✓	S/S
10. Verify that the excavation contractor (with help from appropriate utility-line locators, if part of the client-approved work scope) has walked each proposed excavation site to verify all expected utility-line markings are present.	Trihydro	
11. Traffic-control devices, safety barricades, caution tape, and other safety-management devices are in place as needed to protect project personnel.	NA	
Project ~~Director~~ (job-walk tasks):	2/9/18	S/
D. Daylighting / potholing / "soft digging":		
1. The proposed excavation sites located within the "tolerance zone" (and sites located outside the "tolerance zone" when required by the client) have been potholed to a depth below the anticipated utility zone using "minimally intrusive excavation methods" such as vacuum excavation (either air-entrainment or water-jet) and careful hand-tool use.	NA	
2. Monitoring and emergency equipment is available on site when hazardous atmospheres are expected to be encountered in the potholing excavations.	not	
3. A list of emergency-contact names/numbers is maintained at the potholing excavation site.	potholing	
4. The project health and safety plan addresses potential hazards and safety-performance requirements related to utility-clearance operations.		
5. The location of and directions to the nearest hospital are known by all members of the project team.		
6. Representatives of utility owners that requested to be on site for utility locates are present.		

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
7. Pothole excavations have been visually checked with a flashlight by the excavation contractor, Trihydro project manager, or her/his designee.		
8. Utilities adjacent to the excavation or that cross the excavation have been daylighted using "minimally intrusive excavation methods."		
9. The areal extent of the excavation-clearance pothole has been verified to extend at least 120% beyond the outside diameter of the largest-diameter down-hole tool to be used in the borehole, or at least 2 feet on each side of daylighted/exposed lines, whichever is greater.		
10. If vacuum excavation (e.g., air knife, air vac, hydro-vac) is not available to daylight utility lines, verify that the non-conductive probe method was used as follows: Scratch the ground no more than 10 inches deep above the utility and then probe the scratched area. If the utility isn't found in the scratched area, repeat the first step until the utility is located. Once the utility is found, its depth must be continually verified with the probe until 2 feet of soil remain above the utility. Carefully hand dig the remaining overburden to expose the utility.		
11. The soil encountered in the excavation-clearance pothole has been verified to be free of bedding material (e.g., clean gravel, clean sand, aggregate base [gravelly sand with ~10% fines], or other non-native-looking material) that could indicate the presence of a previously installed utility line.		
12. Excavation work within 2 feet of an underground utility was "hand dug."		
13. Once the utility lines were exposed and the excavations were safe to enter, the exposed lines (including their protective coating) was examined for damage.		
14. The condition of each utility line exposed during daylighting was documented, and the documentation was forwarded to the Trihydro project manager to place in the project file.		
15. If a utility line was damaged in any way, it was reported to the utility owner and Trihydro project manager and documented in the project file.		
16. Damage to a utility line was documented and repaired before it was reburied. The utility owner signed off on the repairs.		
17. Employees entering the excavation followed the procedures described in the Trihydro "Trenching and Excavation Program" and used the Trihydro "Daily Excavation/Trench Inspection Report" to document excavation condition.		
18. The location of daylighted utilities was documented and photographed after daylighting was completed and before the pothole excavation was backfilled.		
19. Locations for hand digging within the "tolerance zone" were noted.		
Project Director (daylighting/potholing tasks):	NA	
E. Excavation (including drilling):		
1. The appropriate permits have been obtained for the work (e.g., hot-work permits, entry permits).	NA	
2. The utility-owner and/or agency representatives that requested to be on site during excavation work are present. (Trihydro Utility Locate Acknowledgement Form)	NA	
3. A safety kickoff meeting was conducted with the excavation contractor to review roles/responsibilities, work activities, anticipated hazards, this checklist, and emergency-response procedures before starting excavation work the site. The safety kickoff meeting was documented in the project file.	2/9/18	SJ
4. A daily tailgate safety meeting was conducted and documented in the project file. Verify weather conditions, safety hazards, PPE requirements, job duties, communication, hand signals, etc.	inside	
5. JSAs covering the work to be done are in place and have been reviewed, "marked up" where appropriate, and acknowledged by the excavation project-team members.		
6. Site workers have been reminded to look for hazardous conditions, processes, and activities, and that they are authorized to stop work if they see an unsafe condition.	2/9/18	SJ
7. The emergency-response plan has been reviewed by all excavation project-team members (e.g., contact numbers, evacuation muster points, hospital routes).	2/9/18	SJ
8. The excavation contractor has checked the excavation sites relative to overhead utilities, subsurface-utility locates, and adjacent surface structures.	2/9/18	SJ
9. The excavation contractor has acknowledged the potential location of each subsurface utility marked in the excavation areas.	2/9/18	SJ
10. Proper traffic control and exclusion zones have been established.	NA	
11. The excavation equipment (e.g., drill rig, backhoe) has been inspected for proper operation and condition.	NA	
12. Emergency equipment (fire extinguisher, first aid kit, emergency shut-off switch, etc.) has been checked, is readily available, and is in working order.	NA	
13. Excavation project-team members are wearing appropriate PPE per the Trihydro HASP and client/site-specific requirements.	2/9/18	SJ
14. Power in the excavation area has been de-energized, if possible. If power cannot be de-energized, the excavation contractor was advised of the hazard.	NO	SJ

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
Project Director (excavation/drilling tasks):	2/9/18	[illegible]
F. If an unmarked utility line is discovered:		
1. Verify the One Call utility-locate request was made correctly.		
2. Identify the owner/operator of the unmarked utility line and contact One Call (dial "811") to request a "No Response" ticket. If the owner/operator fails to respond again, seek a third-party locating service to mark the utility before: a) excavation work begins, or b) advancing the excavation further.		
3. Contact the owner/operator of non-locatable utilities to request they be taken out of service before excavation begins.		
4. If possible, a representative of the unmarked utility line should be on site when the unmarked utility is daylighted.		
Project Director (unmarked utility line tasks):		

Note:

-- If an item doesn't apply, please insert an "NA" in the "**Date**" column and provide an explanation in the "**Project Notes**" section below.

[illegible] for A Vann	[illegible]	2/9/18
Project Manager	Field Manager / Team Members	Date Reviewed
Client / Project Name / Location	Excavator/Driller Name	Date Action Items Completed

Project Notes: [Please cross reference to the appropriate checklist-item number[s] when possible.]

Drilling inside for V1 sub-slab - many questions are N/A

VI Sample: 1044 Cook Ave Indoor Air West
Main Floor Outside of Main Office

VI Sample for Indoor Air West and West Crawlspace not pictured. Indoor Air West Sample was collected outside the janitor's room on the western corridor. Western crawlspace access/sample in crawlspace below janitor's closet

VI Sample: 1044 Cook Ave West Crawlspace Access Inside Boiler Room

VI Sample: 1044 Cook Ave West Crawlspace Access Inside Boiler Room

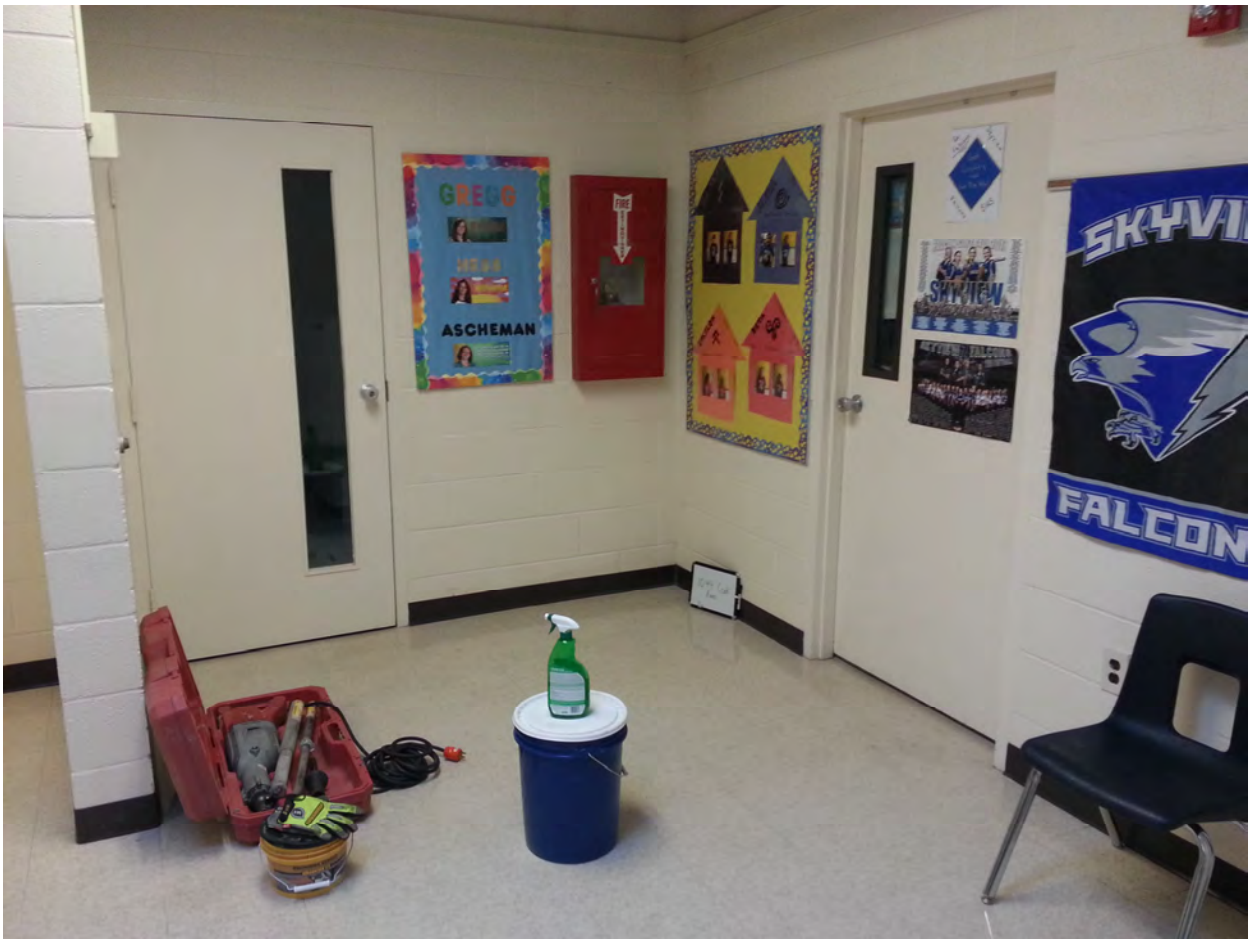
VI Sample: 1044 Cook Ave Indoor Air Boiler Room/Basement

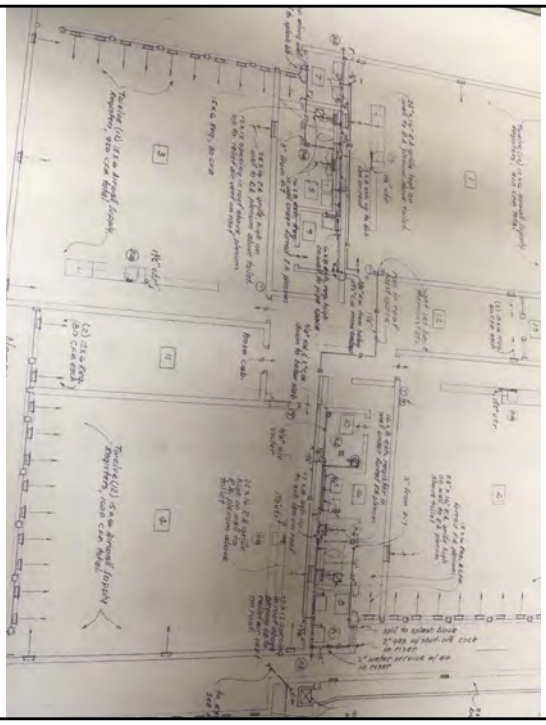
VI Sample: 1044 Cook Ave_Main Annex

VI Sample: 1044 Cook Ave_Subslab Annex

VI Sample: 1044 Cook Ave_Subslab Annex

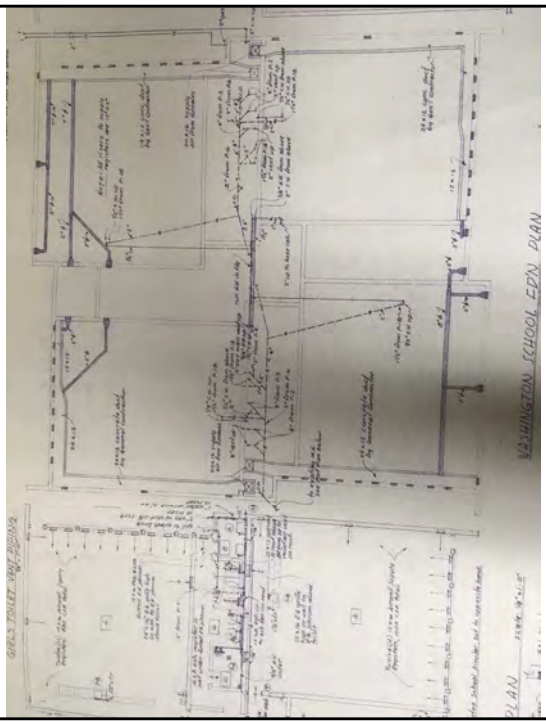
VI Sample: 1044 Cook Ave_Subslab Annex





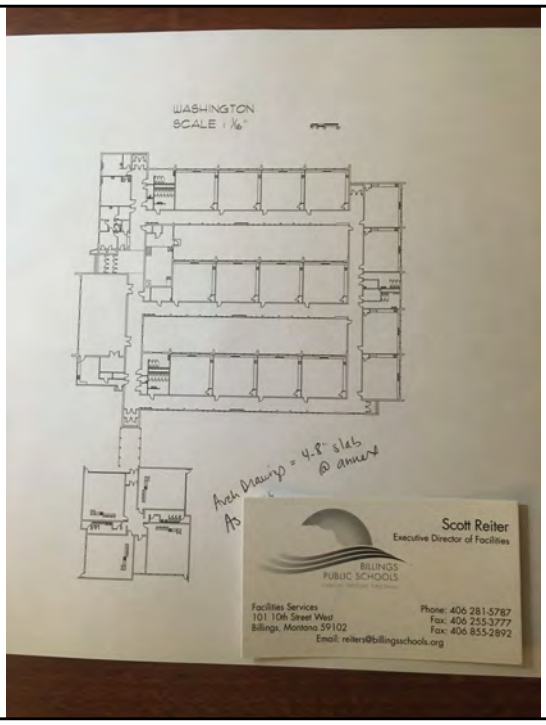
ADDRESS: 1044 COOK AVE

NOTES:
UTILITY LOCATE



ADDRESS: 1044 COOK AVE

NOTES:
UTILITY LOCATE



ADDRESS: 1044 COOK AVE

NOTES:
UTILITY LOCATE

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Leona Brewer

Physical Address of property under investigation: 1140 LYNN AVE BILLINGS MT

Mailing Address: "SAME"

Phone (optional):

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
[illegible]	AIR	[illegible]	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15 [illegible]
[illegible]	AIR	[illegible]	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15 API
			Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*

*OTHER (specify analysis)

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☒ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.
- ☒ NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☒ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

Signature

Syrus Trahan
Printed Name

Telephone #: 307-715-7474

Date: 3/6/18

Property owner/operator copy = white DEQ copy = yellow

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	1140 Lynn	Start Weather:	Sunny, <5 mph
		Start Outdoor Air Temp:	24°F
Project Name:	BPCE	Start Atmospheric Pressure:	30.08
Sample Location:	1140 Lynn		
Date:	2/27/18	End Weather:	Sunny, 5-10mph
Field Personnel:	ST, BS, JS	End Outdoor Air Temp:	30°F
Recorded by:	BS	End Atmospheric Pressure:	29.85

Canister and Sample Information

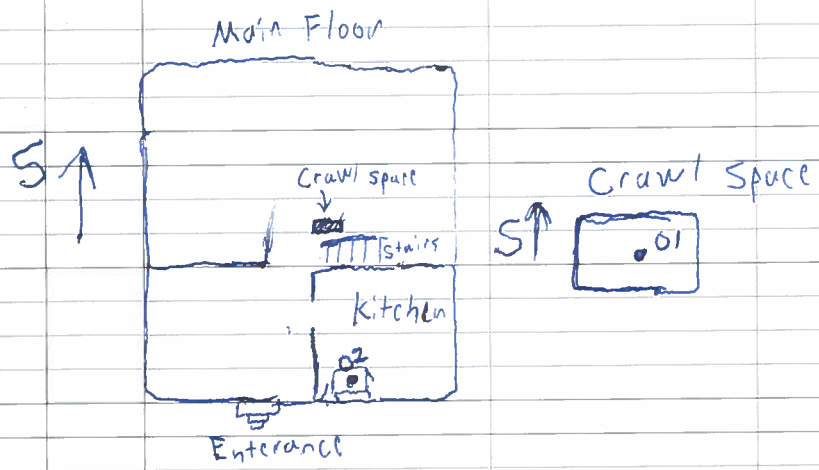
Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
2/27/18	1037	2/28/18	1033	20180227-1140Lynn-01	0044	0137		-28	-3	65°	
2/27/18	1039	2/28/18	1034	20180227-1140Lynn-02	0638	1429		-28	-5	70°	

Comments: -01 in crawl space.
-02 kitchen dining table.

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

Location Sketch:



OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 2/27/18

1. Name: Leona Brewer.

   Address: 1140 LYNNE

   Home Phone: 406-248-6081 Work Phone: _____

2. What is the best time to call to speak with you? _____ At: Work ☐ or Home ☑ ?

3. Are you the Owner ☑, Renter ☐, Other ☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

4. Total number of occupants/persons at this location? 1.
   Number of Children _____ Ages _____

5. How long have you lived at this location? 63 years.

General Home Description

6. Type of Home/Structure (check only one): Single Family Home ☑, Duplex ☐, Apartment ☐, Townhouse ☐ Other _____

7. Home/Structure Description:
   Number of floors: 2
   Basement ☐
   Crawlspace ☑
   Partial Crawlspace/Basement ☐ % of each _____
   Slab On Grade ☐
   Other ☐ _____

8. Age of Home/Structure: 63 years, Not Sure/Unknown ☐

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood ☑, Brick ☐, Concrete ☐, Cement block ☐, Other ☐ _____
   Garage: ☐ Attached ☐ Detached ☐ None

10. Foundation Construction (check all that apply):
    Concrete Slab ☑
    Fieldstone ☐
    Concrete Block ☐
    Elevated Above Ground/Grade ☐
    Other ☐ _____

11. Do you have Private Well ☐ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition Had a well dried up.

12. Do you have a Septic System? Yes ☐ No ☑ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☑

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☐ Unfinished ☐ Partially Finished ☐ Partial Crawlspace ☑?

15. If finished, how many rooms are in the basement? _____
What are rooms used for? Bedrooms ☐ Family Room ☐ Storage ☐
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐

17. Is the basement floor (check all that apply) Concrete ☐, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☐, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

N/A

Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐,
Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe _____

22. Are any of the following used or stored in the basement (check all that apply):
- ☐ Paint
- ☐ Solvents (degreasers, paint thinner, etc.)
- ☐ Fuels/Oils (gasoline, diesel, used oil)
- ☐ Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- ☐ Pesticides

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☐ No ☒
If yes, specify what was done, where in the home, and what month:

24. Have you installed new carpeting in your home within the last year? Yes ☐ No ☒
If yes, when and where? _____

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
No ☒

26. Does anyone in your home use solvents at work?
Yes ☐ If yes, how many persons?
No ☒ If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes ☐ No ☐

28. Where is the washer/dryer located?
Basement ☐
Upstairs Utility Room ☒
Kitchen ☐
Garage ☐
Use a Laundromat ☐
Other, please specify ☐ _____

29. If you have a dryer, is it vented to the outdoors? Yes ☒ No ☐

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas ☒, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system:
- Forced Hot Air ☒
- Forced Hot Water ☐
- Steam ☐
- Radiant Floor Heat ☐
- Wood Stove ☐
- Coal Furnace ☐
- Fireplace ☐
- Other ☐ _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? _____

How is/was the tank filled? _____

Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☐ No ☒
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☐
Other (please specify) _____

33. Do you use any of the following? Room Fans ☐, Ceiling Fans ☒ Attic Fan ☐

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☒ Unknown ☐
If yes, please specify type of pest controlled _____
And approximate date of service _____

36. Water heater type: Gas ☒, Electric ☐, by Furnace ☐,
Other (please describe)_____

37. Water heater location: Basement ☐, Upstairs Utility Room ☐, Garage ☒
Other (please specify) _____

38. What type of cooking appliance do you have? Electric ☐, Gas ☒
Other (please describe) _____

39. Is there a stove exhaust hood present? Yes ☒ No ☐
Does it vent to the outdoors? Yes ☒ No ☐

40. Smoking in Home:
None ☒ Rare (only guests) ☐, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐

41. If yes to question 40, what is smoked?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☐ No ☒

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation: _____

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

45. Please check weekly household cleaning practices:

Dusting ☐

Dry Sweeping ☐

Vacuuming ☐

Polishing (furniture, etc.) ☐

Washing/Waxing Floors ☐

Other (describe) ☐ _____

46. Other comments:

_____

_____

_____

_____

_____

_____

_____

_____

_____

47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

VI Sample: 1140 Lynn Ave_Crawlspace

VI Sample: 1140 Lynn Ave_Crawlspace

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Gary Bennet c/o Jerry Riplogle Building Manager

Physical Address of property under investigation: 1246 Central Ave. Billings MT

Mailing Address:

Phone (optional): Jerry 406-654-6655

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/5/18	Indoor Air	20180205-1246Central-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/5/18	Sub-slab air	20180205-1246Central-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
			Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*

*OTHER (specify analysis) Indoor Air - TO-15 VOCs / MA-APH; Sub-slab - TO-15 VOCs / MA-APH, Fixed gases, Helium

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☐ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☐ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

[signature] for DEQ — Signature

S. SEITZ — Printed Name

Telephone #: 406-558-4850

Date: 2-5-18

Property owner/operator copy = white DEQ copy = yellow

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	1246 Central		
Project Name:	BPCE	**PID (model/serial #):**	Rae PPb PID / PGM7340
Sample location:	Back Room	**Helium Detector (model/serial #):**	Radiodetection / R11189
Date:	2/5/18	**Weather:**	Cloudy, snow
Field Personnel:	ST, SS, JK, MO, M. Gipson	**Air Temp:**	12°F
Recorded by:	ST	**Atmospheric Pressure:**	30.3 inHg

Slab Data

Surface/slab Type:	Concrete
Surface/slab Thickness (inches):	2½"
Slab/subsurface substrate comments:	Concrete w/ agregate below.
Depth of hole through the slab:	~4"
Length of sampling train (feet):	38" ≈ 3.25 ft

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 3.25 x 3 x 10 = 97.5 ml

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	**Time**	**Cumulative volume purged (ml)**	**Helium Beneath Shroud (%) min**	**Helium Beneath Shroud (%) max**	**Helium in Probe (ppm or %)**	**PID reading in probe (ppb)**	**Helium Beneath Shroud (%) min**	**Helium Beneath Shroud (%) max**
2/5/18	1753	~~27~~ 50	27.5	27.6			19.2	26.7
	1754	100	26.8	27.2				
	1755	150	26.8	26.2				
	1755	200	~~29~~ 25.9	26.0				
	1756	250	24.8	24.9		825 ppm		
Conversion: 1.0% = 10,000 ppm								
At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train								
	1756	300	24.2	24.3		1757	2100	23.4 24.0
	1756	350	23.9	24.0		1757	450	23.1 23.4

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
2/5/18	1759	1834	20180205-1246 Central-02	0236	1239		-26.2	-6.0

Comments: ppb peak from port - 1983
O_2 dropped to 20.0 beneath slab

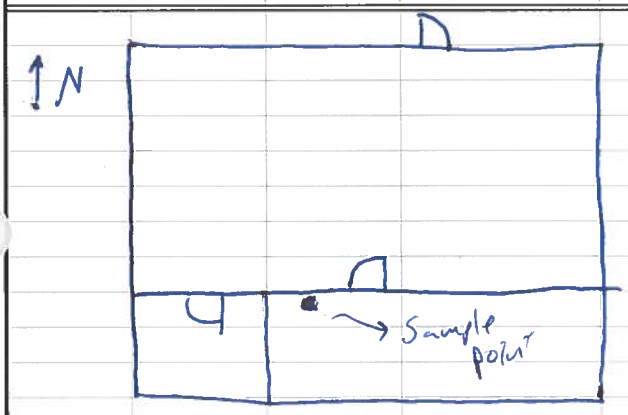
4

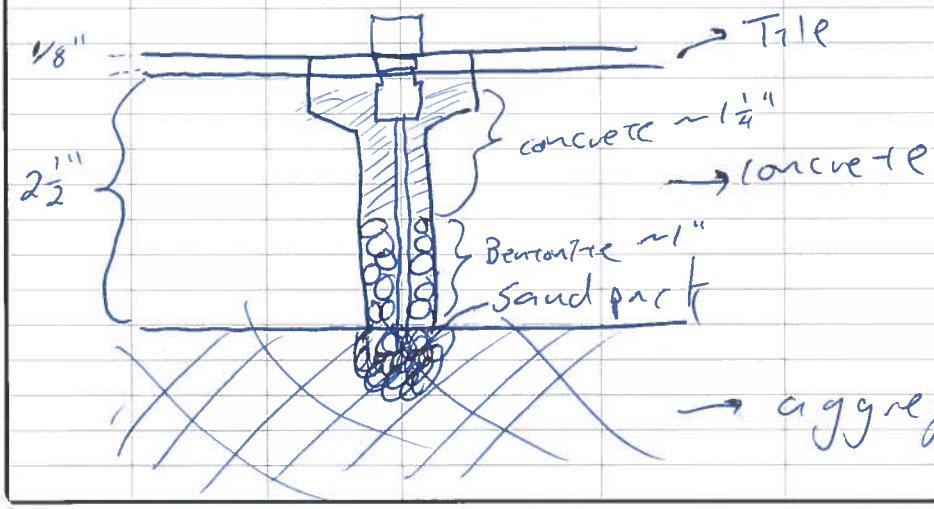
Sub-Slab Soil Vapor Sampling Field Data Sheet

Project Name:	Sample Location/ ID:
Date:	

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

Location Sketch:





Tubing length to top of fitting: 4"

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	776-036-001	**Start Weather:**	Cold, snow covered ground, snowing wind E/SE 6mph
		Start Outdoor Air Temp:	10°F
Project Name:	Bigp PZE GW VI Investigation	**Start Atmospheric Pressure:**	30.4 in Hg.
Sample Location:	Smokers Friendly		
Date:	2/5/18	**End Weather:**	~~12~~ Overcast, snowy
Field Personnel:	ST/SS	**End Outdoor Air Temp:**	12°F
Recorded by:	SS	**End Atmospheric Pressure:**	30.3 in Hg.

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
								~~30~~ 27½ in Hg.			
2/5/18	9:30am	2/5/18	1733	20180205-1246Central-01	PACE 3321	FC02216	N/A	-27.5 in Hg	-9.5	69°F	
				Indoor Air canister in main store area near office - behind register area							
2/5/18				20180205-1246Central-02	0236	1239					

Comments:

	Canister	Start in OK	Start	End
Start in OK	3321	OK	~~-26.2~~	
2min —	0236	OK	-26.2	-26.2

Smoker Friendly (CAL Former)

Department of Environmental Quality
Hazardous Waste Site Cleanup Bureau P.O. Box 200901 Helena MT 59620-0901 (406) 841-5000

COMMERCIAL / INDUSTRIAL BUILDING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 11/14 Survey / questionnaire completed by: S. Seitz

1. Contact Name: Tad Logan-Marson
   Address: _____ City: _____ State: _____ Zip: _____
   Phone 1: 406 248-9288 Phone 2: _____ Cell Phone: _____

2. What is the best time to call to speak with you? _____

3. Are you the Owner ☐, Renter ☑, Other ☐ (please specify) _____ of this Building/Structure? If you are not the owner, please provide owner contact information
   Owner Name: Gary
   Address: _____ City: _____ State: _____ Zip: _____
   Phone 1: _____ Phone 2: _____ Cell Phone: _____

4. Total number of occupants/persons at this location? _____
   Number of Children _____ Ages _____

5. How long have you occupied this location? _____
   Days per week the building is occupied 7 Hours per day the building is occupied 6-8 M-F Sat. 7-8 Sun 8-5
   Describe typical shifts and types of labor (office, light labor, heavy labor, etc.) _____
   12:30 - 8 part-time Manager here the most - 40 hr
   Sunday all day

General Building / Structure Description

6. Type of Building/Structure (check only one): Single Business ☐, Multiple Businesses ☑,
   Other Note not owned by tenant

7. Building/Structure Description:
   Number of floors: 1 Area /square footage of main or ground floor: 25 (50+, check) square feet
   Basement ☑ NA Area /square footage of Basement: _____ square feet
   Crawlspace ☑ NA Area /square footage of Crawlspace: _____ square feet
   Partial crawlspace/basement ☑ NA % of each _____
   Slab on grade ☑ Area /square footage of Slab on grade: same square feet
   Other ☐ _____

8. Age of Building/Structure: _____ years, Not sure/Unknown ☐

9. General Above-Ground Building/Structure construction (check all that apply):
   Wood ☐, Brick ☐, Concrete ☐, Cement Block ☑, Other ☐ _____

NA No bsmnt

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐, Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe _____

22. Are any of the following used or stored in the basement (check all that apply): NA No basement
Paint ☐, Paint Stripper/Remover ☐, Paint Thinner ☐, Metal Degreaser/Cleaner ☐,
Gasoline ☐, Diesel Fuel ☐, Solvents ☐, Glue ☐, Laundry Spot Removers ☐,
Drain Cleaners ☐, Pesticides ☐,
Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.) ☐,
Other products with/containing Volatile Organic Compounds, describe: _____
_____

23. Has the Building / structure recently (within the last six months) had any painting or remodeling?
Yes ☐ No ☒
If yes, specify what was done, where in the Building, and what month:
_____
_____

24. Has new carpeting been installed in the Building / Structure within the last year? Yes ☐ No ☒
If yes, when and where? plan to put new tile in next few months

25. Do any occupants / employees regularly conduct or work in the beauty / hair-dressing business?
Yes, work at a beauty / hair-dressing business ☐
Yes, store supplies for beauty / hair-dressing business ☐ Distance to sample point: _____
Yes, building contains beauty / hair-dressing business ☐ Distance to sample point: _____
Yes, building is near beauty / hair-dressing business ☐ Distance to sample point: _____
No ☒

26. Do any occupants / employees / anyone regularly use or work or conduct a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
Yes, building contains or is near dry cleaning service ☐ Distance to sample point: _____
No ☒ No, but was a dry cleaner

27. Do any occupants / employees / anyone in the Building / structure use solvents at work?
Yes ☐ If yes, how many persons?
No ☒ If no, go to question 28

28. If yes for question 26, are the work clothes washed at Building? Yes ☐ No ☒

29. Does Building / Structure contain a washer/dryer? Yes ☐ No ☒
Where are they located?
Basement ☐
Upstairs ☐
Ground floor ☐
Garage ☐
Other, please specify ☐ _____

30. If Building / Structure contains a dryer, is it vented to the outdoors? Yes ☐ No ☐ NA

31. What type(s) of Building heating do you have (check all that apply)
Fuel type: Gas ☒, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system: Forced Hot Air ☒ Forced Hot Water ☐ Steam ☐
Radiant Floor Heat ☐ Wood Stove ☐ Coal Furnace ☐ Fireplace ☐
Other ☐ _____

45. General Building / Structure use of industrial / office / consumer products (circle as appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol Deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window Cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuel	Never	Hardly ever	Occasionally	Regularly	Often

Cleaners under counter or sink

46. Please check weekly Building / Structure maintenance, janitorial, and cleaning practices:

Dusting ☐ everyday
Dry Sweeping ☐ weekends
Vacuuming ☐ every day
Polishing (furniture, etc.) ☐ rare
Washing/Waxing Floors ☐ NO
Other (describe) ☐ _____

47. Other comments including items / subjects not covered in this questionnaire yet an issue or concern for the Building / Structure:

_____
_____
_____
_____
_____
_____
_____
_____
_____

Excavation, Drilling, and Utility-Locating Checklist

Smoker Friendly

1244 Central

Task	Date	Initials
A. Excavation-site planning:		
1. The local One Call regulations have been checked for local utility-notification requirements (e.g., 48 hours vs. 72 hours).	2/1/18	JR
2. Per the local One Call regulations, list the responsible party (generally the excavation/drilling contractor) for requesting and verifying completion of utility locates below:	2/1/18	JR
3. The property owner and/or business owner has been notified of the excavation schedule.	late Jan	JR
4. Each proposed excavation site or "area of interest" has been delineated for utility-line locators using white spray paint and/or wooden stakes/lathes with white flagging.	—	—
5. Public-utility locates have been requested by calling One Call at least 48 hours (72 hours in some states) before work is scheduled to begin, and the request includes depths, as available.	2/1/18	JR
6. Each utility company has been notified of the excavation schedule and invited to review the proposed excavation sites.	—	—
7. On-site meetings have been scheduled with the appropriate representatives of critical utility facilities (e.g., gas/oil pipelines, high-voltage cables, fiber-optic lines).	—	—
8. Private-utility locates—including fuel lines; tanks; and water, sewer, gas, electricity, and other utilities—have been requested.	—	—
9. The property owner was contacted to determine if he/she knows of privately owned subsurface facilities within 5 feet of the proposed excavation sites. (Review locations with the manager/owner.) Examples of privately owned facilities that are not commonly marked on private property include:	—	—
a) Water and sewer laterals ✓	2/1/18	JR
b) Gas lines ✓	2/1/18	JR
c) Power lines (including those for landscape/yard lighting, pool and spa lines, and "out building" lines) ✓	2/1/18	JR
d) Irrigation lines	—	—
e) Communication lines (cable, telephone, Internet) ✓	2/1/18	JR
f) Propane tank lines	—	—
10. The proposed excavation sites have been reviewed by the appropriate stakeholders (e.g., owner, tenant, driller, excavator) and the Trihydro project manager.	2/1/18	JR
11. Proposed excavation sites have been visually inspected, and available plans and aerial photos have been reviewed for evidence of potential utilities.	2/1/18	JR
12. A scaled site plan showing the proposed excavation sites relative to subsurface utilities has been prepared and is available for stakeholder/Management review.	—	—
13. The basis for each buried utility line's location and the accuracy of the data defining the utility location are documented on the site plan.	—	—
14. The proposed excavation sites are at least 5 feet from subsurface utilities shown on the building plans.	—	—
15. The proposed excavation sites are at least 5 feet from subsurface utilities shown on public right-of-way / street-improvement plans. [Note: Work with utility companies to determine if they require a representative present during excavation activities.]	—	—
16. The proposed excavation sites are at least 7 feet from the pad surrounding underground storage tanks (USTs) shown on the building plans.	—	—
17. The utility-locate ticket number is available on site.	2/1/18	JR
18. A traffic-control plan has been prepared if appropriate. Note: If the project area encompasses a public street or right of way, the local and/or state authority must approve the traffic-control plan before fieldwork begins.	—	—
19. Arrangements have been made to contact the appropriate personnel if utility-line repairs are needed. (Who must be contacted if a line is unexpectedly damaged?)	2/1/18	JR
20. Contact information is in place and readily available with the driller, excavator, and other project stakeholders.	2/1/18	JR
21. The client and other relevant stakeholders (if any) have been notified of the excavation planning/pre-planning steps and results.	2/1/18	JR
22. A detailed work scope was developed by the project team and reviewed by the Project Director and Contracting Team.	—	✓
Project Director (excavation-site planning tasks):		

Excavation, Drilling, and Utility-Locating Checklist

Smoke Friendly

Task	Date	Initials
7. Pothole excavations have been visually checked with a flashlight by the excavation contractor, Trihydro project manager, or her/his designee.		
8. Utilities adjacent to the excavation or that cross the excavation have been daylighted using "minimally intrusive excavation methods."		
9. The areal extent of the excavation-clearance pothole has been verified to extend at least 120% beyond the outside diameter of the largest-diameter down-hole tool to be used in the borehole, or at least 2 feet on each side of daylighted/exposed lines, whichever is greater.		
10. If vacuum excavation (e.g., air knife, air vac, hydro-vac) is not available to daylight utility lines, verify that the non-conductive probe method was used as follows: Scratch the ground no more than 10 inches deep above the utility and then probe the scratched area. If the utility isn't found in the scratched area, repeat the first step until the utility is located. Once the utility is found, its depth must be continually verified with the probe until 2 feet of soil remain above the utility. Carefully hand dig the remaining overburden to expose the utility.		
11. The soil encountered in the excavation-clearance pothole has been verified to be free of bedding material (e.g., clean gravel, clean sand, aggregate base [gravelly sand with ~10% fines], or other non-native-looking material) that could indicate the presence of a previously installed utility line.		
12. Excavation work within 2 feet of an underground utility was "hand dug."		
13. Once the utility lines were exposed and the excavations were safe to enter, the exposed lines (including their protective coating) was examined for damage.		
14. The condition of each utility line exposed during daylighting was documented, and the documentation was forwarded to the Trihydro project manager to place in the project file.		
15. If a utility line was damaged in any way, it was reported to the utility owner and Trihydro project manager and documented in the project file.		
16. Damage to a utility line was documented and repaired before it was reburied. The utility owner signed off on the repairs.		
17. Employees entering the excavation followed the procedures described in the Trihydro "Trenching and Excavation Program" and used the Trihydro "Daily Excavation/Trench Inspection Report" to document excavation condition.		
18. The location of daylighted utilities was documented and photographed after daylighting was completed and before the pothole excavation was backfilled.		
19. Locations for hand digging within the "tolerance zone" were noted.		
Project Director (daylighting/potholing tasks):		
E. Excavation (including drilling):		
1. The appropriate permits have been obtained for the work (e.g., hot-work permits, entry permits).	—	—
2. The utility-owner and/or agency representatives that requested to be on site during excavation work are present. (Trihydro Utility Locate Acknowledgement Form)	—	—
3. A safety kickoff meeting was conducted with the excavation contractor to review roles/responsibilities, work activities, anticipated hazards, this checklist, and emergency-response procedures before starting excavation work the site. The safety kickoff meeting was documented in the project file.	2/1/18	JR
4. A daily tailgate safety meeting was conducted and documented in the project file. Verify weather conditions, safety hazards, PPE requirements, job duties, communication, hand signals, etc.	2/1/18	JR
5. JSAs covering the work to be done are in place and have been reviewed, "marked up" where appropriate, and acknowledged by the excavation project-team members.	2/1/18	JR
6. Site workers have been reminded to look for hazardous conditions, processes, and activities, and that they are authorized to stop work if they see an unsafe condition.	2/1/18	JR
7. The emergency-response plan has been reviewed by all excavation project-team members (e.g., contact numbers, evacuation muster points, hospital routes).	2/1/18	JR
8. The excavation contractor has checked the excavation sites relative to overhead utilities, subsurface-utility locates, and adjacent surface structures.	2/1/18	JR
9. The excavation contractor has acknowledged the potential location of each subsurface utility marked in the excavation areas.	2/1/18	JR
10. Proper traffic control and exclusion zones have been established.	—	—
11. The excavation equipment (e.g., drill rig, backhoe) has been inspected for proper operation and condition.	2/1/18	JR
12. Emergency equipment (fire extinguisher, first aid kit, emergency shut-off switch, etc.) has been checked, is readily available, and is in working order.	2/1/18	JR
13. Excavation project-team members are wearing appropriate PPE per the Trihydro HASP and client/site-specific requirements.	2/1/18	JR
14. Power in the excavation area has been de-energized, if possible. If power cannot be de-energized, the excavation contractor was advised of the hazard.	2/1/18	JR

Department of Environmental Quality
Hazardous Waste Site Cleanup Bureau P.O. Box 200901 Helena MT 59620-0901 (406) 841-5000

COMMERCIAL / INDUSTRIAL BUILDING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 2/1/18 Survey / questionnaire completed by: S. Trahan

Rance footwear

1. Contact Name: Ted Zebelle
   Address: 1246 Central City: Billings State: MT Zip: 59102
   Phone 1: 406 248 9288 Phone 2: _____ Cell Phone: _____

2. What is the best time to call to speak with you? 8-8

3. Are you the Owner ☐, Renter ☐, Other ☒ (please specify) Manager of this Building/Structure? If you are not the owner, please provide owner contact information
   Owner Name: _____
   Address: _____ City: _____ State: _____ Zip: _____
   Phone 1: _____ Phone 2: _____ Cell Phone: _____

4. Total number of occupants/persons at this location? 3
   Number of Children 0 Ages ~~78+~~ (21, 36, 41)

5. How long have you occupied this location? unknown, at least 5 yrs.
   Days per week the building is occupied 7 Hours per day the building is occupied 12
   Describe typical shifts and types of labor (office, light labor, heavy labor, etc.) 8 hours 12 ~ 8:15

General Building / Structure Description

6. Type of Building/Structure (check only one): Single Business ☐, Multiple Businesses ☒,
   Other Strip mall

7. Building/Structure Description:
   Number of floors: 1 Area /square footage of main or ground floor: _____ square feet
   Basement ☐ Area /square footage of Basement: _____ square feet
   Crawlspace ☐ Area /square footage of Crawlspace: _____ square feet
   Partial crawlspace/basement ☐ % of each _____
   Slab on grade ☒ Area /square footage of Slab on grade: _____ square feet
   Other ☐ _____

8. Age of Building/Structure: _____ years, Not sure/Unknown ☒

9. General Above-Ground Building/Structure construction (check all that apply):
   Wood ☐, Brick ☐, Concrete ☐, Cement Block ☒, Other ☐ _____

10. Foundation Construction (check all that apply):
Concrete Slab ☒
Fieldstone ☐
Concrete Block ☐
Elevated Above Ground/Grade ☐
Other ☐ _____

11. Do you have a Private Well ☐ or Cistern ☐?
If yes, please describe location, use, and current condition _____
_____
_____

12. Do you have a Septic System? Yes ☐ No ☒ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your Building? (pond, ditch, etc.) Yes ☐ No ☒

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☐ or Unfinished ☐?

15. If finished, how many rooms are in the basement?_____
What are rooms used for? Office ☐, Shop ☐, Storage ☐,
Other_____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐

17. Is the basement floor (check all that apply) Concrete ☐, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☐, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

Describe the moisture problem _____
_____
_____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐, Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe _____

22. Are any of the following used or stored in the basement (check all that apply):

Paint ☐, Paint Stripper/Remover ☐, Paint Thinner ☐, Metal Degreaser/Cleaner ☐, Gasoline ☐, Diesel Fuel ☐, Solvents ☐, Glue ☐, Laundry Spot Removers ☐, Drain Cleaners ☐, Pesticides ☐,
Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.) ☐,
Other products with/containing Volatile Organic Compounds, describe: _____

23. Has the Building / structure recently (within the last six months) had any painting or remodeling?
Yes ☐ No ☑
If yes, specify what was done, where in the Building, and what month:

24. Has new carpeting been installed in the Building / Structure within the last year? Yes ☑ No ☐
If yes, when and where? Main floor is tile, not carpet

25. Do any occupants / employees regularly conduct or work in the beauty / hair-dressing business?
Yes, work at a beauty / hair-dressing business ☐
Yes, store supplies for beauty / hair-dressing business ☐ Distance to sample point: _____
Yes, building contains beauty / hair-dressing business ☐ Distance to sample point: _____
Yes, building is near beauty / hair-dressing business ☐ Distance to sample point: _____
No ☑

26. Do any occupants / employees / anyone regularly use or work or conduct a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
Yes, building contains or is near dry cleaning service ☐ Distance to sample point: _____
No ☑

27. Do any occupants / employees / anyone in the Building / structure use solvents at work?
Yes ☐ If yes, how many persons?
No ☑ If no, go to question ~~28~~ soap & water.

28. If yes for question 26, are the work clothes washed at Building? Yes ☐ No ☑

29. Does Building / Structure contain a washer/dryer? Yes ☐ No ☑
Where are they located?
Basement ☐
Upstairs ☐
Ground floor ☐
Garage ☐
Other, please specify ☐ _____

30. If Building / Structure contains a dryer, is it vented to the outdoors? Yes ☐ No ☐ NA

31. What type(s) of Building heating do you have (check all that apply)
Fuel type: Gas ☐, Oil ☐, Electric ☑, Wood ☐, Coal ☐,
Other ☐ Baseboard electric, central air

Heat conveyance system: Forced Hot Air ☐ Forced Hot Water ☐ Steam ☐
Radiant Floor Heat ☐ Wood Stove ☐ Coal Furnace ☐ Fireplace ☐
Other ☑ _____

32. Does Building / Structure have (or had in the past) a storage tank for storage of Gasoline ☐, N/A -
Fuel Oil ☐, Propane ☐
If yes, where is/was it located? _____

How is/was the tank filled? _____

Is there staining near the tank? Yes ☐ No ☐

33. Does Building / Structure have air conditioning? Yes ☒ No ☐
Central Air Conditioning ☒
Window Air Conditioning Unit(s) ☐
Other (please specify) _____

34. Does Building / Structure have any: Room Fans ☐, Ceiling Fans ☐, Attic Fan ☐ extractor fan non functional

35. Does Building / Structure ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☒

36. Has Building / Structure had termite or other pesticide treatment? Yes ☒ No ☐ Unknown ☐
If yes, please specify type of pest controlled Ant killer
And approximate date of service Summers.

37. Water heater type: Gas ☐, Electric ☒, by Furnace ☐,
Other (please describe) _____

38. Water heater location: Basement ☐, Upstairs ☒, Ground Floor ☐, Attic ☐,
Other (please specify) _____

39. Does Building / Structure have any cooking appliances? Electric ☐, Gas ☐
Other (please describe) _____

40. Is there a stove exhaust hood present? Yes ☐ No ☒
Does it vent to the outdoors? Yes ☐ No ☐ N/A -

41. Smoking in Building / Structure:
None ☒, Rare (only guests) ☐, Moderate (occupants, light smokers) ☐, Vapes, 1 employee.
Heavy (at least one heavy smoker in Building / Structure) ☐

42. If yes to question 41, what do they smoke?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐ vape

43. Does Building / Structure regularly contain/use air fresheners? Yes ☒ No ☐ Incense.

44. Does anyone in the Building have indoor Building hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____

45. General Building / Structure use of industrial / office / consumer products (circle as appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use					
Solvents	Never	Hardly ever	Occasionally	Regularly	Often	
Aerosol Deodorizers	Never	Hardly ever	Occasionally	Regularly	Often	
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often	Air freshener
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often	Hand Sanitizer
Window Cleaners	Never	Hardly ever	Occasionally	Regularly	Often	windex
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often	
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often	
Paint	Never	Hardly ever	Occasionally	Regularly	Often	
Petroleum Fuel	Never	Hardly ever	Occasionally	Regularly	Often	Butane.

46. Please check weekly Building / Structure maintenance, janitorial, and cleaning practices:

Dusting ☒

Dry Sweeping ☒

Vacuuming ☒

Polishing (furniture, etc.) ☒ windex glass carpet

Washing/Waxing Floors ☒

Other (describe) ☐ _____

47. Other comments including items / subjects not covered in this questionnaire yet an issue or concern for the Building / Structure:

Smoker paraphernalia,

48. **Chemical Inventory/Summary**

Chemical/Chemical Product (consumer name)	Amount present in Building / Structure
a) Soap	
b) Windex	
c) Raid	
d) Pine sol	
e) Resolve	
f) Goo Gone	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

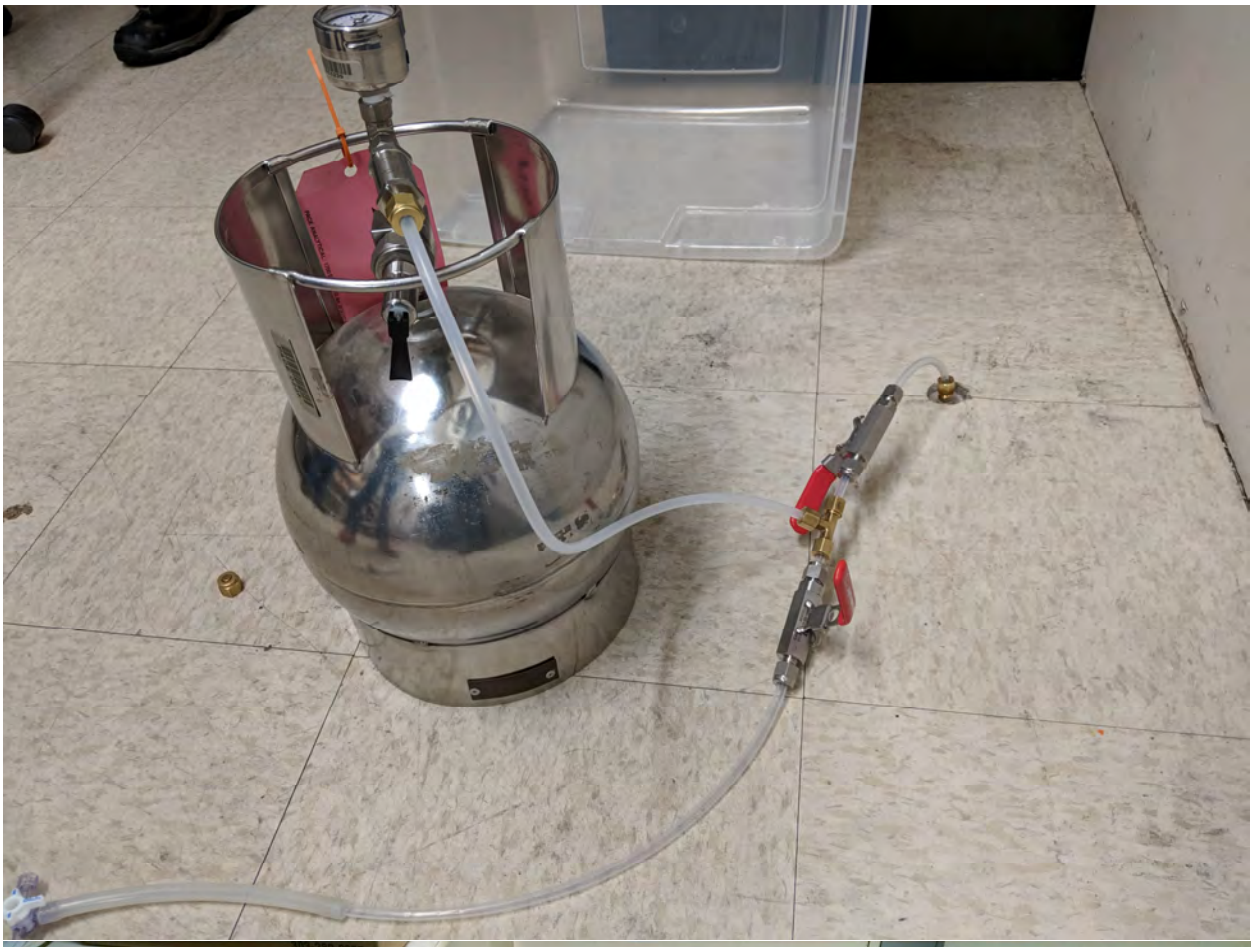
VI Sample: 1246 Central Ave_Subslab

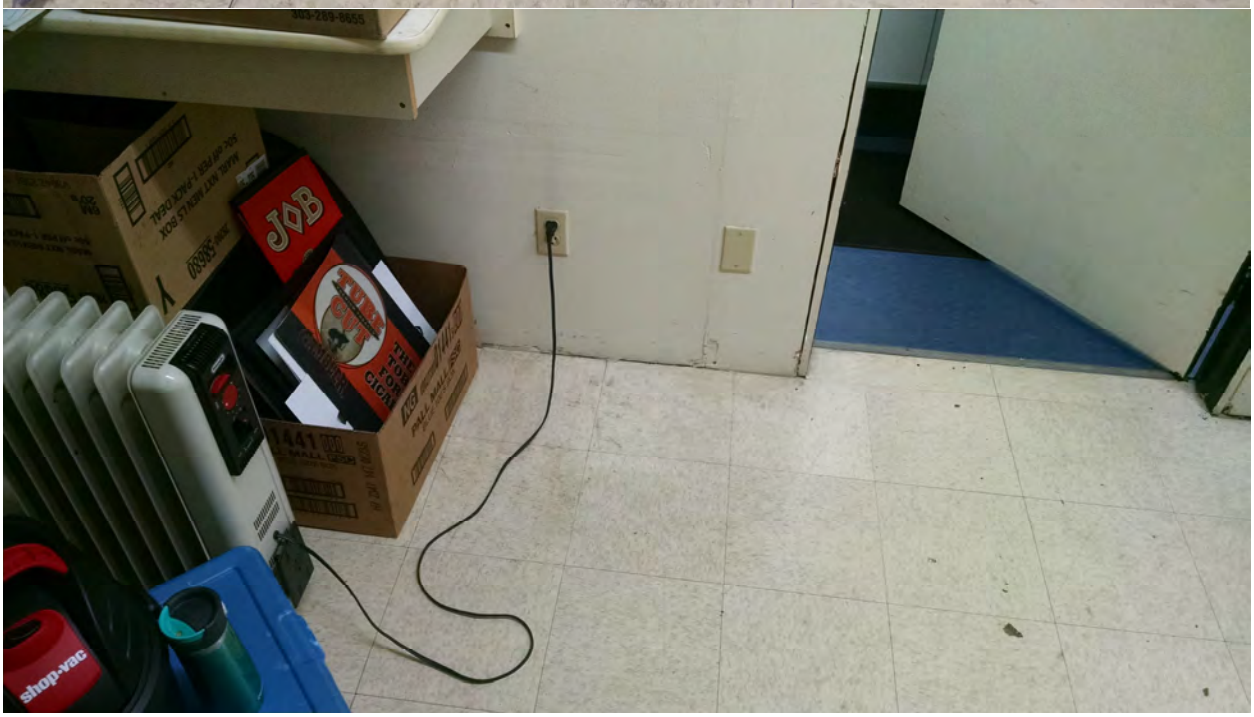
VI Sample: 1246 Central Ave_Subslab

VI Sample: 1246 Central Ave_Subslab

VI Sample: 1246 Central Ave_Subslab

VI Sample: 1246 Central Ave_Subslab

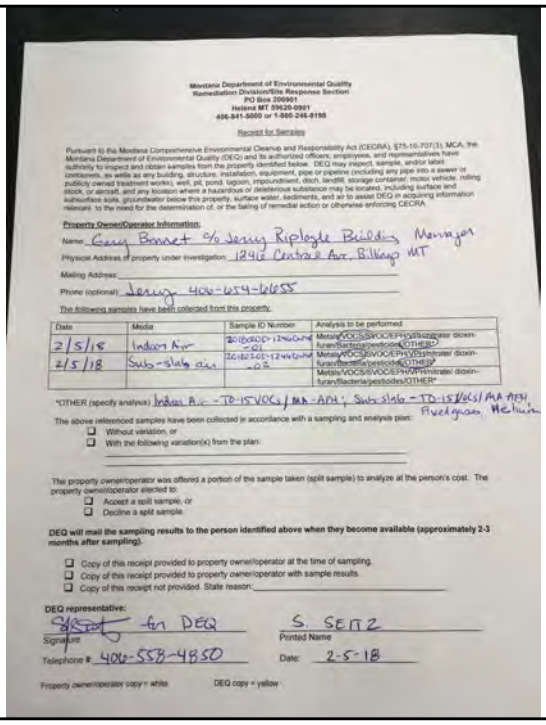




1246 Central Ave water heater

ADDRESS: 1246 CENTRAL AVE

NOTES:
INDOOR AIR MAIN FLOOR SAMPLE LOCATION



Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Gary Barnett c/o Jerry Riplogle Building Manager

Physical Address of property under investigation: 1246 Central Ave. Billings MT

Mailing Address:

Phone (optional): Jerry 406-654-6655

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/5/18	Indoor Air	2018XXCD-1246CAN-01	Metals/VOCs/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/5/18	Sub-slab air	2018XXCD-1246CAN-02	Metals/VOCs/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
			Metals/VOCs/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*

*OTHER (specify analysis): Indoor Air - TO-15 VOCs / MA-APH ; Sub-slab - TO-15 VOCs / MA-APH, Fixed gases, Helium

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☐ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☐ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

Signature: for DEQ

Printed Name: S. SEITZ

Telephone #: 406-558-4850

Date: 2-5-18

Property owner/operator copy = white DEQ copy = yellow

ADDRESS: 1246 CENTRAL AVE

NOTES:
SAMPLE RECEIPT

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Joe Sherman

Physical Address of property under investigation: 1307 Concord Dr. Billings MT 59101

Mailing Address: 1307 Concord Dr. Billings MT 59101

Phone (optional):

The following samples have been collected from this property:

Date	Media		Sample ID Number	Analysis to be performed
3/5/18	Air	20180305-1307	CONCORDDR-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15, APH
3/5/18	Air	20180305-1307	CONCORDDR-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15, APH
3/5/18	Air	20180305-A	(Duplicate of 02 above)	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15, APH

*OTHER (specify analysis)

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☒ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.
- ☒ N/A

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☒ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

for DEQ — Syris Trahan

Signature — Printed Name

Telephone #: 307-745-7474 — Date: 3/14/18

Property owner/operator copy = white — DEQ copy = yellow

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	1307 Concord Dr.	Start Weather:	Sunny, 9 mph west
		Start Outdoor Air Temp:	35°F
Project Name:	BPCE	Start Atmospheric Pressure:	30.17"
Sample Location:	1307 Concord Dr.		
Date:	3/5/18	End Weather:	Pt Cloudy
Field Personnel:	BS, ST	End Outdoor Air Temp:	26° F
Recorded by:	BS	End Atmospheric Pressure:	30.42"

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
3/5/18	1000	3/6/18	0958	20180305-1307ConcordDr-01	1212	0418		26.5	4		
3/5/18	1005	3/6/18	0954	20180305-1307ConcordDr-02/3501	1434			28	4		
3/5/18	1005	3/6/18	0954	20180305-A	0592	0102		25	16		

Comments:

01- Crawl Space

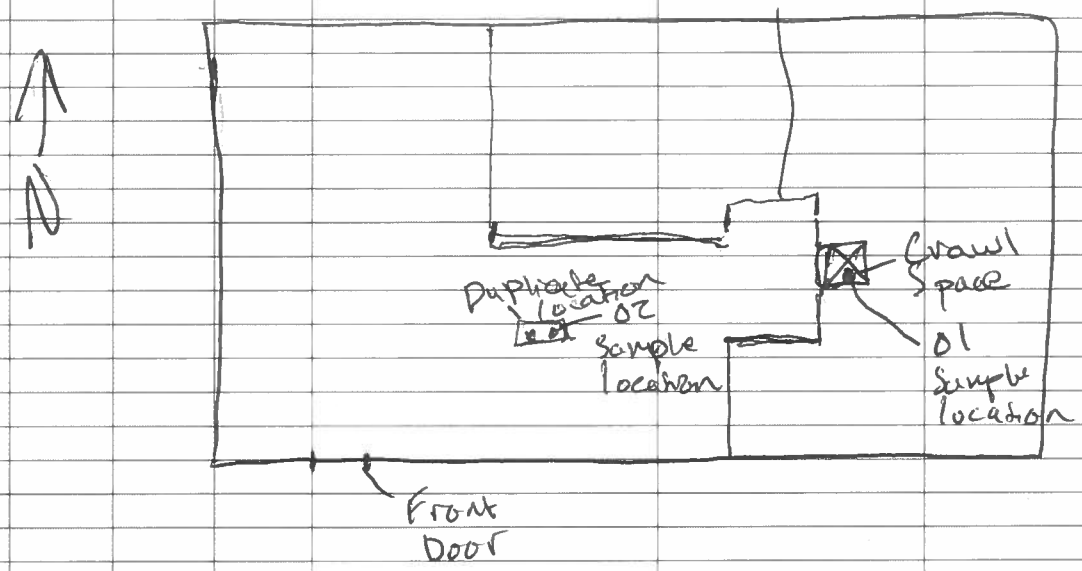
02- Main

A- Main

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

Location Sketch:



OSWER No. 9345.0-35

Completed by S. Trahan after sampling via phone

OCCUPIED DWELLING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 3/6/18

1. Name: Joe Sherman / Frank

   Address: 307 Concord Drive.

   Home Phone: _____ Work Phone: _____

2. What is the best time to call to speak with you? _____ At: Work ☐ or Home ☐ ?

3. Are you the Owner ☑, Renter ☐, Other ☐ (please specify) _____ of this Home/Structure? If you are not the owner, please provide owner contact information:

4. Total number of occupants/persons at this location? 1
   Number of Children _____ Ages _____

5. How long have you lived at this location? 6 years

General Home Description

6. Type of Home/Structure (check only one): Single Family Home ☑, Duplex ☐, Apartment ☐, Townhouse ☐ Other _____

7. Home/Structure Description:
   Number of floors: 1
   Basement ☐
   Crawlspace ☑
   Partial Crawlspace/Basement ☐ % of each _____
   Slab On Grade ☐
   Other ☐ _____

8. Age of Home/Structure: 64 years, Not Sure/Unknown ☐

9. General Above-Ground Home/Structure construction (check all that apply):
   Wood ☑, Brick ☐, Concrete ☐, Cement block ☐, Other ☐ _____
   Garage: ☐ Attached ☑ Detached ☐ None

10. Foundation Construction (check all that apply):
    Concrete Slab ☑
    Fieldstone ☐
    Concrete Block ☐
    Elevated Above Ground/Grade ☐
    Other ☐ _____

11. Do you have Private Well ☐ or Cistern ☐? Is there a GWIC number for your well? _____
If yes, please describe location, use, and current condition _____

12. Do you have a Septic System? Yes ☐ No ☑ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your home? (pond, ditch, etc.) Yes ☐ No ☑

Basement Description (please check all boxes that apply): Crawlspace only.

14. Is the basement Finished ☐ Unfinished ☐ Partially Finished ☐ Partial Crawlspace ☐?

15. If finished, how many rooms are in the basement? _____
What are rooms used for? Bedrooms ☐ Family Room ☐ Storage ☐
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐

17. Is the basement floor (check all that apply) Concrete ☐, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☐, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

Describe the moisture problem _____

20. Does the basement ever flood?

Yes, frequently (3 or more times/year) ☐

Yes, occasionally (1-2 times/year) ☐

Yes, rarely (less that 1 time/year) ☐

No ☐

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐,
Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe _____

22. Are any of the following used or stored in the basement (check all that apply):
- ☐ Paint
- ☐ Solvents (degreasers, paint thinner, etc.)
- ☐ Fuels/Oils (gasoline, diesel, used oil)
- ☐ Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- ☐ Pesticides

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes ☐ No ☑
If yes, specify what was done, where in the home, and what month:

24. Have you installed new carpeting in your home within the last year? Yes ☐ No ☑
If yes, when and where? _____

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
No ☑

26. Does anyone in your home use solvents at work?
Yes ☐ If yes, how many persons?
No ☑ If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes ☐ No ☐

28. Where is the washer/dryer located?
Basement ☐
Upstairs Utility Room ☑
Kitchen ☐
Garage ☐
Use a Laundromat ☐
Other, please specify ☐ _____

29. If you have a dryer, is it vented to the outdoors? Yes ☑ No ☐

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas ☑, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system:
- Forced Hot Air ☑
- Forced Hot Water ☐
- Steam ☐
- Radiant Floor Heat ☐
- Wood Stove ☐
- Coal Furnace ☐
- Fireplace ☐
- Other ☐ _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? _____

How is/was the tank filled? _____

Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☐ No ☐
Central Air Conditioning ☑
Window Air Conditioning Unit(s) ☐
Other (please specify) _____

33. Do you use any of the following? Room Fans ☐, Ceiling Fans ☐, Attic Fan ☐

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐

35. Has your home had termite or other pesticide treatment? Yes ☐ No ☑ Unknown ☐
If yes, please specify type of pest controlled _____
And approximate date of service _____

36. Water heater type: Gas ☑, Electric ☐, by Furnace ☐,
Other (please describe) _____

37. Water heater location: Basement ☐, Upstairs Utility Room ☑, Garage ☐,
Other (please specify) _____

38. What type of cooking appliance do you have? Electric ☐, Gas ☑
Other (please describe) _____

39. Is there a stove exhaust hood present? Yes ☑ No ☐
Does it vent to the outdoors? Yes ☐ No ☑

40. Smoking in Home:
None ☑, Rare (only guests) ☐, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐

41. If yes to question 40, what is smoked?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☐ No ☑

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation: _____

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

45. Please check weekly household cleaning practices:

Dusting ☐

Dry Sweeping ☐

Vacuuming ☐

Polishing (furniture, etc.) ☐

Washing/Waxing Floors ☐

Other (describe) ☐ _____

46. Other comments:

_____

_____

_____

_____

_____

_____

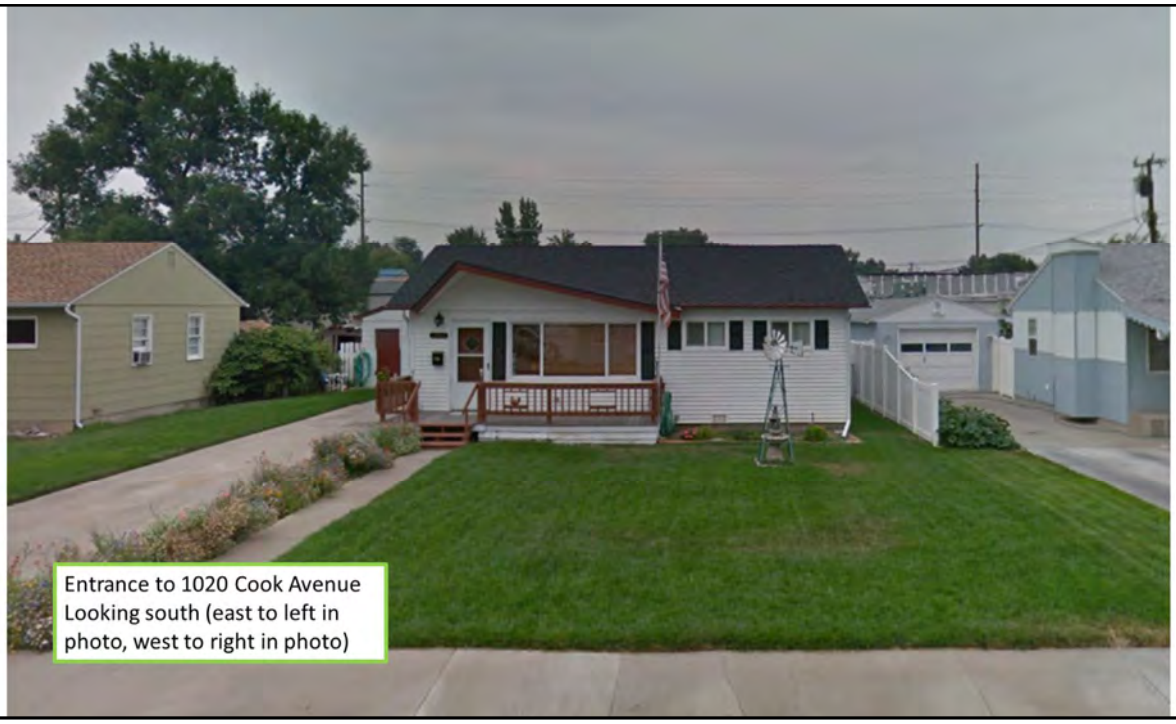
_____

_____

_____

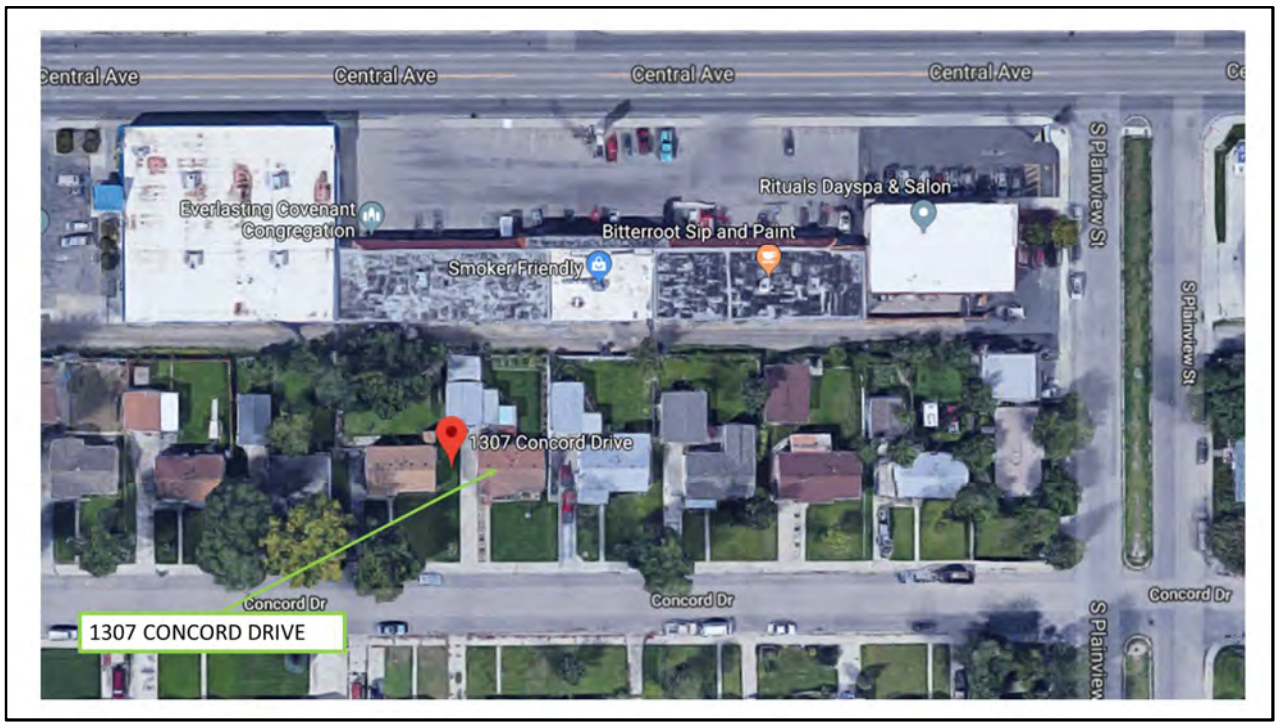
47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	



ADDRESS: 1307 CONCORD DR, BILLINGS MONTANA

NOTES: OUTSIDE OF STRUCTURE – RESIDENTIAL VI SAMPLE STRUCTURE (SOUTH OF FORMER CENTRAL AVENUE LAUNDRY)



ADDRESS: 1307 CONCORD DR, BILLINGS MONTANA

NOTES: OUTSIDE OF STRUCTURE – RESIDENTIAL VI SAMPLE STRUCTURE (SOUTH OF FORMER CENTRAL AVENUE LAUNDRY)

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Amy Ensign (HRDC)

Physical Address of property under investigation: 3119 Montana Ave, Billings MT

Mailing Address: —

Phone (optional): —

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/12/18	Indoor Air Basement	20180212-3119Montana-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/12/18	Indoor Air Main	20180212-3119Montana-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*
2/13/18	Sub slab vapor *	20180213-3119Montana-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER*

*OTHER (specify analysis) Indoor Air: VOCs (TO-15) Petroleum (APH)
Sub slab vapor: VOCs, APH, Fixed gases, Helium

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☑ Without variation, or
- ☐ With the following variation(s) from the plan:

* Duplicate 20180213-A

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample. NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☑ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason:

DEQ representative:

Signature: on behalf DEQ

Printed Name: S. SEITZ (TRI HYDRO)

Telephone #: 406-558-4850

Date: 2/13/18

Property owner/operator copy = white DEQ copy = yellow

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	3119 Montana	Start Weather:	Sunny Calm NNE 5mph
		Start Outdoor Air Temp:	20°F
Project Name:	BPCIE	Start Atmospheric Pressure:	30.2 in Hg
Sample Location:	Basement Laundry Room & Main Floor		
Date:	2/12/18	End Weather:	Sunny Moderate SW breeze
Field Personnel:	ST, MU	End Outdoor Air Temp:	29°F
Recorded by:	ST	End Atmospheric Pressure:	30.1 in Hg

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
2/12/18	1057	2/13/18	1113	20180212-3119MONTANA01	3463	0249		-27.0	-1.0	65°F	65°F
2/12/18	1059	2/13/18	1113	2018 02 12- 3119 MONTANA -02	2381	0030		-25	-1.5	70°F	70°F

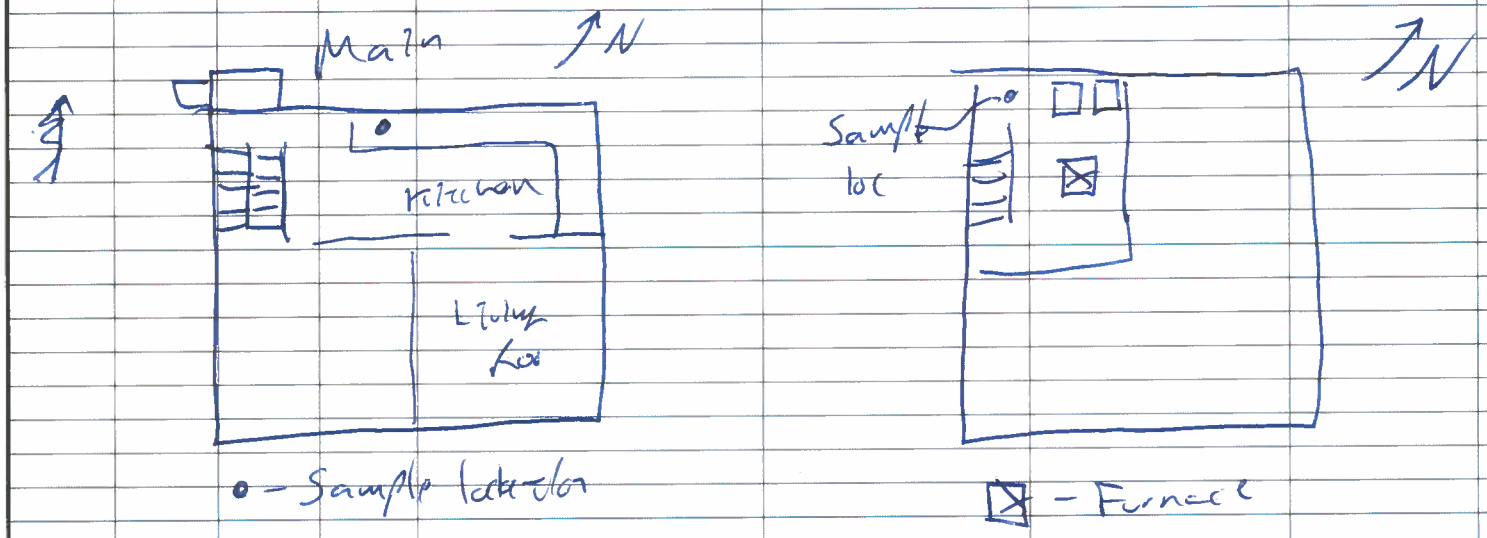
Comments:

01 - Basement Laundry Room
02 - Main Floor Kitchen

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

Location Sketch:



Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	3119 Montana, Billings		
Project Name:	MT DEQ Billings PCE	PID (model/serial #):	RAE ppb 3000 / 524-000778
Sample location:	Basement – Mechanical/Laundry Rm	Helium Detector (model/serial #):	Dielectric / 8628
Date:	2/13/18	Weather:	~~25~~ Sunny, Mod breeze SW
Field Personnel:	ST, MO, SJ	Air Temp:	29°F
Recorded by:	ST	Atmospheric Pressure:	30.3 inHg.

Slab Data

Surface/slab Type:	Concrete floor, concrete walls
Surface/slab Thickness (inches):	4"
Slab/subsurface substrate comments:	Cracked top ~1/2" of slab, other floor cracks
Depth of hole through the slab:	6"
Length of sampling train (feet):	4" bgs + 71" = 75" = 6.25' × 10 × 3 = 181.5 ml

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 181.5

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
2/13/18	1126	50	25.6	~~25.7~~ 26.2				
	1126	100	25.2	25.3				
	1127	150	24.0	24.5				
	1127	200	22.9	23.6				
	1128	250	22.0	22.5				

Conversion: 1.0% = 10,000 ppm

At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

↓	1129	300	21.0	21.8	4/000 ppm	He in sample train.		

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
2/13/18	1135	1217	20180213-3119MONTA-01	NA 3345	2815		-28	3.0
2/13/18	1135	1217	20180213-3119 MONTA A	3444	1520		-28	3.0

Comments: Subslab sample port installed in area in front of furnace where concrete appears to be degraded.

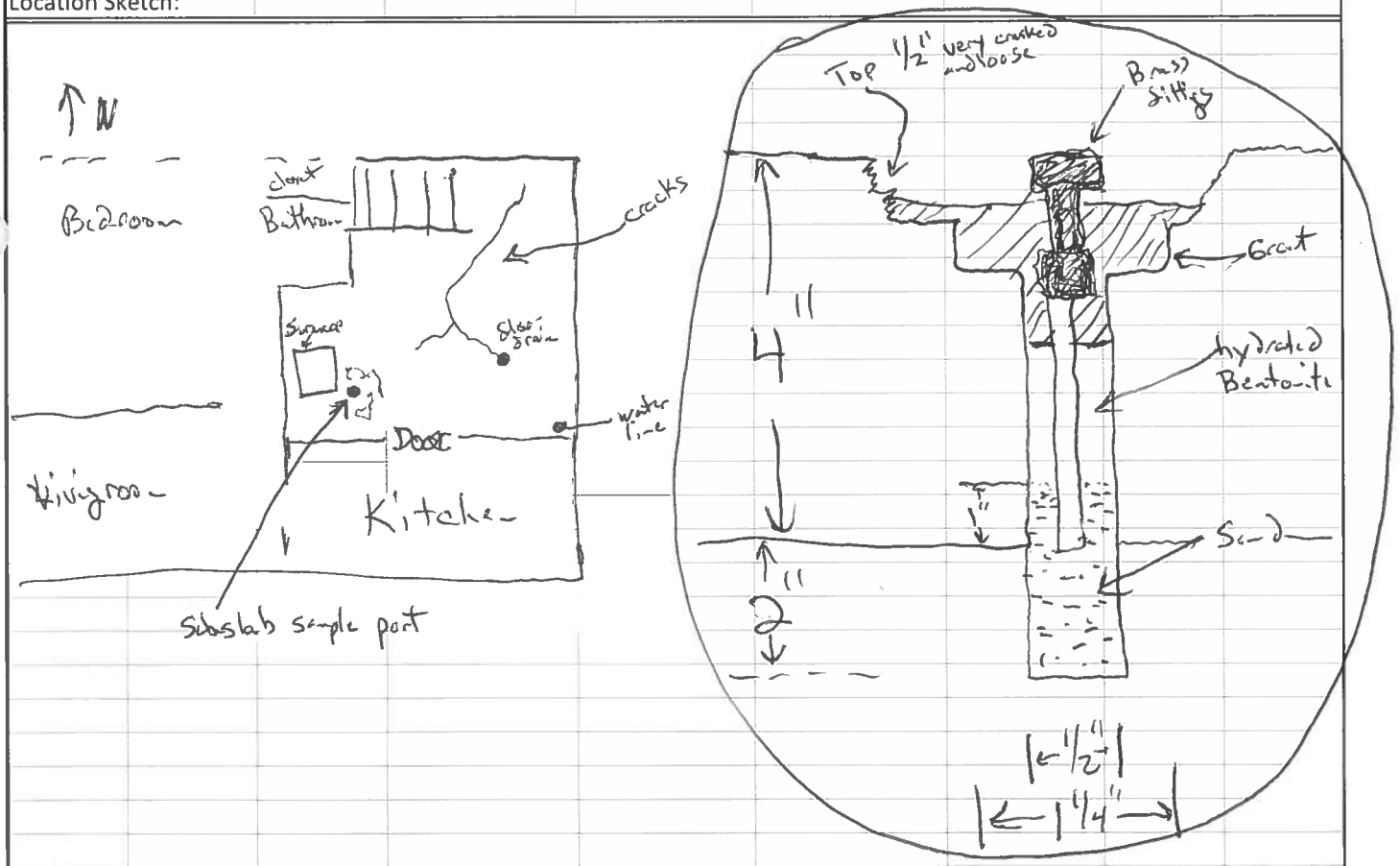
183 ppb ambient air in laundry room (average)
365 ppb peak in subslab.
CO, H_2S, LEL all 0, 21.0% O_2

Sub-Slab Soil Vapor Sampling Field Data Sheet

Project Name: MT DEQ Billing PCE
Sample Location/ ID: 3119 Montana Ave
Date:

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.

Location Sketch:



Department of Environmental Quality
Hazardous Waste Site Cleanup Bureau P.O. Box 200901 Helena MT 59620-0901 (406) 841-5000

3119

COMMERCIAL / INDUSTRIAL BUILDING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 2/12/18 Survey / questionnaire completed by: S. Seitz

1. Contact Name: Amy Ensign
   Address: 3119 Montana Ave City: Billings State: MT Zip: 59101
   Phone 1: 247-4788 Phone 2: _____ Cell Phone: _____

2. What is the best time to call to speak with you? —

3. Are you the Owner ☐, Renter ☐, Other ☐ (please specify) _____ of this Building/Structure? If you are not the owner, please provide owner contact information
   Owner Name: HRDC
   Address: _____ City: _____ State: _____ Zip: _____
   Phone 1: _____ Phone 2: _____ Cell Phone: _____

4. Total number of occupants/persons at this location? various
   Number of Children various Ages birth to 18

5. How long have you occupied this location? 10-15 years
   Days per week the building is occupied _____ Hours per day the building is occupied _____
   Describe typical shifts and types of labor (office, light labor, heavy labor, etc.) _____
   Home for families - temporary

General Building / Structure Description

6. Type of Building/Structure (check only one): Single Business ☑, Multiple Businesses ☐,
   Other _____

7. Building/Structure Description: including basement 11 units apartment
   Number of floors: 2 Area /square footage of main or ground floor: _____ square feet
   Basement ☑ Area /square footage of Basement: full square feet
   Crawlspace ☐ Area /square footage of Crawlspace: _____ square feet
   Partial crawlspace/basement ☐ % of each _____
   Slab on grade ☐ Area /square footage of Slab on grade: _____ square feet
   Other ☐ _____

8. Age of Building/Structure: _____ years, Not sure/Unknown ☐

9. General Above-Ground Building/Structure construction (check all that apply):
   Wood ☑, Brick ☐, Concrete ☐, Cement Block ☐, Other ☐ _____

10. Foundation Construction (check all that apply):
Concrete Slab ☒
Fieldstone ☐
Concrete Block ☐
Elevated Above Ground/Grade ☐
Other ☐ _____

11. Do you have a Private Well ☐ or Cistern ☐?
If yes, please describe location, use, and current condition _____

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____
When was the last time it was serviced? city water city sewer
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your Building? (pond, ditch, etc.) Yes ☐ No ☐

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☒ or Unfinished ☐?

15. If finished, how many rooms are in the basement? apartment
What are rooms used for? Office ☐, Shop ☐, Storage ☒,
Other living space & laundry

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐

17. Is the basement floor (check all that apply) Concrete ☒, Tile ☒, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☒, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐, Floor Drain ☒, Other Hole/Opening In Floor ☐
Describe Laundry room

22. Are any of the following used or stored in the basement (check all that apply):

Paint ☐, Paint Stripper/Remover ☐, Paint Thinner ☐, Metal Degreaser/Cleaner ☐, Gasoline ☐, Diesel Fuel ☐, Solvents ☐, Glue ☐, Laundry Spot Removers ☐, Drain Cleaners ☐, Pesticides ☐,
Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.) ☐,
Other products with/containing Volatile Organic Compounds, describe: _____

23. Has the Building / structure recently (within the last six months) had any painting or remodeling?
Yes ☐ No ☐
If yes, specify what was done, where in the Building, and what month:

24. Has new carpeting been installed in the Building / Structure within the last year? Yes ☐ No ☐
If yes, when and where? _____

25. Do any occupants / employees regularly conduct or work in the beauty / hair-dressing business?
Yes, work at a beauty / hair-dressing business ☐
Yes, store supplies for beauty / hair-dressing business ☐ Distance to sample point: _____
Yes, building contains beauty / hair-dressing business ☐ Distance to sample point: _____
Yes, building is near beauty / hair-dressing business ☐ Distance to sample point: _____
No ☒

26. Do any occupants / employees / anyone regularly use or work or conduct a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
Yes, building contains or is near dry cleaning service ☐ Distance to sample point: _____
No ☒

27. Do any occupants / employees / anyone in the Building / structure use solvents at work?
Yes ☐ If yes, how many persons?
No ☒ If no, go to question 28

28. If yes for question 26, are the work clothes washed at Building? Yes ☒ No ☐

29. Does Building / Structure contain a washer/dryer? Yes ☒ No ☐ washer dryer no solvent use
Where are they located?
Basement ☒
Upstairs ☐
Ground floor ☐
Garage ☐
Other, please specify ☐ _____

30. If Building / Structure contains a dryer, is it vented to the outdoors? Yes ☒ No ☐

31. What type(s) of Building heating do you have (check all that apply)
Fuel type: Gas ☐, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ _____

Heat conveyance system: Forced Hot Air ☐ Forced Hot Water ☐ Steam ☐
Radiant Floor Heat ☐ Wood Stove ☐ Coal Furnace ☐ Fireplace ☐
Other ☐ _____

32. Does Building / Structure have (or had in the past) a storage tank for storage of Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? _____
_____
How is/was the tank filled? _____
_____
Is there staining near the tank? Yes ☐ No ☐

33. Does Building / Structure have air conditioning? Yes ☐ No ☐
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☐
Other (please specify) _____

34. Does Building / Structure have any: Room Fans ☐, Ceiling Fans ☐, Attic Fan ☐

35. Does Building / Structure ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐

36. Has Building / Structure had termite or other pesticide treatment? Yes ☐ No ☐ Unknown ☐
If yes, please specify type of pest controlled _____
And approximate date of service _____

37. Water heater type: Gas ☐, Electric ☐, by Furnace ☐,
Other (please describe)_____

38. Water heater location: Basement ☐, Upstairs ☐, Ground Floor ☐, Attic ☐,
Other (please specify) _____

39. Does Building / Structure have any cooking appliances? Electric ☒, Gas ☐
Other (please describe) _____

40. Is there a stove exhaust hood present? Yes ☐ No ☐
Does it vent to the outdoors? Yes ☐ No ☐

41. Smoking in Building / Structure:
None ☒, Rare (only guests) ☐, Moderate (occupants, light smokers) ☐,
Heavy (at least one heavy smoker in Building / Structure) ☐

42. If yes to question 41, what do they smoke?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐

43. Does Building / Structure regularly contain/use air fresheners? Yes ☐ No ☒

44. Does anyone in the Building have indoor Building hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____
_____
_____

45. General Building / Structure use of industrial / office / consumer products (circle as appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol Deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window Cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuel	Never	Hardly ever	Occasionally	Regularly	Often

46. Please check weekly Building / Structure maintenance, janitorial, and cleaning practices:

Dusting ☐

Dry Sweeping ☐

Vacuuming ☐

Polishing (furniture, etc.) ☐

Washing/Waxing Floors ☐

Other (describe) ☐ _____

47. Other comments including items / subjects not covered in this questionnaire yet an issue or concern for the Building / Structure:

_____

_____

_____

_____

_____

_____

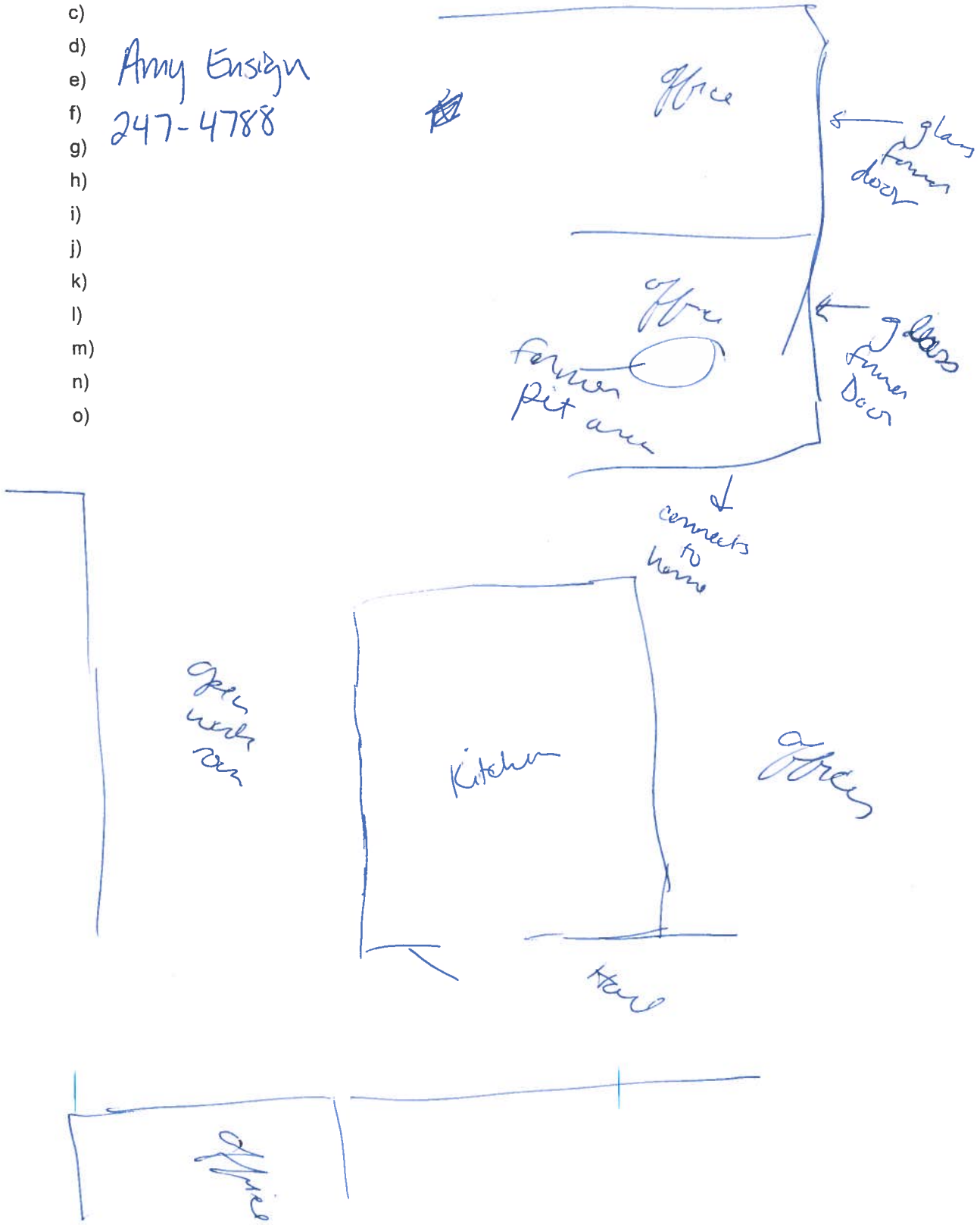
_____

_____

_____

48. **Chemical Inventory/Summary**

Chemical/Chemical Product (consumer name)	Amount present in Building / Structure
a)	
b)	
c)	
d)	
e)	Amy Ensign
f)	247-4788
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	



Excavation, Drilling, and Utility-Locating Checklist 3119 Montana

3119 Montana

Task	Date	Initials
A. Excavation-site planning:		
1. The local One Call regulations have been checked for local utility-notification requirements (e.g., 48 hours vs. 72 hours).	02/08/18	JR
2. Per the local One Call regulations, list the responsible party (generally the excavation/drilling contractor) for requesting and verifying completion of utility locates below: Trihydro	02/08/18	JR
3. The property owner and/or business owner has been notified of the excavation schedule.	02/05/18	JR
4. Each proposed excavation site or "area of interest" has been delineated for utility-line locators using white spray paint and/or wooden stakes/lathes with white flagging.	—	—
5. Public-utility locates have been requested by calling One Call at least 48 hours (72 hours in some states) before work is scheduled to begin, and the request includes depths, as available.	02/04/18	JR
6. Each utility company has been notified of the excavation schedule and invited to review the proposed excavation sites.	02/04/18	JR
7. On-site meetings have been scheduled with the appropriate representatives of critical utility facilities (e.g., gas/oil pipelines, high-voltage cables, fiber-optic lines).	—	—
8. Private-utility locates—including fuel lines; tanks; and water, sewer, gas, electricity, and other utilities—have been requested.	—	—
9. The property owner was contacted to determine if he/she knows of privately owned subsurface facilities within 5 feet of the proposed excavation sites. (Review locations with the manager/owner.) Examples of privately owned facilities that are not commonly marked on private property include:	02/08/18	JR
a) Water and sewer laterals — water east sewer ~~south~~ north	02/08/18	JR
b) Gas lines — ~~south~~ north	02/08/18	JR
c) Power lines (including those for landscape/yard lighting, pool and spa lines, and "out building" lines) — ~~south~~ north	02/08/18	JR
d) Irrigation lines	—	—
e) Communication lines (cable, telephone, Internet) — ~~south~~ north	02/08/18	JR
f) Propane tank lines	—	—
10. The proposed excavation sites have been reviewed by the appropriate stakeholders (e.g., owner, tenant, driller, excavator) and the Trihydro project manager.	02/08/18	JR
11. Proposed excavation sites have been visually inspected, and available plans and aerial photos have been reviewed for evidence of potential utilities.	—	—
12. A scaled site plan showing the proposed excavation sites relative to subsurface utilities has been prepared and is available for stakeholder/Management review.	—	—
13. The basis for each buried utility line's location and the accuracy of the data defining the utility location are documented on the site plan.	—	—
14. The proposed excavation sites are at least 5 feet from subsurface utilities shown on the building plans.	—	—
15. The proposed excavation sites are at least 5 feet from subsurface utilities shown on public right-of-way / street-improvement plans. [Note: Work with utility companies to determine if they require a representative present during excavation activities.]	—	—
16. The proposed excavation sites are at least 7 feet from the pad surrounding underground storage tanks (USTs) shown on the building plans.	—	—
17. The utility-locate ticket number is available on site.	02/08/18	JR
18. A traffic-control plan has been prepared if appropriate. Note: If the project area encompasses a public street or right of way, the local and/or state authority must approve the traffic-control plan before fieldwork begins.	—	—
19. Arrangements have been made to contact the appropriate personnel if utility-line repairs are needed. (Who must be contacted if a line is unexpectedly damaged?)	02/08/18	JR
20. Contact information is in place and readily available with the driller, excavator, and other project stakeholders.	02/08/18	JR
21. The client and other relevant stakeholders (if any) have been notified of the excavation planning/pre-planning steps and results.	—	—
22. A detailed work scope was developed by the project team and reviewed by the Project Director and Contracting Team.	—	—
Project Director (excavation-site planning tasks):		

Excavation, Drilling, and Utility-Locating Checklist

3/19 Montana

Task	Date	Initials
B. Utility-line marking:		
1. Electrical circuits are energized during utility-line marking for subsurface power lines (e.g., circuits on timers or light-sensing switches).	02/08/18	JR
2. Public-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	02/08/18	JR
3. Private-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	—	—
4. Verify that One Call locators marked their facilities in the designated excavation area or provided notification that they do not have any facilities near the proposed excavation sites.	02/08/18	JR
5. One Call was contacted to request a "refresh" if utility-locate markings are missing, difficult to see, or more than 14 days old (7 days in some states). "Refresh" markings must be performed by the original marking organization.	—	—
Project Director (utility-line marking tasks):		
C. Job walk:		
1. Visual verification that each proposed excavation site does not lie on a line connecting two similar-looking manhole covers (e.g., sanitary sewers or storm drains). (Consider having the line snaked to confirm their locations.)	02/08/18	JR
2. Visual verification that each proposed excavation site does not lie on a line with any water, gas, electrical meters, utility cleanouts, or other utility boxes in the surrounding areas.	02/08/18	JR
3. Visual verification that the pavement near each proposed excavation site has not subsided or give the appearance it may be covering a previous excavation (e.g., linear cracks or sagging curbs).	02/08/18	JR
4. Visual verification that each proposed excavation has adequate overhead clearance for the excavation equipment (e.g., at least 10 feet from overhead-utility lines and/or reasonable distance from canopies).	02/08/18	JR
5. Fences and fields have been checked for markers, signs, posts, valves, stub outs, etc.	02/08/18	JR
6. Surface structures such as tank batteries, wells, valves, phone pedestals, and electrical junction boxes have been checked for evidence of subsurface utilities.	—	—
7. Observed evidence of subsurface utilities has been photographed, sketched, or otherwise documented.	02/08/18	JR
8. Proposed excavation sites have been "walked"/reviewed by the excavation contractor, Trihydro project manager, and other stakeholders (e.g., client representative, property owner, tenant).	02/08/18	JR
9. Proposed excavation sites are located at least 5 feet from marked utilities (i.e., the "tolerance zone"), or written approval to excavate within the 5-foot tolerance zone has been obtained from the appropriate utility owner. In no case shall a proposed excavation be located closer than 2 feet from the outside edge of a marked utility. (Note: The tolerance zone is measured from the outside edge of a subsurface structure—not its centerline.)	02/08/18	JR
10. Verify that the excavation contractor (with help from appropriate utility-line locators, if part of the client-approved work scope) has walked each proposed excavation site to verify all expected utility-line markings are present.	02/08/18	JR
11. Traffic-control devices, safety barricades, caution tape, and other safety-management devices are in place as needed to protect project personnel.	—	—
Project Director (job-walk tasks):		
D. Daylighting / potholing / "soft digging":		
1. The proposed excavation sites located within the "tolerance zone" (and sites located outside the "tolerance zone" when required by the client) have been potholed to a depth below the anticipated utility zone using "minimally intrusive excavation methods" such as vacuum excavation (either air-entrainment or water-jet) and careful hand-tool use.		
2. Monitoring and emergency equipment is available on site when hazardous atmospheres are expected to be encountered in the potholing excavations.		
3. A list of emergency-contact names/numbers is maintained at the potholing excavation site.		
4. The project health and safety plan addresses potential hazards and safety-performance requirements related to utility-clearance operations.		
5. The location of and directions to the nearest hospital are known by all members of the project team.		
6. Representatives of utility owners that requested to be on site for utility locates are present.		

Excavation, Drilling, and Utility-Locating Checklist

3119 ostara

Task	Date	Initials
7. Pothole excavations have been visually checked with a flashlight by the excavation contractor, Trihydro project manager, or her/his designee.		
8. Utilities adjacent to the excavation or that cross the excavation have been daylighted using "minimally intrusive excavation methods."		
9. The areal extent of the excavation-clearance pothole has been verified to extend at least 120% beyond the outside diameter of the largest-diameter down-hole tool to be used in the borehole, or at least 2 feet on each side of daylighted/exposed lines, whichever is greater.		
10. If vacuum excavation (e.g., air knife, air vac, hydro-vac) is not available to daylight utility lines, verify that the non-conductive probe method was used as follows: Scratch the ground no more than 10 inches deep above the utility and then probe the scratched area. If the utility isn't found in the scratched area, repeat the first step until the utility is located. Once the utility is found, its depth must be continually verified with the probe until 2 feet of soil remain above the utility. Carefully hand dig the remaining overburden to expose the utility.		
11. The soil encountered in the excavation-clearance pothole has been verified to be free of bedding material (e.g., clean gravel, clean sand, aggregate base [gravelly sand with ~10% fines], or other non-native-looking material) that could indicate the presence of a previously installed utility line.		
12. Excavation work within 2 feet of an underground utility was "hand dug."		
13. Once the utility lines were exposed and the excavations were safe to enter, the exposed lines (including their protective coating) was examined for damage.		
14. The condition of each utility line exposed during daylighting was documented, and the documentation was forwarded to the Trihydro project manager to place in the project file.		
15. If a utility line was damaged in any way, it was reported to the utility owner and Trihydro project manager and documented in the project file.		
16. Damage to a utility line was documented and repaired before it was reburied. The utility owner signed off on the repairs.		
17. Employees entering the excavation followed the procedures described in the Trihydro "Trenching and Excavation Program" and used the Trihydro "Daily Excavation/Trench Inspection Report" to document excavation condition.		
18. The location of daylighted utilities was documented and photographed after daylighting was completed and before the pothole excavation was backfilled.		
19. Locations for hand digging within the "tolerance zone" were noted.		
Project Director (daylighting/potholing tasks):		
E. Excavation (including drilling):		
1. The appropriate permits have been obtained for the work (e.g., hot-work permits, entry permits).	—	—
2. The utility-owner and/or agency representatives that requested to be on site during excavation work are present. (Trihydro Utility Locate Acknowledgement Form)	—	—
3. A safety kickoff meeting was conducted with the excavation contractor to review roles/responsibilities, work activities, anticipated hazards, this checklist, and emergency-response procedures before starting excavation work the site. The safety kickoff meeting was documented in the project file.	02/08/18	JR
4. A daily tailgate safety meeting was conducted and documented in the project file. Verify weather conditions, safety hazards, PPE requirements, job duties, communication, hand signals, etc.	02/08/18	JR
5. JSAs covering the work to be done are in place and have been reviewed, "marked up" where appropriate, and acknowledged by the excavation project-team members.	02/08/18	JR
6. Site workers have been reminded to look for hazardous conditions, processes, and activities, and that they are authorized to stop work if they see an unsafe condition.	02/08/18	JR
7. The emergency-response plan has been reviewed by all excavation project-team members (e.g., contact numbers, evacuation muster points, hospital routes).	02/08/18	JR
8. The excavation contractor has checked the excavation sites relative to overhead utilities, subsurface-utility locates, and adjacent surface structures.	02/08/18	JR
9. The excavation contractor has acknowledged the potential location of each subsurface utility marked in the excavation areas.	02/08/18	JR
10. Proper traffic control and exclusion zones have been established.	—	—
11. The excavation equipment (e.g., drill rig, backhoe) has been inspected for proper operation and condition.	02/08/18	JR
12. Emergency equipment (fire extinguisher, first aid kit, emergency shut-off switch, etc.) has been checked, is readily available, and is in working order.	02/08/18	JR
13. Excavation project-team members are wearing appropriate PPE per the Trihydro HASP and client/site-specific requirements.	02/08/18	JR
14. Power in the excavation area has been de-energized, if possible. If power cannot be de-energized, the excavation contractor was advised of the hazard.	—	—

Excavation, Drilling, and Utility-Locating Checklist

3119 Montana

Task	Date	Initials
Project Director (excavation/drilling tasks):		
F. If an unmarked utility line is discovered:		
1. Verify the One Call utility-locate request was made correctly.	02/08/18	JR
2. Identify the owner/operator of the unmarked utility line and contact One Call (dial "811") to request a "No Response" ticket. If the owner/operator fails to respond again, seek a third-party locating service to mark the utility before: a) excavation work begins, or b) advancing the excavation further.	—	—
3. Contact the owner/operator of non-locatable utilities to request they be taken out of service before excavation begins.	—	—
4. If possible, a representative of the unmarked utility line should be on site when the unmarked utility is daylighted.	—	—
Project Director (unmarked utility line tasks):		

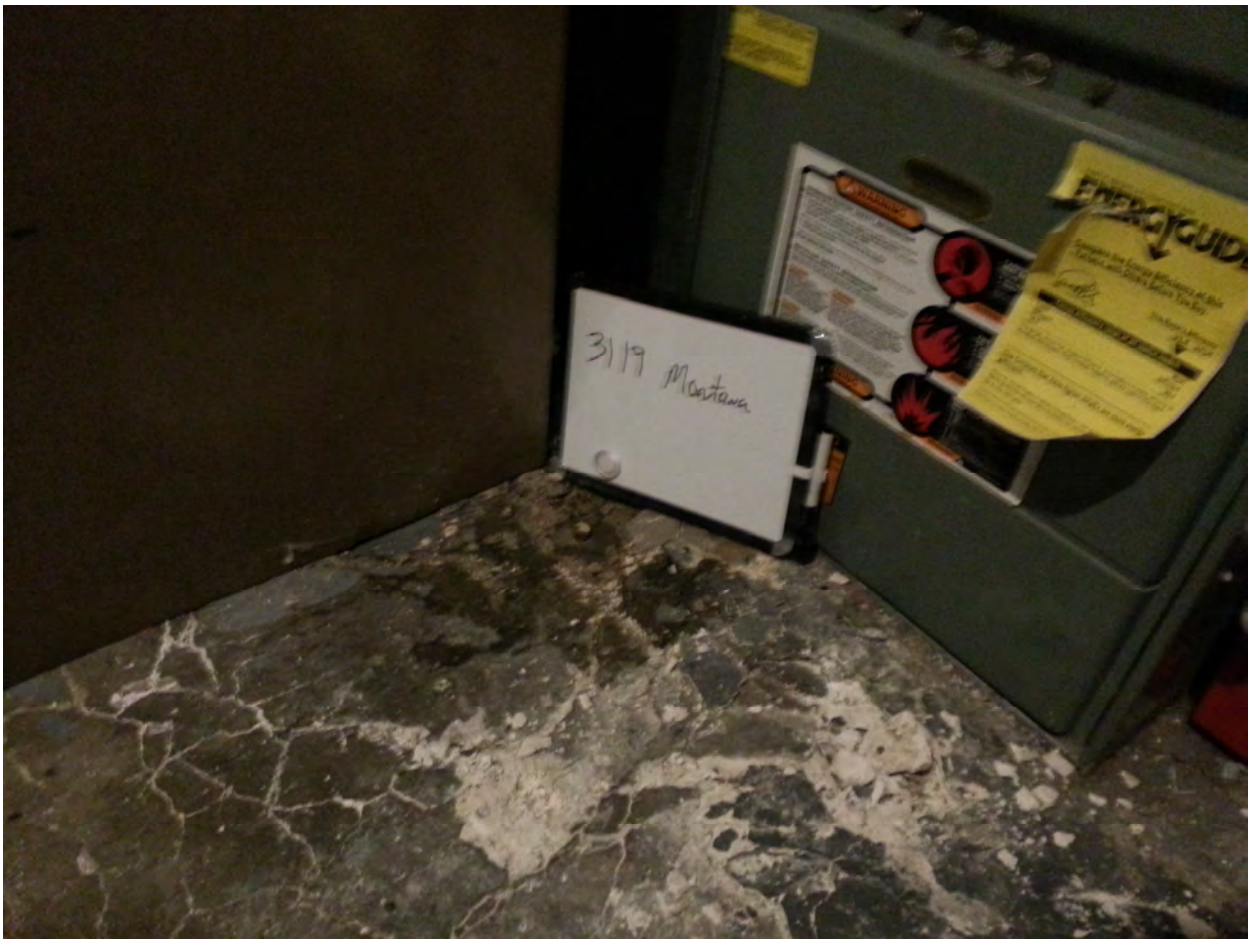
Note:

-- If an item doesn't apply, please insert an "NA" in the "**Date**" column and provide an explanation in the "**Project Notes**" section below.

Andrew Vann	Joel Riebli & Cameron Brown	
Project Manager	Field Manager / Team Members	Date Reviewed
MT DEQ / Billings PCE / 3119 Montana	Trihydro	
Client / Project Name / Location	Excavator/Driller Name	Date Action Items Completed

Project Notes: [Please cross reference to the appropriate checklist-item number[s] when possible.]

VI Sample: 3119 Montana Ave_Subslab



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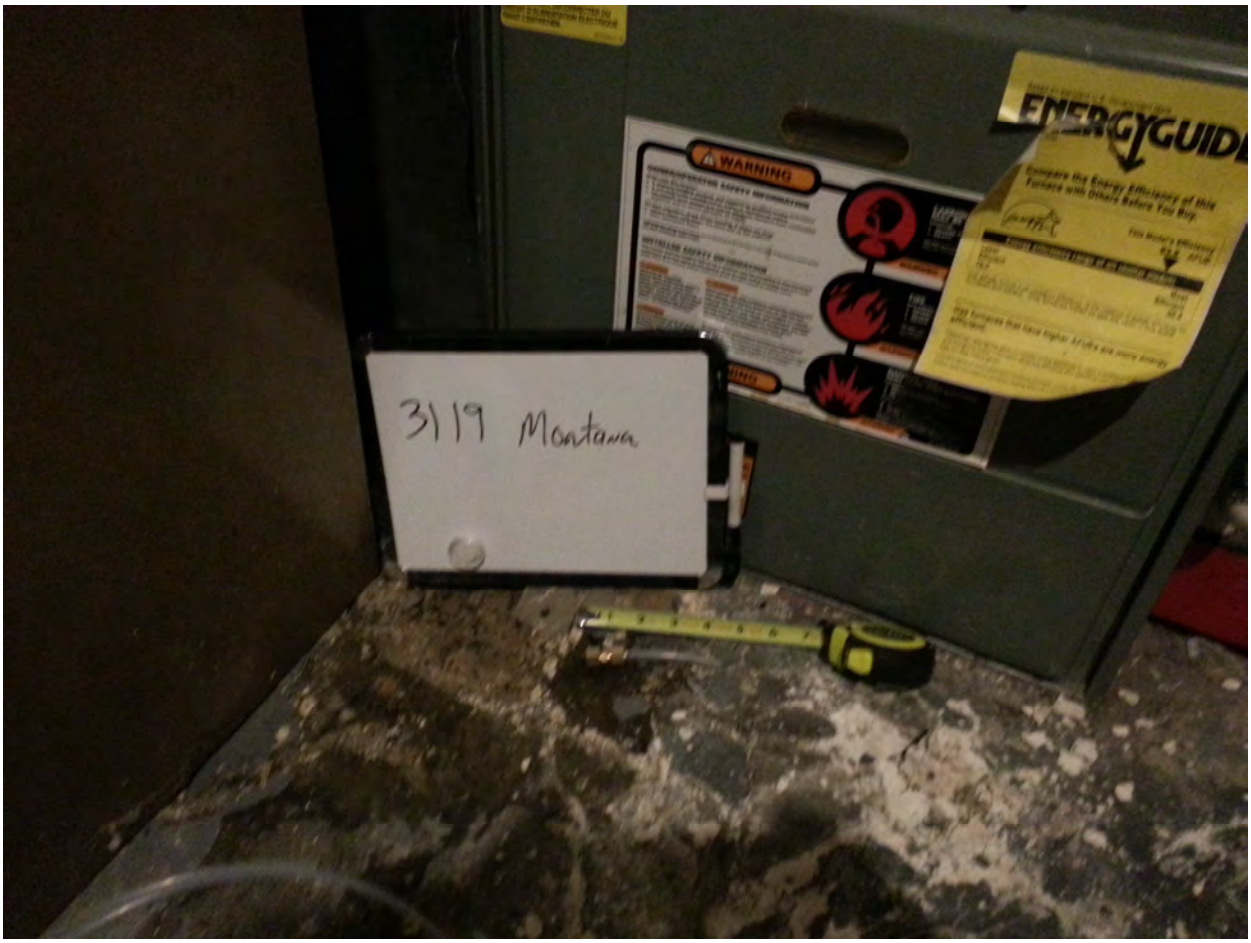


VI Sample: 3119 Montana Ave_Subslab

VI Sample: 3119 Montana Ave_Main

ADDRESS: 3119 MONTANA AVE

NOTES:
SUBSLAB SAMPLE IN FURNACE ROOM AT BOTTOM OF STAIRS BEFORE ENTERING APARTMENT

Note – concrete foundation has cracks and is pocked/aged

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Kate Zimmerman - Myers

Physical Address of property under investigation: 4011 2nd Ave. South Billings MT

Mailing Address: SAME

Phone (optional): 406 254-0854

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/27/18	AIR	20180227-4011 2ND AVE-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15, API
2/27/18	AIR	20180227-4011 2ND AVE-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15, API
2/27/18	AIR	20180227-4011 2ND AVE-03	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15, API
2/28/18	AIR	20180228-4011 2ND AVE-04	TO-15, API FIXED GAS, CH4

*OTHER (specify analysis) _____

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☒ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.
- ☒ N/A

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☒ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason: _____

DEQ representative:

Signature: _____ Printed Name: Syris Trahan

Telephone #: 307-745-7474 Date: 3/6/18

Property owner/operator copy = white DEQ copy = yellow

Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	4011 2nd Ave S.	Start Weather:	Partly cloudy, C 5mph
Project Name:	BPCE	Start Outdoor Air Temp:	34°F
Sample Location:		Start Atmospheric Pressure:	29.80
Date:	2/27/18	End Weather:	Sunny, calm
Field Personnel:	BS, ST	End Outdoor Air Temp:	34°F
Recorded by:	BS	End Atmospheric Pressure:	29.91

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
2/27/18	1658	2/28/18	1704	20180227-4011 2nd AVE-01	2836	0521		28	4	68	68
2/27/18	1705	2/28/18	1705	20180227-4011 2nd Ave-02	1288	0275		25	2	60	60
2/27/18	1706	2/28/18	1703	20180227-4011 2nd Ave-03	0822	1437		25.5	0	68	68

Comments:

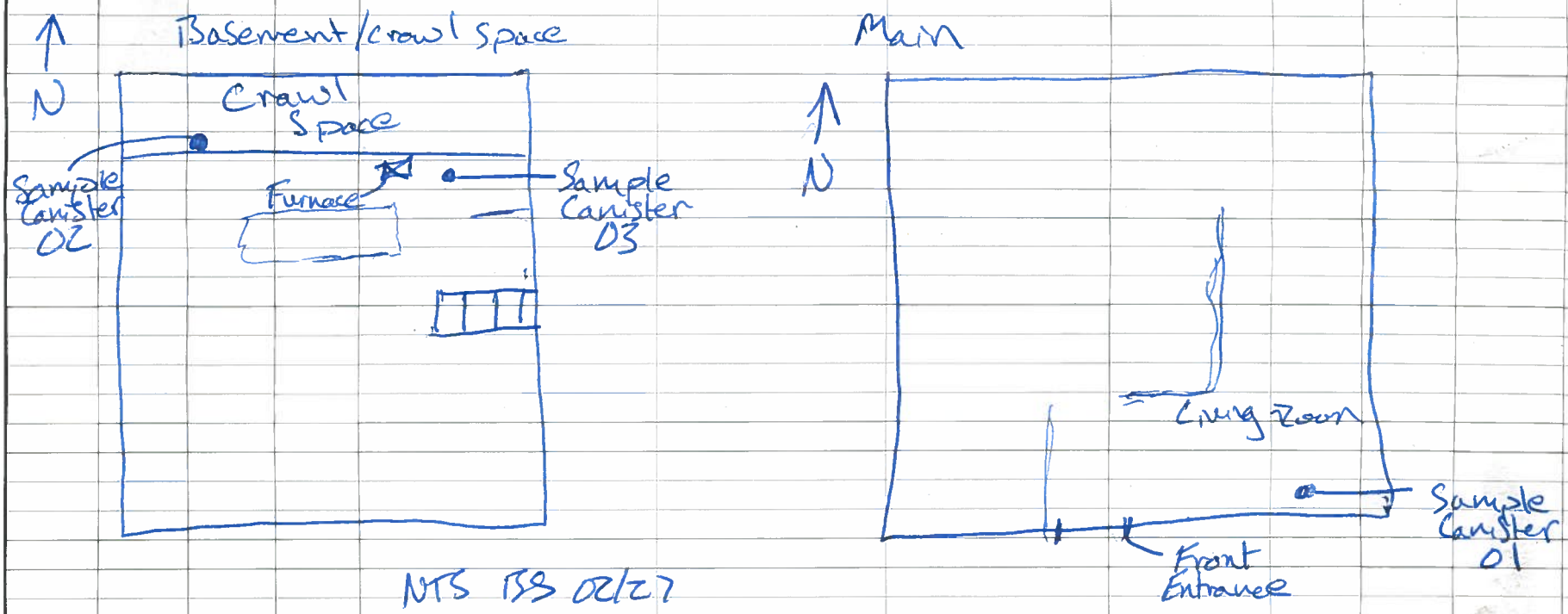
01- Indoor Air main floor living Room.
02- Crawl Space
03- Basement

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

03 Basement - Back room furthest from stairs, next to crawl space.
02 Crawl Space - 2' inside crawl space divider toward west wall exterior.
01 Main - SE corner of living room.

Location Sketch: Basement, Main



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		Start Outdoor Air Temp:	34°F
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Comments:

01- Indoor Air main floor living Room.
02- Crawl Space
03- Basement

22. Are any of the following used or stored in the basement (check all that apply):
- [x] Paint
- [ ] Solvents (degreasers, paint thinner, etc.)
- [ ] Fuels/Oils (gasoline, diesel, used oil)
- [ ] Other Cleaners (drain cleaners, laundry spot treatment, other solvents)
- [ ] Pesticides

Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.)
Other products with/containing Volatile Organic Compounds, describe: _____

23. Have you recently (within the last six months) done any painting or remodeling in your home?
Yes [x] No [ ]
If yes, specify what was done, where in the home, and what month:
painting

24. Have you installed new carpeting in your home within the last year? Yes [ ] No [x]
If yes, when and where? _____

25. Do you regularly use or work in a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) [ ]
Yes, use dry-cleaning infrequently (monthly or less) [ ]
Yes, work at a dry cleaning service [ ]
No [x]

26. Does anyone in your home use solvents at work?
Yes [ ] If yes, how many persons?
No [x] If no, go to question 28

27. If yes for question 26, are the work clothes washed at home? Yes [ ] No [ ]

28. Where is the washer/dryer located?
Basement [x]
Upstairs Utility Room [ ]
Kitchen [ ]
Garage [ ]
Use a Laundromat [ ]
Other, please specify [ ] _____

29. If you have a dryer, is it vented to the outdoors? Yes [x] No [ ]

30. What type (s) of home heating do you have (check all that apply)
Fuel type: Gas [x], Oil [ ], Electric [ ], Wood [ ], Coal [ ],
Other [ ] _____

Heat conveyance system:
- Forced Hot Air [x]
- Forced Hot Water [ ]
- Steam [ ]
- Radiant Floor Heat [ ]
- Wood Stove [ ]
- Coal Furnace [ ]
- Fireplace [ ]
- Other [ ] _____

31. Does your home have (or had in the past) a storage tank for storage of
Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? _____

How is/was the tank filled? _____

Is there staining near the tank? Yes ☐ No ☐

32. Do you have air conditioning? Yes ☒ No ☐
Central Air Conditioning ☐
Window Air Conditioning Unit(s) ☒
Other (please specify) _____

33. Do you use any of the following? Room Fans ☐, Ceiling Fans ☒, Attic Fan ☐

34. Do you ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☐

35. Has your home had termite or other pesticide treatment? Yes ☒ No ☐ Unknown ☐
If yes, please specify type of pest controlled _____
And approximate date of service 2 times per year

36. Water heater type: Gas ☒, Electric ☐, by Furnace ☐,
Other (please describe) basement

37. Water heater location: Basement ☒, Upstairs Utility Room ☐, Garage ☐,
Other (please specify) _____

38. What type of cooking appliance do you have? Electric ☒, Gas ☐
Other (please describe) _____

39. Is there a stove exhaust hood present? Yes ☒ No ☐
Does it vent to the outdoors? Yes ☐ No ☒

40. Smoking in Home:
None ☒, Rare (only guests) ☐, Moderate (residents, light smokers) ☐,
Heavy (at least one heavy smoker in household) ☐

41. If yes to question 40, what is smoked?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐

42. Do you regularly use air fresheners? Yes ☒ No ☐

43. Does anyone in the home have indoor home hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____

NO

44. Do you have a radon or sub-slab air mitigation system? If yes, please provide any information regarding date of installation, maintenance, and reason for installation: _____

NO

44. General family/home use of consumer products (please circle appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuels	Never	Hardly ever	Occasionally	Regularly	Often
Spray-on deodorant	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	Regularly	Often
Window cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Nail polish remover	Never	Hardly ever	Occasionally	Regularly	Often
Hair sprays	Never	Hardly ever	Occasionally	Regularly	Often
Candles	Never	Hardly ever	Occasionally	Regularly	Often
Incense	Never	Hardly ever	Occasionally	Regularly	Often

45. Please check weekly household cleaning practices:

Dusting ☒

Dry Sweeping ☐

Vacuuming ☒

Polishing (furniture, etc.) ☐

Washing/Waxing Floors ☐

Other (describe) ☐ _____

pentine

46. Other comments:

_____

_____

_____

_____

_____

_____

_____

_____

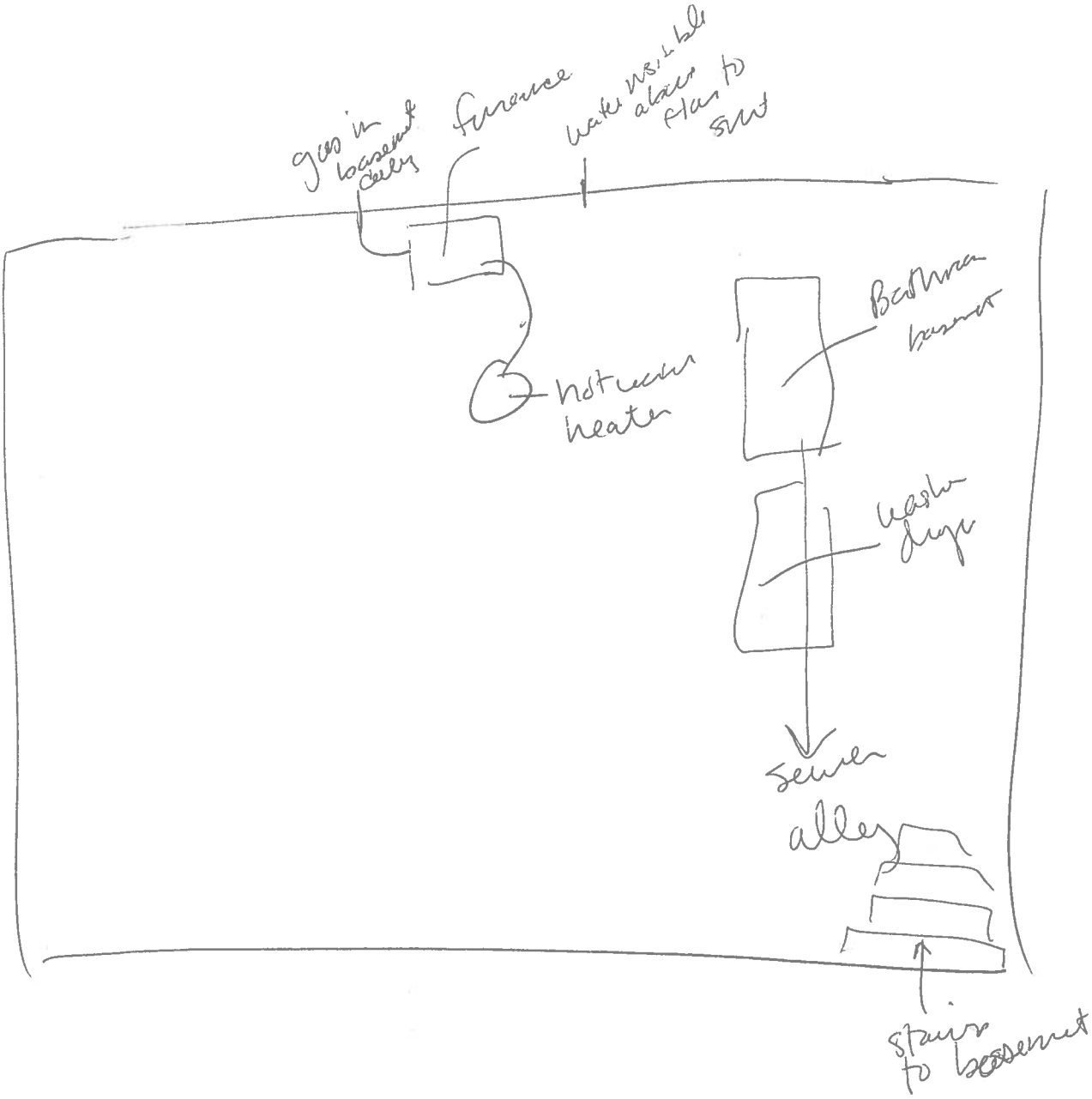
_____

47. Chemical Inventory/Summary

Chemical/Chemical Product (consumer name)	Amount present in home
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

* Mondays off –
9am tomorrow
8am 4011 2nd Ave S.

10am Monday


gas in basement alley
furnace
water visible above floor to sink
hot water heater
Bathroom basement
washer dryer
sewer alley
stairs to basement

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
A. Excavation-site planning:		
1. The local One Call regulations have been checked for local utility-notification requirements (e.g., 48 hours vs. 72 hours).	2/26	SJS
2. Per the local One Call regulations, list the responsible party (generally the excavation/drilling contractor) for requesting and verifying completion of utility locates below: TRI HYDRO	2/26	SJS
3. The property owner and/or business owner has been notified of the excavation schedule.	2/26	SJS
4. Each proposed excavation site or "area of interest" has been delineated for utility-line locators using white spray paint and/or wooden stakes/lathes with white flagging.	NA	—
5. Public-utility locates have been requested by calling One Call at least 48 hours (72 hours in some states) before work is scheduled to begin, and the request includes depths, as available.	2/25	SJS
6. Each utility company has been notified of the excavation schedule and invited to review the proposed excavation sites.	2/26	SJS
7. On-site meetings have been scheduled with the appropriate representatives of critical utility facilities (e.g., gas/oil pipelines, high-voltage cables, fiber-optic lines).	NA	—
8. Private-utility locates—including fuel lines; tanks; and water, sewer, gas, electricity, and other utilities—have been requested.	NA	—
9. The property owner was contacted to determine if he/she knows of privately owned subsurface facilities within 5 feet of the proposed excavation sites. (Review locations with the manager/owner.) Examples of privately owned facilities that are not commonly marked on private property include:	2/26	SR
a) Water and sewer laterals Water front Sewer back	2/26	SR
b) Gas lines west side	2/26	SR
c) Power lines (including those for landscape/yard lighting, pool and spa lines, and "out building" lines) back	2/26	SR
d) Irrigation lines	~~NA~~	—
e) Communication lines (cable, telephone, Internet) Some front Some back	2/26	SR
f) Propane tank lines	NA	—
10. The proposed excavation sites have been reviewed by the appropriate stakeholders (e.g., owner, tenant, driller, excavator) and the Trihydro project manager.	NA	—
11. Proposed excavation sites have been visually inspected, ~~and available plans~~ and aerial photos have been reviewed for evidence of potential utilities.	NA	—
12. A scaled site plan showing the proposed excavation sites relative to subsurface utilities has been prepared and is available for stakeholder/Management review.	NA	—
13. The basis for each buried utility line's location and the accuracy of the data defining the utility location are documented on the site plan.	NA	—
14. The proposed excavation sites are at least 5 feet from subsurface utilities shown on the building plans.	NA	—
15. The proposed excavation sites are at least 5 feet from subsurface utilities shown on public right-of-way / street-improvement plans. [Note: Work with utility companies to determine if they require a representative present during excavation activities.]	NA	—
16. The proposed excavation sites are at least 7 feet from the pad surrounding underground storage tanks (USTs) shown on the building plans. NO UST	NA	—
17. The utility-locate ticket number is available on site. 18004860	2/26	SR
18. A traffic-control plan has been prepared if appropriate. Note: If the project area encompasses a public street or right of way, the local and/or state authority must approve the traffic-control plan before fieldwork begins.	NA	—
19. Arrangements have been made to contact the appropriate personnel if utility-line repairs are needed. (Who must be contacted if a line is unexpectedly damaged?)	NA	—
20. Contact information is in place and readily available with the driller, excavator, and other project stakeholders. TRI HYDRO	NA	—
21. The client and other relevant stakeholders (if any) have been notified of the excavation planning/pre-planning steps and results.	NA	—
22. A detailed work scope was developed by the project team and reviewed by the Project Director and Contracting Team. VI work Plan	2/26	SJS
Project Director (excavation-site planning tasks):		

4011 2nd Ave S.

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
B. Utility-line marking:		
1. Electrical circuits are energized during utility-line marking for subsurface power lines (e.g., circuits on timers or light-sensing switches).	NO	SJS
2. Public-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and ~~project~~ budget.	2/26	SJS
3. Private-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	—	—
4. Verify that One Call locators marked their facilities in the designated excavation area or provided notification that they do not have any facilities near the proposed excavation sites.	2/26	
5. One Call was contacted to request a "refresh" if utility-locate markings are missing, difficult to see, or more than 14 days old (7 days in some states). "Refresh" markings must be performed by the original marking organization.	NA	SJS
Project Director (utility-line marking tasks):		
C. Job walk:		
1. Visual verification that each proposed excavation site does not lie on a line connecting two similar-looking manhole covers (e.g., sanitary sewers or storm drains). (Consider having the line snaked to confirm their locations.)	2/26	JR
2. Visual verification that each proposed excavation site does not lie on a line with any water, gas, electrical meters, utility cleanouts, or other utility boxes in the surrounding areas.	2/26	JR
3. Visual verification that the pavement near each proposed excavation site has not subsided or give the appearance it may be covering a previous excavation (e.g., linear cracks or sagging curbs).	2/26	JR
4. Visual verification that each proposed excavation has adequate overhead clearance for the excavation equipment (e.g., at least 10 feet from overhead-utility lines and/or reasonable distance from canopies).	2/26	JR
5. Fences and fields have been checked for markers, signs, posts, valves, stub outs, etc.	NA	—
6. Surface structures such as tank batteries, wells, valves, phone pedestals, and electrical junction boxes have been checked for evidence of subsurface utilities.	NA	—
7. Observed evidence of subsurface utilities has been photographed, sketched, or otherwise documented.	2/26	JR
8. Proposed excavation sites have been "walked"/reviewed by the excavation contractor, Trihydro project manager, and other stakeholders (e.g., client representative, property owner, tenant).	2/26	JR
9. Proposed excavation sites are located at least 5 feet from marked utilities (i.e., the "tolerance zone"), or written approval to excavate within the 5-foot tolerance zone has been obtained from the appropriate utility owner. In no case shall a proposed excavation be located closer than 2 feet from the outside edge of a marked utility. (Note: The tolerance zone is measured from the outside edge of a subsurface structure—not its centerline.)	2/26	JR
10. Verify that the excavation contractor (with help from appropriate utility-line locators, if part of the client-approved work scope) has walked each proposed excavation site to verify all expected utility-line markings are present.	2/26	JR
11. Traffic-control devices, safety barricades, caution tape, and other safety-management devices are in place as needed to protect project personnel.	NA	JR
Project Director (job-walk tasks):		
D. Daylighting / potholing / "soft digging":		
1. The proposed excavation sites located within the "tolerance zone" (and sites located outside the "tolerance zone" when required by the client) have been potholed to a depth below the anticipated utility zone using "minimally intrusive excavation methods" such as vacuum excavation (either air-entrainment or water-jet) and careful hand-tool use.	NA	SJS
2. Monitoring and emergency equipment is available on site when hazardous atmospheres are expected to be encountered in the potholing excavations.	↓	
3. A list of emergency-contact names/numbers is maintained at the potholing excavation site.		
4. The project health and safety plan addresses potential hazards and safety-performance requirements related to utility-clearance operations.		
5. The location of and directions to the nearest hospital are known by all members of the project team.		
6. Representatives of utility owners that requested to be on site for utility locates are present.		

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
7. Pothole excavations have been visually checked with a flashlight by the excavation contractor, Trihydro project manager, or her/his designee.	NA	S/S
8. Utilities adjacent to the excavation or that cross the excavation have been daylighted using "minimally intrusive excavation methods."		
9. The areal extent of the excavation-clearance pothole has been verified to extend at least 120% beyond the outside diameter of the largest-diameter down-hole tool to be used in the borehole, or at least 2 feet on each side of daylighted/exposed lines, whichever is greater.		
10. If vacuum excavation (e.g., air knife, air vac, hydro-vac) is not available to daylight utility lines, verify that the non-conductive probe method was used as follows: Scratch the ground no more than 10 inches deep above the utility and then probe the scratched area. If the utility isn't found in the scratched area, repeat the first step until the utility is located. Once the utility is found, its depth must be continually verified with the probe until 2 feet of soil remain above the utility. Carefully hand dig the remaining overburden to expose the utility.		
11. The soil encountered in the excavation-clearance pothole has been verified to be free of bedding material (e.g., clean gravel, clean sand, aggregate base [gravelly sand with ~10% fines], or other non-native-looking material) that could indicate the presence of a previously installed utility line.		
12. Excavation work within 2 feet of an underground utility was "hand dug."		
13. Once the utility lines were exposed and the excavations were safe to enter, the exposed lines (including their protective coating) was examined for damage.		
14. The condition of each utility line exposed during daylighting was documented, and the documentation was forwarded to the Trihydro project manager to place in the project file.		
15. If a utility line was damaged in any way, it was reported to the utility owner and Trihydro project manager and documented in the project file.		
16. Damage to a utility line was documented and repaired before it was reburied. The utility owner signed off on the repairs.		
17. Employees entering the excavation followed the procedures described in the Trihydro "Trenching and Excavation Program" and used the Trihydro "Daily Excavation/Trench Inspection Report" to document excavation condition.		
18. The location of daylighted utilities was documented and photographed after daylighting was completed and before the pothole excavation was backfilled.		
19. Locations for hand digging within the "tolerance zone" were noted.		
Project Director (daylighting/potholing tasks):		S/S
E. Excavation (including drilling):		
1. The appropriate permits have been obtained for the work (e.g., hot-work permits, entry permits).	NA	S/S
2. The utility-owner and/or agency representatives that requested to be on site during excavation work are present. (~~Trihydro Utility Locate Acknowledgement Form~~) NA	2/26	S/S
3. A safety kickoff meeting was conducted with the excavation contractor to review roles/responsibilities, work activities, anticipated hazards, this checklist, and emergency-response procedures before starting excavation work the site. The safety kickoff meeting was documented in the project file. TRIHYDRO - TSM	2/26	S/S
4. A daily tailgate safety meeting was conducted and documented in the project file. Verify weather conditions, safety hazards, PPE requirements, job duties, communication, hand signals, etc.	2/26	S/S
5. JSAs covering the work to be done are in place and have been reviewed, "marked up" where appropriate, and acknowledged by the excavation project-team members.	2/26	JR
6. Site workers have been reminded to look for hazardous conditions, processes, and activities, and that they are authorized to stop work if they see an unsafe condition.	2/26	JR
7. The emergency-response plan has been reviewed by all excavation project-team members (e.g., contact numbers, evacuation muster points, hospital routes).	2/26	JR
8. The excavation contractor has checked the excavation sites relative to overhead utilities, subsurface-utility locates, and adjacent surface structures.	2/26	JR
9. The excavation contractor has acknowledged the potential location of each subsurface utility marked in the excavation areas.	2/26	JR
10. Proper traffic control and exclusion zones have been established.	NA	—
11. The excavation equipment (e.g., drill rig, backhoe) has been inspected for proper operation and condition.	2/26	JR
12. Emergency equipment (fire extinguisher, first aid kit, emergency shut-off switch, etc.) has been checked, is readily available, and is in working order.	2/26	JR
13. Excavation project-team members are wearing appropriate PPE per the Trihydro HASP and client/site-specific requirements.	2/26	JR
14. Power in the excavation area has been de-energized, if possible. If power cannot be de-energized, the excavation contractor was advised of the hazard.	NA	—

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
Project Director (excavation/drilling tasks):		
F. If an unmarked utility line is discovered:		
1. Verify the One Call utility-locate request was made correctly.	2/26	SR
2. Identify the owner/operator of the unmarked utility line and contact One Call (dial "811") to request a "No Response" ticket. If the owner/operator fails to respond again, seek a third-party locating service to mark the utility before: a) excavation work begins, or b) advancing the excavation further.	NA	SR
3. Contact the owner/operator of non-locatable utilities to request they be taken out of service before excavation begins.	NA	SR
4. If possible, a representative of the unmarked utility line should be on site when the unmarked utility is daylighted.	NA	SR
Project Director (unmarked utility line tasks):		

Note:

-- If an item doesn't apply, please insert an "NA" in the "**Date**" column and provide an explanation in the "**Project Notes**" section below.

SR on behalf A. Van	Sylvis, Joel, Brant, Jake, Sarah	2/26/18
Project Manager	Field Manager / Team Members	Date Reviewed
MT DEQ R76-036-001	TRI HYDRO	2/26/18
Client / Project Name / Location	Excavator/Driller Name	Date Action Items Completed

Project Notes: [Please cross reference to the appropriate checklist-item number[s] when possible.]

[redacted]

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID: 4011 2nd Avenue South
HGAS: QRAE II / 152-M1984

Project Name: BPCE
PID (model/serial #): ppb RAE3000 / 594-000778
Sample location: Basement subslab
Helium Detector (model/serial #): Dielectric / R11169
Date: 2/26/18
Weather: Cloudy, light breeze
Field Personnel: ST, SS, JR, BS, JS
Air Temp: 34°F
Recorded by: ST
Atmospheric Pressure: 29.91 inHg

Slab Data

Surface/slab Type: Poured Concrete
Surface/slab Thickness (inches): 4-8" (estimate)
Slab/subsurface substrate comments: concrete slab over unknown
Depth of hole through the slab: 9 1/2" of 1/2" drill bit
Length of sampling train (feet): 10" + 4ft sample train ≈ 5 ft

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 150 ml

Helium Tracer Leak Test Field Data

Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Sample Collection Data: Helium Beneath Shroud (%) min	Sample Collection Data: Helium Beneath Shroud (%) max
2/28/18	1712	50	21.6	26.0				
2/28/18	1713	100	20.5	21.2				
	1714	150	19.6	20.1				
	1715	200	23.3	24.0				
	1715	250	22.9	23.2				
	1716	300	22.5	22.8	725 ppm			

Conversion: 1.0% = 10,000 ppm
At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum
2/28/18	1725	1814	20180228-4011 2ND AVE -01	2764	1116		27	4

1735 Pause test, attempt to clear H_2O from subslab port
1744 Resume testing.

Comments:
Purging port difficult, but does not result in elevated He in purge train.

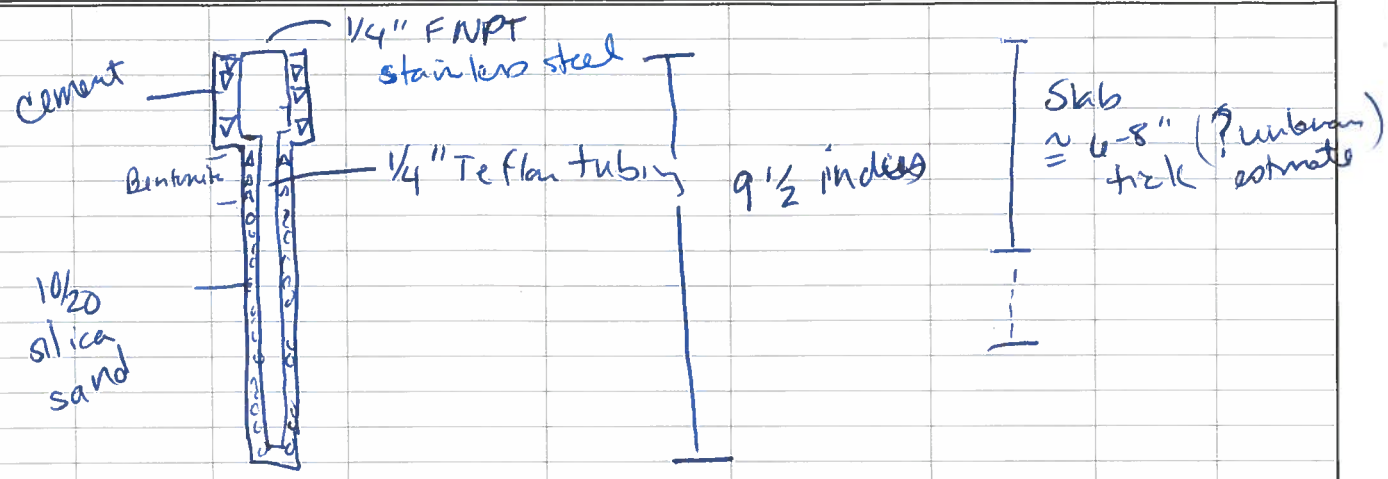
1734 - Water noticed being drawn ~1 inch up sample train, gurgling as gas rushes past.

PID = ppb 0 in port
no LEL
no H_2O
no CO
O_2 = 20.9%

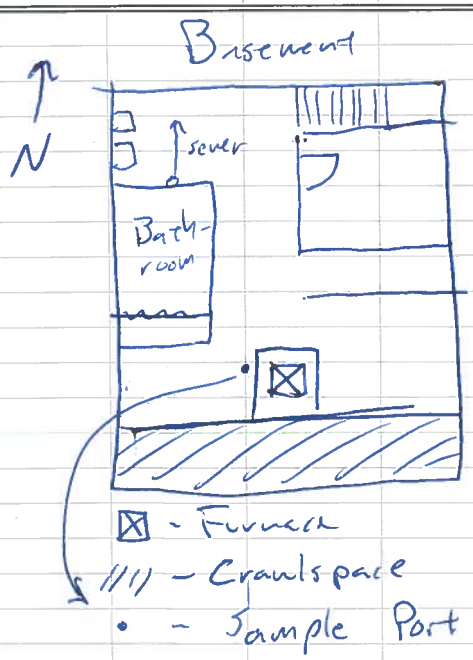
Sub-Slab Soil Vapor Sampling Field Data Sheet

Project Name: Billings VI Investigation	Sample Location/ ID: 4011 S 2nd Ave
Date:	

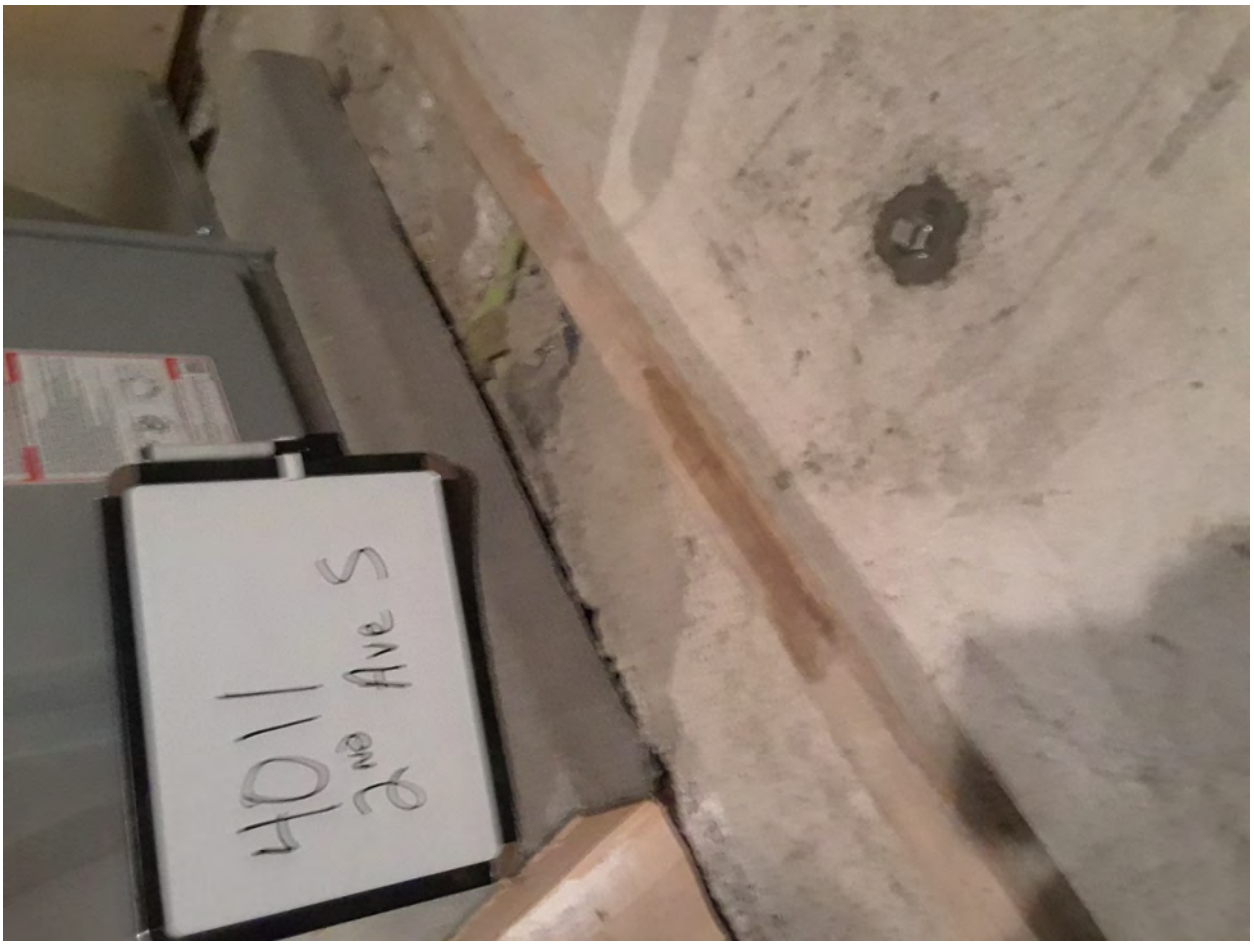
Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.



Location Sketch:



VI Sample: 4011 2nd Ave S_Subslab



VI Sample: 4011 2nd Ave S_Subslab

ADDRESS: 4011 2nd AVE S

NOTES:
LOCATION TO INSTALL SUBSLAB PORT NEAR FURNACE. ALSO DIFFERENT FOUNDATIONS AND POTENTIAL VI PATHWAY AROUND FURNACE FOOTING

Montana Department of Environmental Quality
Remediation Division/Site Response Section
PO Box 200901
Helena MT 59620-0901
406-841-5000 or 1-800-246-8198

Receipt for Samples

Pursuant to the Montana Comprehensive Environmental Cleanup and Responsibility Act (CECRA), §75-10-707(3), MCA, the Montana Department of Environmental Quality (DEQ) and its authorized officers, employees, and representatives have authority to inspect and obtain samples from the property identified below. DEQ may inspect, sample, and/or label containers, as wells as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft, and any location where a hazardous or deleterious substance may be located, including surface and subsurface soils, groundwater below this property, surface water, sediments, and air to assist DEQ in acquiring information relevant to the need for the determination of, or the taking of remedial action or otherwise enforcing CECRA.

Property Owner/Operator Information:

Name: Keller Supply

Physical Address of property under investigation: 4211 1st Avenue S. Billings, MT

Mailing Address: Same

Phone (optional): 406 - 245 - 3191

The following samples have been collected from this property:

Date	Media	Sample ID Number	Analysis to be performed
2/28/18	AIR	20180228-4211 1ST AVE S-01	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-5 APH
2/28/18	AIR	20180228-4211 1ST AVE S-02	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-15 APH
2/28/18	AIR	20180228-5 (DUPLICATE OF ABOVE SAMPLE)	Metals/VOCS/SVOC/EPH/VPH/nitrate/ dioxin-furan/Bacteria/pesticides/OTHER* TO-5 APH
3/1/18	AIR	20180301-4211 1ST AVE S-01	TO-5 APH, TO-15 D CH_4

*OTHER (specify analysis) _____

The above referenced samples have been collected in accordance with a sampling and analysis plan:

- ☒ Without variation, or
- ☐ With the following variation(s) from the plan:

The property owner/operator was offered a portion of the sample taken (split sample) to analyze at the person's cost. The property owner/operator elected to:

- ☐ Accept a split sample, or
- ☐ Decline a split sample.
- ☒ NA

DEQ will mail the sampling results to the person identified above when they become available (approximately 2-3 months after sampling).

- ☒ Copy of this receipt provided to property owner/operator at the time of sampling.
- ☐ Copy of this receipt provided to property owner/operator with sample results.
- ☐ Copy of this receipt not provided. State reason: _____

DEQ representative:

Signature: [signature] Printed Name: Sylvia Trahan

Telephone #: 307 745 - 7474 Date: 3/6/18

Property owner/operator copy = white DEQ copy = yellow

Sub-Slab Soil Vapor Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID: 4211 1st Ave S,

Project Name: BPCE
Sample location: Keller Supply
Date: 3/1/18
Field Personnel: JS/SS
Recorded by: JS

PID (model/serial #): ppb RAE 3000 / PGM 7340
Helium Detector (model/serial #): Dielectric / 08628
Weather: Partly Cloudy, Winds: SW 3 mph
Air Temp: 23° F
Atmospheric Pressure: 30.06 in.

Slab Data Poured Concrete

Surface/slab Type: Poured concrete
Surface/slab Thickness (inches): 6"
Slab/subsurface substrate comments:
Depth of hole through the slab: 8 1/2" ID
Length of sampling train (feet): 7"

Volume to purge (ml): 3 (tubing volumes) x 10 ml/ft x #ft = 180

Helium Tracer Leak Test Field Data							Sample Collection Data	
Date	Time	Cumulative volume purged (ml)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max	Helium in Probe (ppm or %)	PID reading in probe (ppb)	Helium Beneath Shroud (%) min	Helium Beneath Shroud (%) max
3/1/18	0937	100	24.8	25.7				
	0939	200	21.4	22.5				
↓	0940	300	20.1	20.8				
	0941	350	19.6	20.0				

Conversion: 1.0% = 10,000 ppm
At 20% He, there should be no more than 2 % (20,000 ppm) He in sample train
~~200,000~~ 4,000/200,000 ~~= 0.02~~ → 0.4%/20% = 0.02%

0ppm of helium during 2nd Seal test.

Canister Information

Date	Start Time	End Time	Sample ID	Canister ID	Flow Controller #	Canister ID ~~Vacuum Gauge #~~	Initial Vacuum	Final Vacuum
3/1/18	1000	1040	20180301-4211 1STAVE S-01		0905	0299	-27	

Comments:
Addition test (had to improve seal)

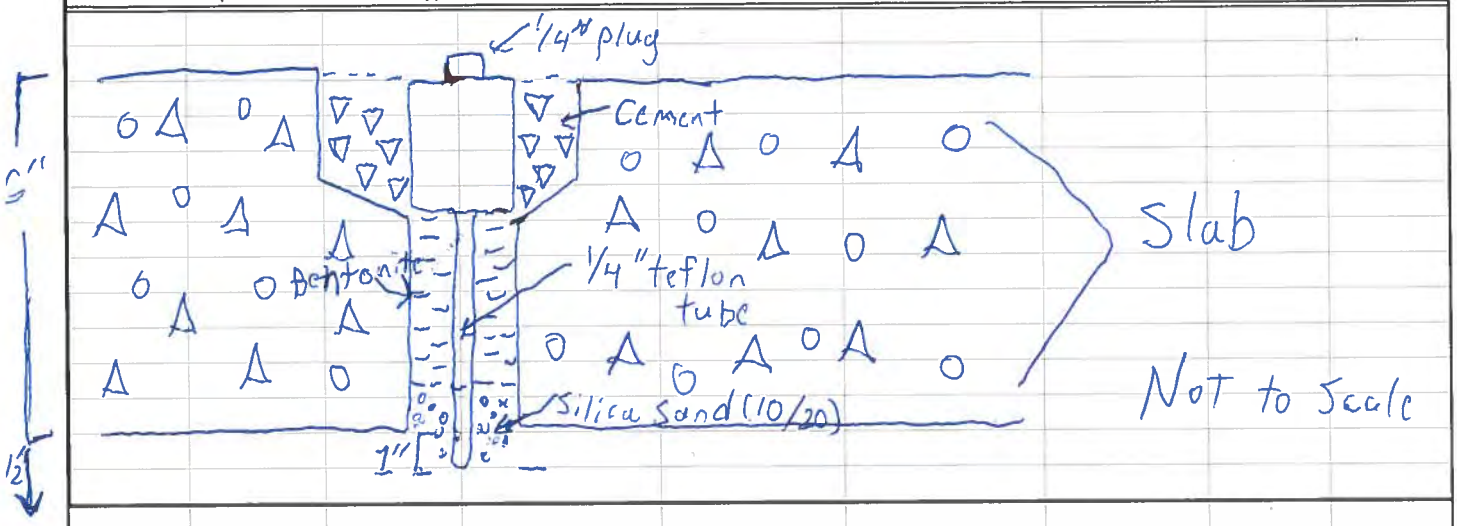
Date	Cumulative volume	% min	% max
3/1/18	100 ml	24.8	25.1
	200 ml	24.0	24.8
↓	300 ml	22.6	24.0

Approx 280 ppb on PID in ambient air
CO_2, H_2S, OXY, LEL = 0ppm, 0.0ppm, 20.9%, 0% LEL (Respectively)
Approx 28 ppb in subsurface

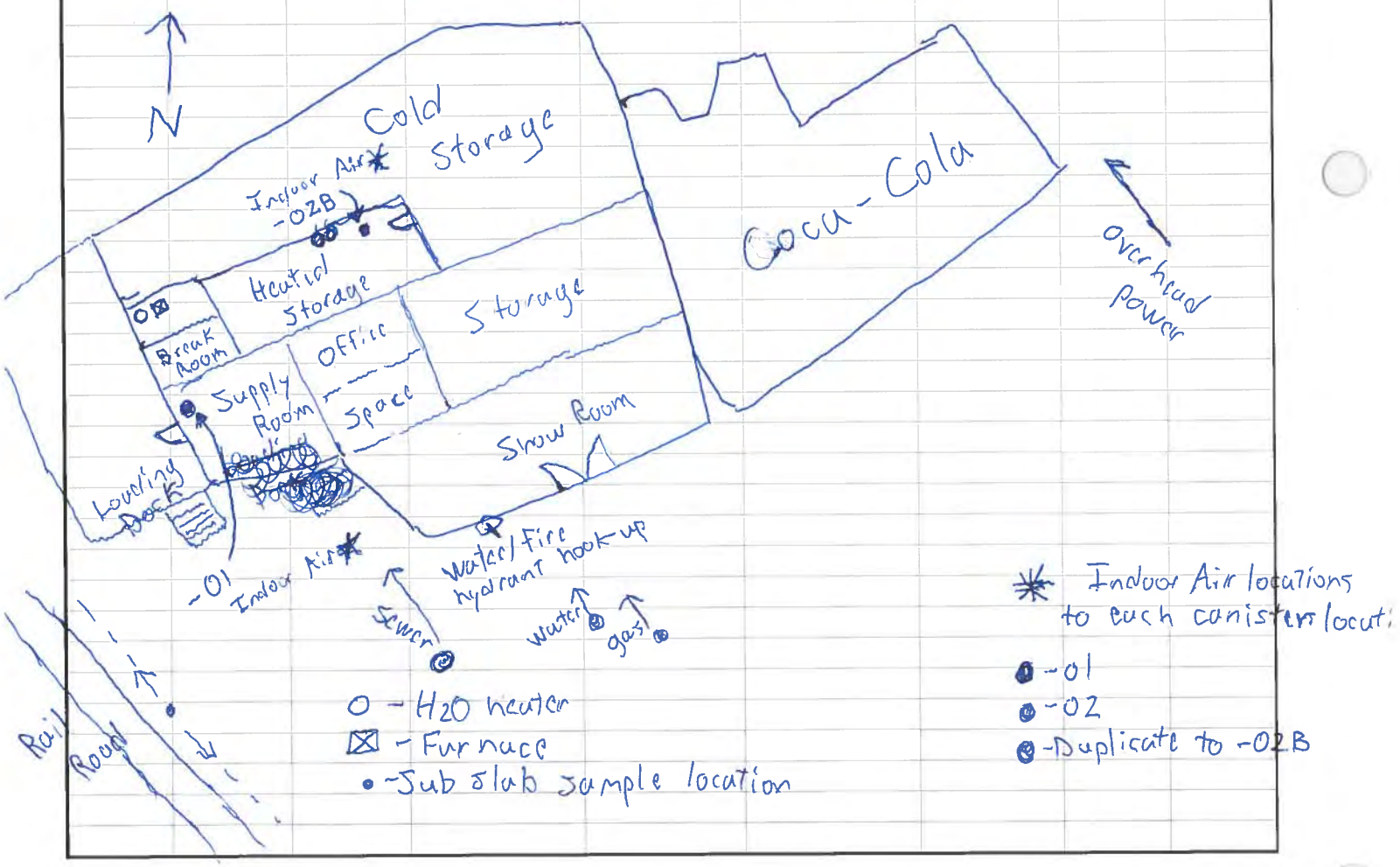
Sub-Slab Soil Vapor Sampling Field Data Sheet

Project Name: BPCE
Date: 3/1/18
Sample Location/ ID: 4211 1ST AVE S

Location Description: Include floor type/construction, location of probe, fuel sources, sumps, stored chemicals, drains, etc.



Location Sketch:



Indoor Air Sampling Field Data Sheet

Prepared by the Montana Department of Environmental Quality

Site ID:	Billings PCE GW Facility	Start Weather:	Cool, Sunny, wind SSW 10mph, 86% humidity
		Start Outdoor Air Temp:	~~15°F~~ 18°F
Project Name:	VI Investigation	Start Atmospheric Pressure:	~~30.2 in Hg~~ 29.88 in Hg
Sample Location:	4211 1st AVE S		
Date:	~~2/27/18~~ 2/28/18	End Weather:	
Field Personnel:	SS, ST	End Outdoor Air Temp:	
Recorded by:	SS, ST	End Atmospheric Pressure:	

Canister and Sample Information

Start Date	Start Time	End Date	End Time	Sample ID	Canister ID	Flow Controller #	Vacuum Gauge #	Initial Vacuum	Final Vacuum	Pre-Sample Indoor Air Temp	Post-Sample Indoor Air Temp
2/27	0747	—	—	20180227-4211 1ST AVES-01	0254	0762		-26	—	≈70°F	Do not analyze because canister flow
2/27	0745	—	—	20180227-4211 1ST AVES-02	1281	1351	—	-26	—	≈60°F	
2/27	0745	—	—	20180227-A	2824	0138	—	-28	—	≈60°F	
2/28	0747	2/28	1547	20180228-4211 1ST AVES-01	2172	0335	—	-25	-0.5	≈70°F	
2/28	0750	2/28	1550	20180228-4211 1ST AVES-02	2109	0046	—	-28	-2.5	≈60°F	
2/28	~~0750~~	2/28	1550	20180228-B	2348	0069	—	-24.5	-2.5	≈60°F	

Comments:

+01 - Shut in test for 2 min start/end @ -26 in Hg ✓ → Placed in Plumbing Parts/Service showroom (4½ ft) off ground

+02 - Shut in test for 2 min start/end -26 in Hg ✓ → Placed in plumbing parts warehouse heated area near slab slab port (4 ft off ground)

+A - Duplicate to +02 - shut in test passed 2 min @ -28 in Hg ✓

Indoor Air Sampling Field Data Sheet

Description of Sample Locations (s):

See front

Location Sketch:

See Sub-slab form

● = indoor air location @ 4-5 ft above slab/floor

Department of Environmental Quality
Hazardous Waste Site Cleanup Bureau P.O. Box 200901 Helena MT 59620-0901 (406) 841-5000

COMMERCIAL / INDUSTRIAL BUILDING QUESTIONNAIRE

Indoor Air Assessment Survey

Date: 2/26/18 Survey / questionnaire completed by: S. Seitz

1. Contact Name: Nick Bernier (Manager
   Address: 4211 1st Ave S. City: Billings State: MT Zip: 59101
   Phone 1: 406-245-3191 Phone 2: _____ Cell Phone: _____

2. What is the best time to call to speak with you? —

3. Are you the Owner ☑, Renter ☐, Other ☐ (please specify) _____ of this Building/Structure? If you are not the owner, please provide owner contact information
   Owner Name: Keller Supply
   Address: same City: _____ State: _____ Zip: _____
   Phone 1: _____ Phone 2: _____ Cell Phone: _____

4. Total number of occupants/persons at this location? _____
   Number of Children _____ Ages _____

5. How long have you occupied this location? 14 years (Boise Cascade Before)
   How many days per week is the building occupied? 5
   How many hours per day is the building occupied? 7am - 5pm - 8hr sample period

General Building / Structure Description

6. Type of Building/Structure (check only one): Single Business ☑, Multiple Businesses ☐,
   Other _____

7. Building/Structure Description:
   Number of floors: 1 Area /square footage of main or ground floor: 75000 square feet
   Basement ☑ NO Area /square footage of Basement: _____ square feet
   Crawlspace ☐ NO Area /square footage of Crawlspace: _____ square feet
   Partial crawlspace/basement ☑ NO % of each _____
   Slab on grade ☑ Area /square footage of Slab on grade: 75000 square feet all
   Other ☐ _____

8. Age of Building/Structure: built in 1940's years, Not sure/Unknown ☑

9. General Above-Ground Building/Structure construction (check all that apply):
   Wood ☑, Brick ☐, Concrete ☐, Cement Block ☑, Other ☐ _____

10. Foundation Construction (check all that apply):
Concrete Slab ☐
Fieldstone ☐
Concrete Block ☐
Elevated Above Ground/Grade ☐
Other ☐ _____

11. Do you have a Private Well ☐ or Cistern ☐?
If yes, please describe location, use, and current condition _____
not

12. Do you have a Septic System? Yes ☐ No ☐ Not Used ☐ Unknown ☐
If yes, what is the construction type? _____
Where is it located? _____ City water / sewer
When was the last time it was serviced? _____
Do you (or have you ever) use(d) any degreaser for your septic system? Yes ☐ No ☐
If yes, when was the last application? _____

13. Do you have standing water outside of your Building? (pond, ditch, etc.) Yes ☐ No ☐
NA

Basement Description (please check all boxes that apply):

14. Is the basement Finished ☐ or Unfinished ☐? NA

15. If finished, how many rooms are in the basement? _____
What are rooms used for? Office ☐, Shop ☐, Storage ☐,
Other _____

16. If not finished, do you plan on finishing in the future? Yes ☐ No ☐

17. Is the basement floor (check all that apply) Concrete ☐, Tile ☐, Carpeted ☐, Dirt ☐,
Other ☐ _____

18. Are the basement walls Poured Concrete ☐, Cement Block ☐, Stone ☐, Wood ☐,
Brick ☐, Other ☐ _____

19. Does the basement have a moisture problem?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

Describe the moisture problem _____

20. Does the basement ever flood?
Yes, frequently (3 or more times/year) ☐
Yes, occasionally (1-2 times/year) ☐
Yes, rarely (less that 1 time/year) ☐
No ☐

21. Does the basement have any of the following? Floor Cracks ☐, Wall Cracks ☐, Sump ☐, Floor Drain ☐, Other Hole/Opening In Floor ☐
Describe_____

22. Are any of the following used or stored in the basement (check all that apply):

Paint ☐, Paint Stripper/Remover ☐, Paint Thinner ☐, Metal Degreaser/Cleaner ☐,
Gasoline ☐, Diesel Fuel ☑, Solvents ☑, Glue ☐, Laundry Spot Removers ☐,
Drain Cleaners ☐, Pesticides ☐, stored closed and new in building
Other equipment with fuel tanks (chain saw, lawn mower, snow blower, etc.) ☐,
Other products with/containing Volatile Organic Compounds, describe: _____
_____

23. Has the Building / structure recently (within the last six months) had any painting or remodeling?
Yes ☐ No ☐
If yes, specify what was done, where in the Building, and what month:
_____
_____

24. Has new carpeting been installed in the Building / Structure within the last year? Yes ☐ No ☑
If yes, when and where? _____

25. Do any occupants / employees regularly conduct or work in the beauty / hair-dressing business?
Yes, work at a beauty / hair-dressing business ☐
Yes, store supplies for beauty / hair-dressing business ☐ Distance to sample point: _____
Yes, building contains beauty / hair-dressing business ☐ Distance to sample point: _____
Yes, building is near beauty / hair-dressing business ☐ Distance to sample point: _____
No ☑

26. Do any occupants / employees / anyone regularly use or work or conduct a dry cleaning service?
Yes, use dry-cleaning regularly (at least weekly) ☐
Yes, use dry-cleaning infrequently (monthly or less) ☐
Yes, work at a dry cleaning service ☐
Yes, building contains or is near dry cleaning service ☐ Distance to sample point: _____
No ☑

27. Do any occupants / employees / anyone in the Building / structure use solvents at work?
Yes ☑ If yes, how many persons? could but rarely - sold, not done
No ☐ If no, go to question 28

28. If yes for question 26, are the work clothes washed at Building? Yes ☐ No ☐

29. Does Building / Structure contain a washer/dryer? Yes ☐ No ☑
Where are they located?
Basement ☐
Upstairs ☐
Ground floor ☐
Garage ☐
Other, please specify ☐ _____

30. If Building / Structure contains a dryer, is it vented to the outdoors? Yes ☐ No ☑

31. What type(s) of Building heating do you have (check all that apply)
Fuel type: Gas ☑, Oil ☐, Electric ☐, Wood ☐, Coal ☐,
Other ☐ furnace

Heat conveyance system: Forced Hot Air ☑ Forced Hot Water ☐ Steam ☐
Radiant Floor Heat ☐ Wood Stove ☐ Coal Furnace ☐ Fireplace ☐
Other ☐ _____

32. Does Building / Structure have (or had in the past) a storage tank for storage of Gasoline ☐, Fuel Oil ☐, Propane ☐
If yes, where is/was it located? _____
_____
How is/was the tank filled? no tanks
_____
Is there staining near the tank? Yes ☐ No ☐

33. Does Building / Structure have air conditioning? Yes ☑ No ☐
Central Air Conditioning ☑
Window Air Conditioning Unit(s) ☐
Other (please specify) _____

34. Does Building / Structure have any: Room Fans ☐, Ceiling Fans ☐, Attic Fan ☐ NA

35. Does Building / Structure ventilate using the fan-only mode of your central air conditioning or forced air heating system? Yes ☐ No ☑

36. Has Building / Structure had termite or other pesticide treatment? Yes ☐ No ☐ Unknown ☑
If yes, please specify type of pest controlled _____
And approximate date of service _____

37. Water heater type: Gas ☑, Electric ☐, by Furnace ☐,
Other (please describe) _____

38. Water heater location: Basement ☐, Upstairs ☐, Ground Floor ☑, Attic ☐,
Other (please specify) _____

39. Does Building / Structure have any cooking appliances? Electric ☐, Gas ☐
Other (please describe) No

40. Is there a stove exhaust hood present? Yes ☐ No ☐ NA
Does it vent to the outdoors? Yes ☐ No ☐

41. Smoking in Building / Structure:
None ☑, Rare (only guests) ☐, Moderate (occupants, light smokers) ☐,
Heavy (at least one heavy smoker in Building / Structure) ☐

42. If yes to question 41, what do they smoke?
Cigarettes ☐ Cigars ☐
Pipe ☐ Other ☐ NA

43. Does Building / Structure regularly contain/use air fresheners? Yes ☐ No ☑

44. Does anyone in the Building have indoor Building hobbies or crafts involving:
Heating ☐, Soldering ☐, Welding ☐, Model Glues ☐, Paints ☐,
Spray Paint ☐, Wood Finishing ☐, Other ☐ _____
_____ NO
_____

45. General Building / Structure use of industrial / office / consumer products (circle as appropriate). Assume that: Never = never used, Hardly ever = less than once/month, Occasionally = about once/month, Regularly = about once/week, and Often = more than once/week.

stored not used here pipe solvents for sale

Product	Frequency of Use				
Solvents	Never	Hardly ever	Occasionally	Regularly	Often
Aerosol Deodorizers	Never	Hardly ever	Occasionally	Regularly	Often
Insecticides	Never	Hardly ever	Occasionally	Regularly	Often
Disinfectants	Never	Hardly ever	Occasionally	~~Regularly~~	Often
Window Cleaners	Never	Hardly ever	Occasionally	Regularly	Often
Ink / Toner Cartridge	Never	Hardly ever	Occasionally	Regularly	Often
Glue / Adhesives	Never	Hardly ever	Occasionally	Regularly	Often
Paint	Never	Hardly ever	Occasionally	Regularly	Often
Petroleum Fuel	Never	Hardly ever	Occasionally	Regularly	Often

stored not

46. Please check weekly Building / Structure maintenance, janitorial, and cleaning practices:

Dusting ☐
Dry Sweeping ☐
Vacuuming ☐
Polishing (furniture, etc.) ☐
Washing/Waxing Floors ☐
Other (describe) ☐ _____

routinely in offices

47. Other comments including items / subjects not covered in this questionnaire yet an issue or concern for the Building / Structure:

No solvents used @ this location but stored and sold for pipe/plumbing install outside of building

48. **Chemical Inventory/Summary**

Chemical/Chemical Product (consumer name)	Amount present in Building / Structure
a)	
b)	
c)	
d)	
e)	
f)	
g)	
h)	
i)	
j)	
k)	
l)	
m)	
n)	
o)	

Not performed

See sub-slab install sheet for single sub-slab port in parts office shelving /storage area

SJ 2/20/18

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
A. Excavation-site planning:		
1. The local One Call regulations have been checked for local utility-notification requirements (e.g., 48 hours vs. 72 hours).	2/26	JR
2. Per the local One Call regulations, list the responsible party (generally the excavation/drilling contractor) for requesting and verifying completion of utility locates below: Trihydro	2/26	JR
3. The property owner and/or business owner has been notified of the excavation schedule.	2/26	JR
4. Each proposed excavation site or "area of interest" has been delineated for utility-line locators using white spray paint and/or wooden stakes/lathes with white flagging.	NA	—
5. Public-utility locates have been requested by calling One Call at least 48 hours (72 hours in some states) before work is scheduled to begin, and the request includes depths, as available.	2/26	JR
6. Each utility company has been notified of the excavation schedule and invited to review the proposed excavation sites.	2/26	JR
7. On-site meetings have been scheduled with the appropriate representatives of critical utility facilities (e.g., gas/oil pipelines, high-voltage cables, fiber-optic lines).	NA	JR
8. Private-utility locates—including fuel lines; tanks; and water, sewer, gas, electricity, and other utilities—have been requested.	NA	JR
9. The property owner was contacted to determine if he/she knows of privately owned subsurface facilities within 5 feet of the proposed excavation sites. (Review locations with the manager/owner.) Examples of privately owned facilities that are not commonly marked on private property include:	2/26	JR
a) Water and sewer laterals	2/26	JR
b) Gas lines	2/26	JR
c) Power lines (including those for landscape/yard lighting, pool and spa lines, and "out building" lines)	2/26	JR
d) Irrigation lines	NA	JR
e) Communication lines (cable, telephone, Internet)	2/26	JR
f) Propane tank lines	NA	JR
10. The proposed excavation sites have been reviewed by the appropriate stakeholders (e.g., owner, tenant, driller, excavator) and the Trihydro project manager.	2/26	JR
11. Proposed excavation sites have been visually inspected, and available plans and aerial photos have been reviewed for evidence of potential utilities.	NA	JR
12. A scaled site plan showing the proposed excavation sites relative to subsurface utilities has been prepared and is available for stakeholder/Management review.	NA	JR
13. The basis for each buried utility line's location and the accuracy of the data defining the utility location are documented on the site plan.	NA	JR
14. The proposed excavation sites are at least 5 feet from subsurface utilities shown on the building plans.	NA	JR
15. The proposed excavation sites are at least 5 feet from subsurface utilities shown on public right-of-way / street-improvement plans. [Note: Work with utility companies to determine if they require a representative present during excavation activities.]	NA	JR
16. The proposed excavation sites are at least 7 feet from the pad surrounding underground storage tanks (USTs) shown on the building plans.	NA	JR
17. The utility-locate ticket number is available on site. 18004858 2/24	2/26	JR
18. A traffic-control plan has been prepared if appropriate. Note: If the project area encompasses a public street or right of way, the local and/or state authority must approve the traffic-control plan before fieldwork begins.	NA	JR
19. Arrangements have been made to contact the appropriate personnel if utility-line repairs are needed. (Who must be contacted if a line is unexpectedly damaged?)	2/26	JR
20. Contact information is in place and readily available with the driller, excavator, and other project stakeholders.	2/26	JR
21. The client and other relevant stakeholders (if any) have been notified of the excavation planning/pre-planning steps and results.	NA	JR
22. A detailed work scope was developed by the project team and reviewed by the Project Director and Contracting Team.	NA	JR
Project Director (excavation-site planning tasks):		

1211 1st Ave South

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
B. Utility-line marking:		
1. Electrical circuits are energized during utility-line marking for subsurface power lines (e.g., circuits on timers or light-sensing switches).	2/26	JR
2. Public-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	2/26	JR
3. Private-utility lines have been marked using electronic techniques appropriate to the project site (e.g., ground-penetrating radar, geophysical survey) if part of the client-approved work scope and project budget.	NA	JR
4. Verify that One Call locators marked their facilities in the designated excavation area or provided notification that they do not have any facilities near the proposed excavation sites.	2/26	JR
5. One Call was contacted to request a "refresh" if utility-locate markings are missing, difficult to see, or more than 14 days old (7 days in some states). "Refresh" markings must be performed by the original marking organization.	NA	JR
Project Director (utility-line marking tasks):		
C. Job walk:		
1. Visual verification that each proposed excavation site does not lie on a line connecting two similar-looking manhole covers (e.g., sanitary sewers or storm drains). (Consider having the line snaked to confirm their locations.)	2/26	JR
2. Visual verification that each proposed excavation site does not lie on a line with any water, gas, electrical meters, utility cleanouts, or other utility boxes in the surrounding areas.	2/26	JR
3. Visual verification that the pavement near each proposed excavation site has not subsided or give the appearance it may be covering a previous excavation (e.g., linear cracks or sagging curbs).	2/26	JR
4. Visual verification that each proposed excavation has adequate overhead clearance for the excavation equipment (e.g., at least 10 feet from overhead-utility lines and/or reasonable distance from canopies).	2/26	JR
5. Fences and fields have been checked for markers, signs, posts, valves, stub outs, etc.	NA	JR
6. Surface structures such as tank batteries, wells, valves, phone pedestals, and electrical junction boxes have been checked for evidence of subsurface utilities.	NA	JR
7. Observed evidence of subsurface utilities has been photographed, sketched, or otherwise documented.	2/26	JR
8. Proposed excavation sites have been "walked"/reviewed by the excavation contractor, Trihydro project manager, and other stakeholders (e.g., client representative, property owner, tenant).	2/26	JR
9. Proposed excavation sites are located at least 5 feet from marked utilities (i.e., the "tolerance zone"), or written approval to excavate within the 5-foot tolerance zone has been obtained from the appropriate utility owner. In no case shall a proposed excavation be located closer than 2 feet from the outside edge of a marked utility. (Note: The tolerance zone is measured from the outside edge of a subsurface structure—not its centerline.)	2/26	JR
10. Verify that the excavation contractor (with help from appropriate utility-line locators, if part of the client-approved work scope) has walked each proposed excavation site to verify all expected utility-line markings are present.	2/26	JR
11. Traffic-control devices, safety barricades, caution tape, and other safety-management devices are in place as needed to protect project personnel.	NA	JR
Project Director (job-walk tasks):		
D. Daylighting / potholing / "soft digging":		
1. The proposed excavation sites located within the "tolerance zone" (and sites located outside the "tolerance zone" when required by the client) have been potholed to a depth below the anticipated utility zone using "minimally intrusive excavation methods" such as vacuum excavation (either air-entrainment or water-jet) and careful hand-tool use.		
2. Monitoring and emergency equipment is available on site when hazardous atmospheres are expected to be encountered in the potholing excavations.		
3. A list of emergency-contact names/numbers is maintained at the potholing excavation site.		
4. The project health and safety plan addresses potential hazards and safety-performance requirements related to utility-clearance operations.		
5. The location of and directions to the nearest hospital are known by all members of the project team.		
6. Representatives of utility owners that requested to be on site for utility locates are present.		

4211 1st Ave South

Excavation, Drilling, and Utility-Locating Checklist

Task	Date	Initials
7. Pothole excavations have been visually checked with a flashlight by the excavation contractor, Trihydro project manager, or her/his designee.		
8. Utilities adjacent to the excavation or that cross the excavation have been daylighted using "minimally intrusive excavation methods."		
9. The areal extent of the excavation-clearance pothole has been verified to extend at least 120% beyond the outside diameter of the largest-diameter down-hole tool to be used in the borehole, or at least 2 feet on each side of daylighted/exposed lines, whichever is greater.		
10. If vacuum excavation (e.g., air knife, air vac, hydro-vac) is not available to daylight utility lines, verify that the non-conductive probe method was used as follows: Scratch the ground no more than 10 inches deep above the utility and then probe the scratched area. If the utility isn't found in the scratched area, repeat the first step until the utility is located. Once the utility is found, its depth must be continually verified with the probe until 2 feet of soil remain above the utility. Carefully hand dig the remaining overburden to expose the utility.		
11. The soil encountered in the excavation-clearance pothole has been verified to be free of bedding material (e.g., clean gravel, clean sand, aggregate base [gravelly sand with ~10% fines], or other non-native-looking material) that could indicate the presence of a previously installed utility line.		
12. Excavation work within 2 feet of an underground utility was "hand dug."		
13. Once the utility lines were exposed and the excavations were safe to enter, the exposed lines (including their protective coating) was examined for damage.		
14. The condition of each utility line exposed during daylighting was documented, and the documentation was forwarded to the Trihydro project manager to place in the project file.		
15. If a utility line was damaged in any way, it was reported to the utility owner and Trihydro project manager and documented in the project file.		
16. Damage to a utility line was documented and repaired before it was reburied. The utility owner signed off on the repairs.		
17. Employees entering the excavation followed the procedures described in the Trihydro "Trenching and Excavation Program" and used the Trihydro "Daily Excavation/Trench Inspection Report" to document excavation condition.		
18. The location of daylighted utilities was documented and photographed after daylighting was completed and before the pothole excavation was backfilled.		
19. Locations for hand digging within the "tolerance zone" were noted.		
Project Director (daylighting/potholing tasks):		
E. Excavation (including drilling):		
1. The appropriate permits have been obtained for the work (e.g., hot-work permits, entry permits).	NA	JR
2. The utility-owner and/or agency representatives that requested to be on site during excavation work are present. (Trihydro Utility Locate Acknowledgement Form)	NA	JR
3. A safety kickoff meeting was conducted with the excavation contractor to review roles/responsibilities, work activities, anticipated hazards, this checklist, and emergency-response procedures before starting excavation work the site. The safety kickoff meeting was documented in the project file.	2/26	JR
4. A daily tailgate safety meeting was conducted and documented in the project file. Verify weather conditions, safety hazards, PPE requirements, job duties, communication, hand signals, etc.	2/26	JR
5. JSAs covering the work to be done are in place and have been reviewed, "marked up" where appropriate, and acknowledged by the excavation project-team members.	2/26	JR
6. Site workers have been reminded to look for hazardous conditions, processes, and activities, and that they are authorized to stop work if they see an unsafe condition.	2/26	JR
7. The emergency-response plan has been reviewed by all excavation project-team members (e.g., contact numbers, evacuation muster points, hospital routes).	2/26	JR
8. The excavation contractor has checked the excavation sites relative to overhead utilities, subsurface-utility locates, and adjacent surface structures.	2/26	JR
9. The excavation contractor has acknowledged the potential location of each subsurface utility marked in the excavation areas.	2/26	JR
10. Proper traffic control and exclusion zones have been established.	NA	JR
11. The excavation equipment (e.g., drill rig, backhoe) has been inspected for proper operation and condition.	2/26	JR
12. Emergency equipment (fire extinguisher, first aid kit, emergency shut-off switch, etc.) has been checked, is readily available, and is in working order.	2/26	JR
13. Excavation project-team members are wearing appropriate PPE per the Trihydro HASP and client/site-specific requirements.	2/26	JR
14. Power in the excavation area has been de-energized, if possible. If power cannot be de-energized, the excavation contractor was advised of the hazard.	NA	JR

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Excavation, Drilling, and Utility-Locating Checklist

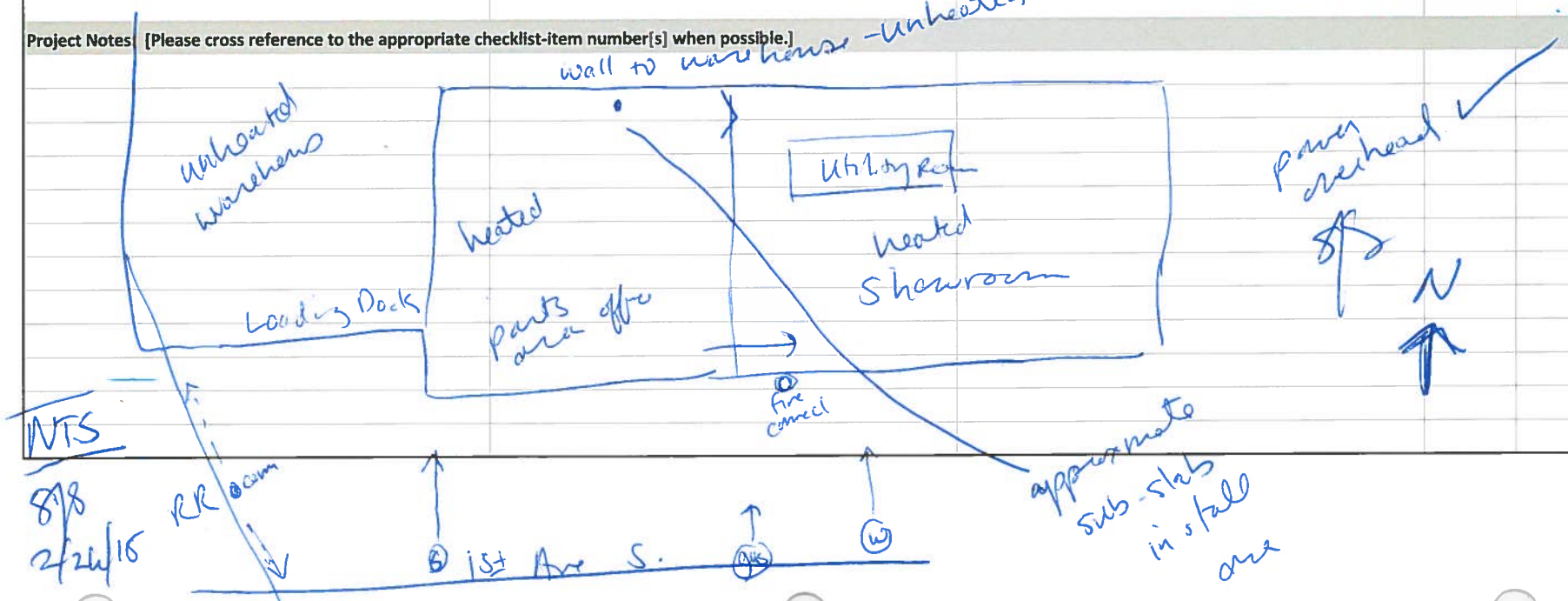
Task	Date	Initials
Project Director (excavation/drilling tasks):		
F. If an unmarked utility line is discovered:		
1. Verify the One Call utility-locate request was made correctly.	2/26	JR
2. Identify the owner/operator of the unmarked utility line and contact One Call (dial "811") to request a "No Response" ticket. If the owner/operator fails to respond again, seek a third-party locating service to mark the utility before: a) excavation work begins, or b) advancing the excavation further.	NA	JR
3. Contact the owner/operator of non-locatable utilities to request they be taken out of service before excavation begins.	NA	JR
4. If possible, a representative of the unmarked utility line should be on site when the unmarked utility is daylighted.	NA	JR
Project Director (unmarked utility line tasks):		

Note:

-- If an item doesn't apply, please insert an "NA" in the "**Date**" column and provide an explanation in the "**Project Notes**" section below.

Sarah Sor Andrew Vann	Syris, Joel, Sarah, Brandt, Jake	2/26/2018
Project Manager	Field Manager / Team Members	Date Reviewed
WDEQ Billy PCE 4211 1st Ave South	Trihydro	
Client / Project Name / Location	Excavator/Driller Name	Date Action Items Completed

Project Notes [Please cross reference to the appropriate checklist-item number[s] when possible.]



4211 1st Ave South

VI Sample: 4211 1st Ave S_Subslab

VI Sample: 4211 1st Ave S_Subslab

VI Sample: 4211 1st Ave S_Subslab

ADDRESS: 4211 1ST AVE S

NOTES:
INDDOR AIR SAMPLES IN FRONT OF OFFICE AREA (PARTS SALES)

ADDRESS: 4211 1ST AVE S

NOTES:
INDOOR AIR SAMPLE IN BACK PARTS STORAGE AREA NEAR NORTH WALL TO UNHEATED WAREHOUSE

APPENDIX E-6

DEEPER WELL SLUG TESTS RESULTS AND ANALYSIS

memorandum

To:	Mike Gipson; DEQ
From:	Tim Moloney; Trihydro
cc:	Andrew Vann; Trihydro
Date:	December 31, 2018
Re:	Remedial Investigation Report Support – Bedrock Wells Slug Test Analysis Discussion Billings PCE Groundwater Facility, Billings, MT

This technical memorandum provides details of the slug test analysis and results for bedrock wells performed as part of the Remedial Investigation at the Billings PCE Groundwater Facility (Facility) located in Billings, Montana. The slug-out test and hydraulic analysis was conducted in accordance with the RI Work Plan (Trihydro 2017). This memorandum supplements the RI Report.

Slug Tests were completed at bedrock monitoring wells MW-126 and MW-127. The tests were initiated following purging and sampling the well on 9/10/18 and 9/11/18, by purging the well dry with a bladder pump. Fluid level measurements were recorded over the following three months as the water level in the wells recovered toward static. The fluid level measurements are compiled in Table 1 (attached).

The measured water levels were subtracted from the pre-test static water level at each well to calculate displacement and the time-displacement data were imported to the computer program AQTESOLV. AQTESOLV was used to fit the Bouwer and Rice (1976) slug test solution to the data to estimate hydraulic conductivity (K) in the aquifer immediately adjacent to the well. The program combines statistical parameter estimation methods with interactive curve-matching capabilities. The solution line was fit by visual curve matching in AQTESOLV, with preference given to matching normalized heads in the range of 0.2-0.3. This resulted in fitting to the late-time data at MW-126 since the head did not approach static until late time; while fitting to the early time data at MW-127. The AQTESOLV outputs are provided in Attachment A (attached).

The saturated thickness of the aquifer was taken as the depth from the top of the shallow saturated zone to the bottom of the wells. It was assumed that the aquifer was confined due to the depth of the screened interval below the shallow water table, and the low permeability weathered bedrock comprising most of the aquifer material above the well screens. Although it is know that the underlying shale is typically upwards of 100-160 ft thick from regional geology (Trihydro 2017).

The estimated hydraulic conductivities were 2.88 x 10-4 feet per day (ft/d) at MW-127 and 4.23 x 10-5 ft/d at MW-126. Those values are within the range of hydraulic conductivities reported for shale by Domenico and Schwartz (1990), which is 2.8 x 10-8 to 5.7 x 10-4 ft/d. The tests suggest that the hydraulic conductivity of the bedrock aquifer is low, consistent with other shale formations.

REFERENCES

Trihydro. 2017. Remedial Investigation Work Plan, Billings PCE Groundwater Facility, Billings, Montana. November 10, 2017.

Bouwer, H. and R.C. Rice. 1976. A slug test method for determining hydraulic conductivity of unconfined aquifers with completely or partially penetrating wells, Water Resources Research, vol. 12, no. 3, pp. 423-428.

Domenico, P.A. and F.W. Schwartz, 1990. Physical and Chemical Hydrogeology, John Wiley & Sons, New York, 824 p.

TABLES

Trihydro
CORPORATION

TABLE 1 OF APPENDIX E6 - SLUG TEST DATA
REMEDIAL INVESTIGATION REPORT, BILLINGS PCE GROUNDWATER FACILITY

Slug Test Data Collection
Billings PCE Plume
Slug Volume = 5.5 gallons on 9/10/18 and 0.5 gallons on 9/11/18
MW-126
Static water 13.14

Date	Day	Time	Elapsed Minutes	Depth to Water	Notes
9/11/2018	Tuesday	7:55		32.98	*Sampled at 08:00 - VOCs only*
9/11/2018	Tuesday	8:08	0	34.25	*purged to maximum depth with bladder pump*
9/11/2018	Tuesday	9:06	58	34.16	
9/11/2018	Tuesday	11:25	197	34.14	
9/11/2018	Tuesday	15:06	418	34.12	
9/11/2018	Tuesday	20:50	762	34.06	
9/12/2018	Wednesday	8:22	1454	33.97	
9/13/2018	Thursday	8:20	2892	33.79	
9/14/2018	Friday	8:22	4334	33.60	
9/15/2018	Saturday	13:58	6110	33.37	
9/17/2018	Monday	16:03	9115	32.97	
9/24/2018	Monday	15:35	19167	31.74	
10/1/2018	Monday	16:06	29278	29.57	*had to re*
10/8/2018	Monday	2:50:00 PM	39170	28.4	
10/22/2018	Monday		59289	24.55	
10/30/2018	Tuesday		70567	22.75	
11/5/2018	Monday		79495	21.51	
11/13/2018	Tuesday		90704	20.2	
11/18/2018	Sunday		98313	19.4	
12/11/2018	Tuesday		131442	17.12	

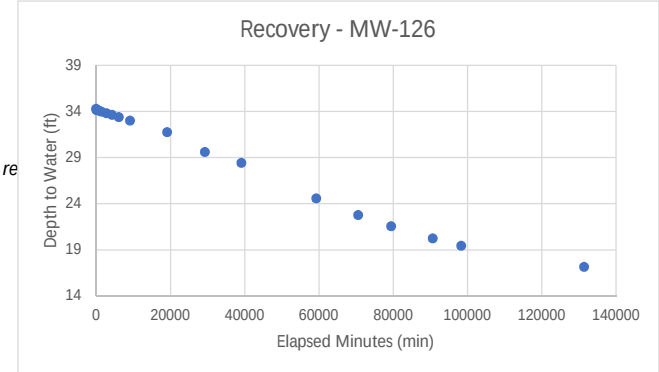
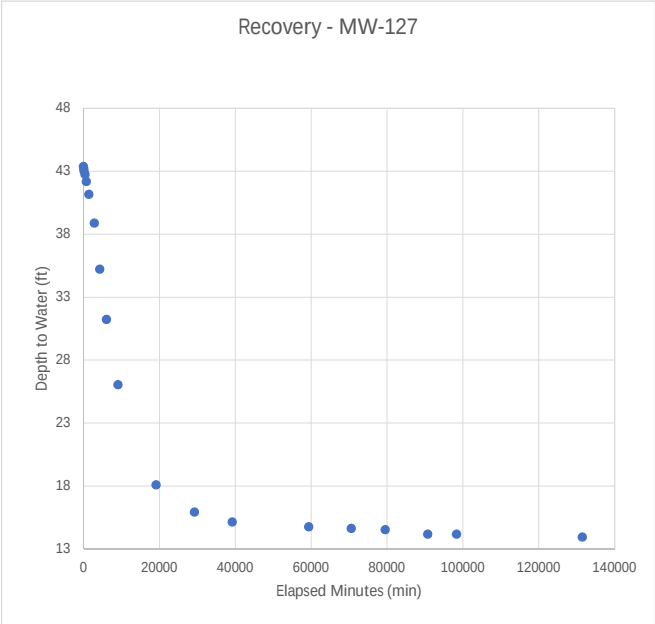


TABLE 1 OF APPENDIX E6 - SLUG TEST DATA
REMEDIAL INVESTIGATION REPORT, BILLINGS PCE GROUNDWATER FACILITY

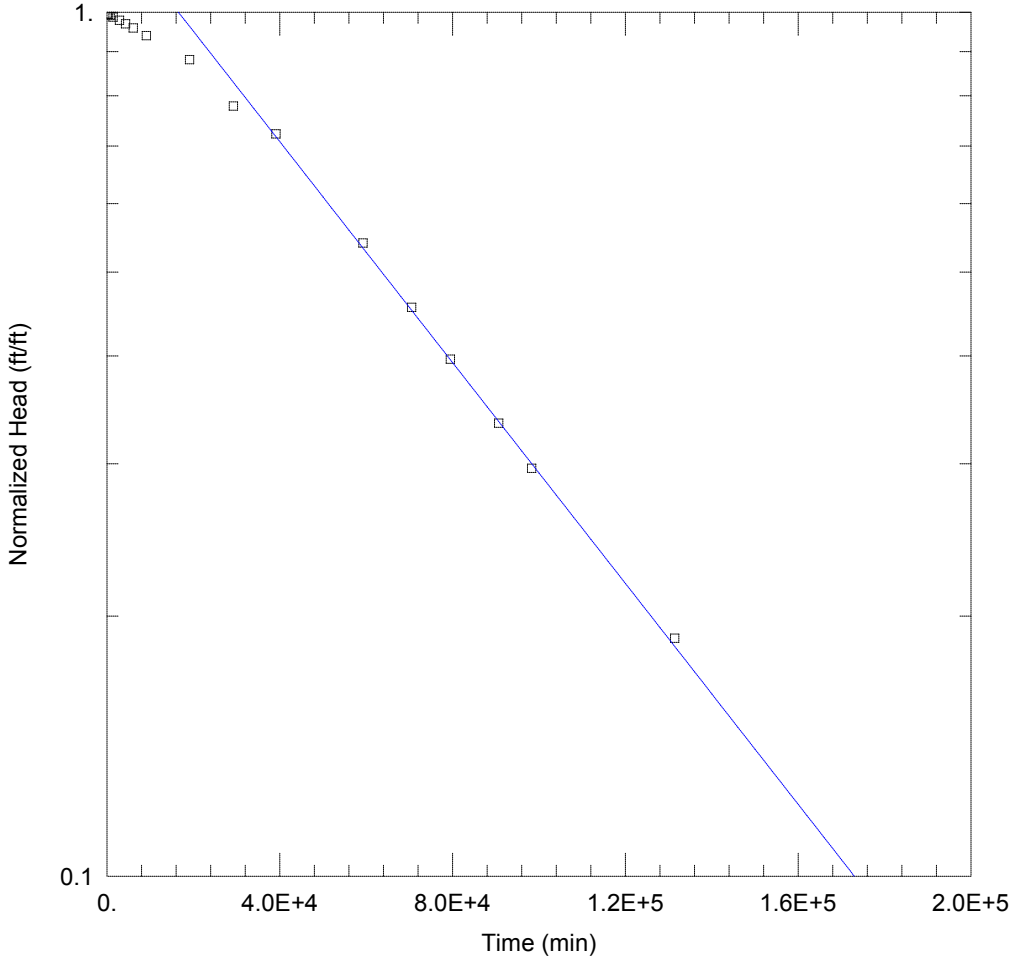
Slug Test Data Collection
Billings PCE Plume
Slug Volume = 7.75 gallons on 9/10/18 and 1.5 gallons on 9/11/18
MW-127
Static water le 13.03

Date	Day	Time	Elapsed Minutes	Depth to Water	Notes
9/11/2018	Tuesday	8:33		40.63	*Prior to Sample Purge*
9/11/2018	Tuesday	8:40			*Sample Collected. VOCs only. Pump inlet lowered.*
9/11/2018	Tuesday	9:00	0	43.36	*Purged Dry. 1.5 gallons*
9/11/2018	Tuesday	10:00	60	43.21	
9/11/2018	Tuesday	11:56	176	43.01	
9/11/2018	Tuesday	15:15	375	42.72	
9/11/2018	Tuesday	21:02	722	42.17	
9/12/2018	Wednesda	8:35	1415	41.16	
9/13/2018	Thursday	8:30	2850	38.87	
9/14/2018	Friday	8:33	4293	35.21	
9/15/2018	Saturday	14:05	6065	31.22	
9/17/2018	Monday	16:13	9073	26.04	
9/24/2018	Monday	15:46	19126	18.08	
10/1/2018	Monday	16:18	29238	15.91	
10/8/2018	Monday	3:00:00 PM	39240	15.13	
10/22/2018	Monday		59356	14.75	
10/30/2018	Tuesday		70634	14.62	
11/5/2018	Monday		79561	14.52	
11/13/2018	Tuesday		90769	14.16	
11/18/2018	Sunday		98378	14.16	
12/11/2018	Tuesday		131515	13.93	



ATTACHMENT A

Trihydro
CORPORATION



WELL TEST ANALYSIS

Data Set: \...\MW-126.aqt
Date: 12/13/18 Time: 10:50:55

PROJECT INFORMATION

Company: Trihydro
Client: MDEQ
Project: 776-036-001
Location: Billings PCE
Test Well: MW-126
Test Date: 9/11/18

AQUIFER DATA

Saturated Thickness: 15.5 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-126)

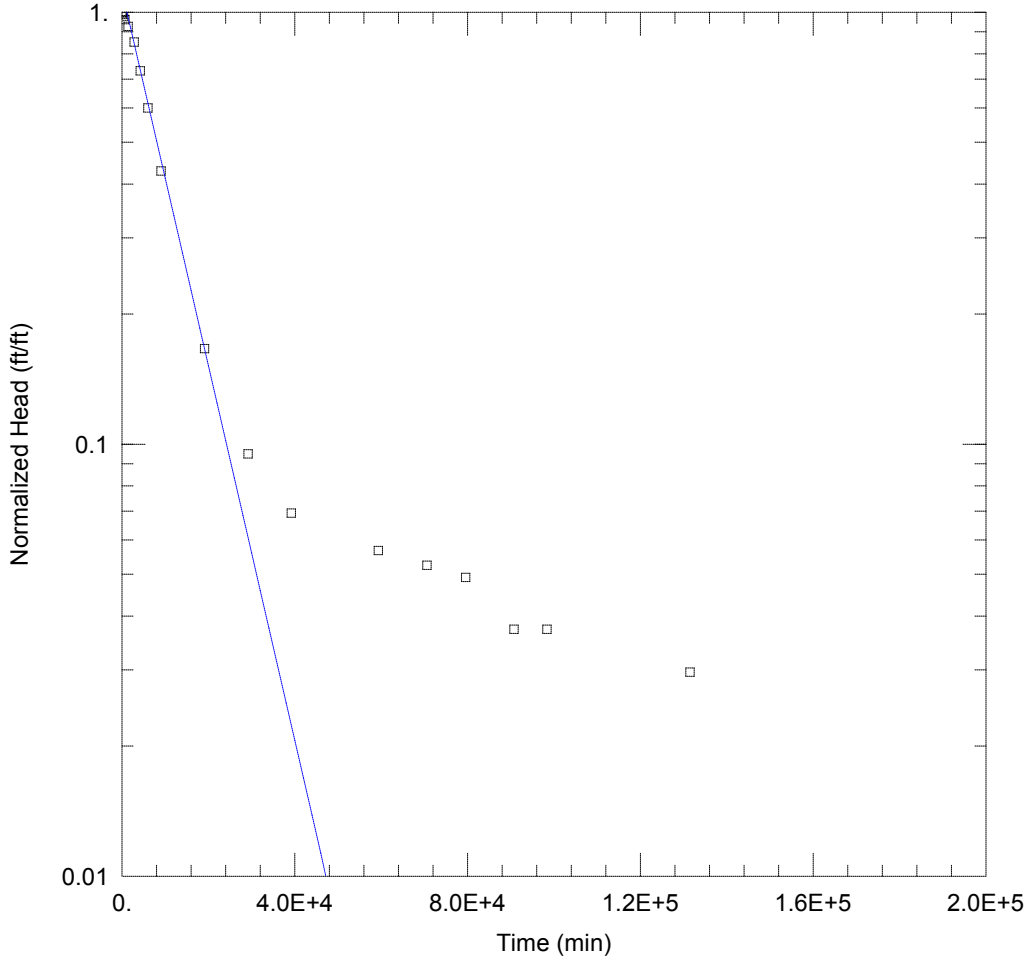
Initial Displacement: -21.11 ft
Total Well Penetration Depth: 30. ft
Casing Radius: 0.08333 ft

Static Water Column Height: 22. ft
Screen Length: 5. ft
Well Radius: 0.344 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 4.227E-5 ft/day y0 = -26.92 ft



WELL TEST ANALYSIS

Data Set: \...\MW-127.aqt
Date: 12/13/18 Time: 10:55:34

PROJECT INFORMATION

Company: Trihydro
Client: MDEQ
Project: 776-036-001
Location: Billings PCE
Test Well: MW-126
Test Date: 9/11/18

AQUIFER DATA

Saturated Thickness: 32. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-127)

Initial Displacement: -30.33 ft
Total Well Penetration Depth: 32. ft
Casing Radius: 0.083 ft
Static Water Column Height: 32. ft
Screen Length: 5. ft
Well Radius: 0.344 ft
Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 0.0002876 ft/day y0 = -34.02 ft

APPENDIX E-7

IDW WASTE MANIFESTS/DISPOSAL RECORDS

Beartooth Environmental, Inc.

NAME OF WASTE STREAM

Non Hazardous Soil

PROFILE #: CH1671222

Beartooth Environmental REP: Scott Jorgenson

[✓] New [ ] Amended

A. GENERATOR INFORMATION

Generator Name: Montana Department of Environmental Quality
Physical Address: 1225 Cedar Street
City: Helena State: MT Zip: 59620
Mailing Address: 2707 Broadwater Ave
City: Helena State: MT Zip: 59602
USEPA ID #: CESQG
State ID#:

Technical Contact: Sarah Seitz
Phone: (406)-558-4850
Fax:
Billing Name: TriHydro
Billing Address: 2707 Broadwater Avenue
City: Helena State: MT Zip: 59602
Attention: Sarah Seitz
Telephone: (406)-579-9991

B. DOT Shipping Name: Non-Hazardous, Non D.O.T Regulated (Soil with trace contaminants))

UN/NA No.: NA Packing Group: NA Hazard Class: NA RQ: NA

C. RCRA Process Generating: Dry Cleaning Site Clean-up

	Yes	No
RCRA Waste?	[ ]	[✓]
Exempt Waste?:	[ ]	[✓]
TSCA Waste?:	[ ]	[✓]
Universal Waste?:	[ ]	[✓]

EPA Waste Codes: none

D. REPORT CODES

SIC Code: 9512
Source Code: G32
Form Code: W301
Origin Code:
System Type:

E. OTHER COMPONENTS

	[✓] No	[ ] Yes	Total ppm
PCB's	[ ]	[ ]	
Cyanides	[ ]	[ ]	
Sulfides	[ ]	[ ]	
Pesticides	[ ]	[ ]	
Phenolics	[ ]	[ ]	
Dioxins	[ ]	[ ]	
Halogens	[ ]	[ ]	

F. PHYSICAL CHARACTERISTICS AT 70° F

1. Infectious or Biological Waste? [ ] Yes [✓] No
2. NCR Regulated Radioactivity? [ ] Yes [✓] No
3. Reactivity [✓] None [ ] Pyrophoric [ ] Cyanides [ ] Sulfides [ ] Water Reactive [ ] Shock Sensitive [ ] DOT Explosive [ ] Other

Weight
Density: ____ Lbs./Gal. 114 Lbs./Cu. Ft.
Dry Weight [ ] < 1.0% [ ] 1 - 5% [ ] 5 - 20% [✓] 20 - 100%

pH [✓] N/A [ ] 0-2 [ ] 2.1-4 [ ] 4.1-10 [ ] 10.1-12.4 [ ] ≥12.5 Exact:

Dermal Toxicity LD_{50} (Mg/Kg)
[ ] ≤40 [ ] >40, ≤200 [ ] >200, ≤1000 [✓] >1000
Material poisonous by inhalation? [ ] Yes [✓] No

Oral Toxicity LD_{50} (Mg/Kg)
[✓] Solids [ ] Liquids
[ ] ≤5 [ ] >50, ≤200 [✓] >50, ≤500 [ ] >5, ≤50 [ ] >200 [ ] >500

[ ] Gas (Cylinder) [✓] Solid 100%
[ ] Aerosol [ ] Sludges
[ ] Lab-Pack [ ] Free Liquids
[ ] Loose-Pack 100%
[ ] Over-Pack

Flash Point (liquid only)
[ ] <73°F (23°C)
[ ] 73-140°F (23-60°C)
[ ] 142-200°F (61-93°C)
[ ] >200°F (93°C)
[✓] N/A

Boiling Point
[ ] <95°F (35°C)
[ ] >95°F (35°C)
[✓] N/A

	Yes	No
5. Is waste stored in vented drums?	[ ]	[✓]
6. Is waste pumpable?	[ ]	[✓]
7. Is waste polymerizable?	[ ]	[✓]
8. Is waste subject to the National Emission Standards for Benzene Waste Operations (40 CFR 61 SubpartFF)?	[ ]	[✓]
9. Is this waste regulated as an ozone depleting substance (40 CFR part 82)?	[ ]	[✓]
10. Does this waste contain scrap metal pieces greater than 2 inches in size?	[ ]	[✓]

Layers
[✓] Single Layer [ ] Bi-layer [ ] Multi-layer

Viscosity
[ ] Low [ ] Medium [✓] High

Odor
[✓] None [ ] Mild [ ] Strong Describe:

Color/Appearance: Varies/Soil

BTU/Lb.: 0

H. PHYSICAL/CHEMICAL CONSTITUENTS

Non Hazardous Soil from Site Clean-Up	100%
Contains:	
Contaminated Soil	100%
See two provided Soil Analysis	
20170801-IDW-01 & 20180523-Waste	
	100%

(Attach All MSDS, Sample Analysis and Additional Info.)

G. METALS [✓] None
[✓] TCLP(mg/l) [ ] STLC(mg/l) [✓] Total(ppm)
[ ] Generator Knowledge

	Reg. Limit	Below	Above	Range
Arsenic	5 mg/L	[✓]	[ ]	0.022 mg/L
Barium	100 mg/L	[ ]	[ ]	0.83 mg/L
Cadmium	1 mg/L	[ ]	[ ]	0.0052 mg/L
Chromium	5 mg/L	[ ]	[ ]	ND
Copper		[ ]	[ ]	
Lead	5 mg/L	[ ]	[ ]	0.011 mg/L
Mercury	0.2 mg/L	[ ]	[ ]	ND
Nickel	134 mg/L	[ ]	[ ]	
Selenium	1 mg/L	[ ]	[ ]	ND
Silver	5 mg/L	[ ]	[ ]	ND
Zinc		[ ]	[ ]	
Others:				

I. ANTICIPATED VOLUME

Qty.	Container	Qty.	Container
	5 gl. pail		Cubic Yard Box*
	14 gl. drum		Super Sack*
	30 gl. drum		Rolloff
50X	55 gl. drum		Tanker*
	85 gl. drum		Other

Per [✓] 1 Time [ ] Week [ ] Month [ ] Year [ ] Other

(*) Is this waste regulated as a Marine Pollutant (49CFR 172.101) [ ] Yes [✓] No

Generator's Certification:

I hereby certify that the above and attached description is complete and accurate to the best of my knowledge and ability to determine that no deliberate or willful omissions of composition properties exist and that all known or suspected hazards have been disclosed. I certify that the materials tested are representative of all materials described by this profile.

I authorize Mountain States Environmental to make waste characterization decisions as per 40 CFR part 261 and land disposal restriction notification and certification as per 40 CFR part 268.

Generator's Authorized Signature: _____ Date: 6/26/18

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CESQG

2. Page 1 of 1

3. Emergency Response Phone: 800-884-2597

4. Waste Tracking Number: MT2018152

5. Generator's Name and Mailing Address
MT Dept of Environ Quality(Trihydro)
2707 Broadwater Ave Attn:Sarah Heitz
Helena,MT 59601
Generator's Phone: 406 444-6472

Generator's Site Address (if different than mailing address)
~~1225 Cedar Street~~ JW
~~Helena,MT 59620~~
715 Central Ave.
Billings, MT 59101

6. Transporter 1 Company Name
SMITH SYSTEMS TRANSPORTATION
U.S. EPA ID Number: MTD986382133

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Clean Harbors Deer Trail,LLC
108555 EAST Hwy 36 BCR-1
Deer Trail, CO 80105
Facility's Phone: 970-386-2293
U.S. EPA ID Number: COD981300484

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
	1. Non Hazardous, Non D.O.T. Regulated (Soil with trace contaminants)	42	DW	1400	P	
	2.					
	3.					
	4.					

13. Special Handling Instructions and Additional Information
1) CH1671222 Non Hazardous soil
(CC#DE000018/ MT11037)

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name | Signature | Month | Day | Year

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name | Signature | Month | Day | Year
Transporter 2 Printed/Typed Name | Signature | Month | Day | Year

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator) | Month | Day | Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name | Signature | Month | Day | Year

GENERATOR | INT'L | TRANSPORTER | DESIGNATED FACILITY

GENERATOR'S/SHIPPER'S INITIAL COPY

Beartooth Environmental, Inc.
5635 Silver Saddle Dr.
Shepherd, MT 59079
Phone (406) 373-2220 Fax (406) 373-6300

WORK ORDER AUTHORIZATION

Generator: Montana Department of Environmental Quality
Attn: Mike Gipson
Address: 1225 Cedar Street
Helena, MT 59620
Phone: 406-444-6422

Work order 8715
EPA ID #: CESQG

Site: 715 Central Avenue
Billings, MT 59102

Manifest # : MT 2018152

Manifest Mailed to: Trihydro, 2707 Broadwater Ave
Helena, MT 59602

Bill to Customer: Trihydro, 2707 Broadwater Ave
Helena, MT 59602

Cust. P.O. # :

Site Contact: Sarah Seitz
Phone: 406-558-4850 Mobile: 303.910.6187

Pickup for Disposal

Quantity	Size/Type	Material	Manifest	Profile #	Disp. Site
42 ~~60~~	55/DM	Non Hazardous Soil		New	Harbors DR

Equip./Materials:	Volume Of Waste:

The Undersigned hereby authorizes and requests Beartooth Environmental Services to perform the work specified above.

Luke Darnell
Name (Please Print)

Signature / Title — Date: 6/26/18

Beartooth Environmental Representative — Date: 6-26-18

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	CESQG	1	800-884-2597	MT2018152A

5. Generator's Name and Mailing Address
MT Dept. of Environ Quality (Trihydro)
2707 Broadwater Ave. Attn: Sarah Seitz
Helena, MT 59601
Generator's Phone: 406-444-6422

Generator's Site Address (if different than mailing address)
715 Central Ave
Billings, MT 59101

6. Transporter 1 Company Name: SMITH SYSTEMS TRANSPORTATION
U.S. EPA ID Number: NED986382133

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address: CLEAN HARBORS DEERTRAIL, LLC
10855 EAST HIGHWAY 36
DEERTRAIL, CO 80105 U.S.A
Facility's Phone: 970-388-2262
U.S. EPA ID Number: COD991300484

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
	1. Non Hazardous, Non D.O.T., Regulated (Soil with trace contaminants)	14	DM	9,800	P	
	2.					
	3.					
	4.					

13. Special Handling Instructions and Additional Information 14x55
1) CH1671222 Non Hazardous Soil

(CC#BE000018/MT11037)

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name | Signature | Month | Day | Year

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Bryan Russell | Signature: Bryan Russell | Month 6 | Day 26 | Year 18
Transporter 2 Printed/Typed Name | Signature | Month | Day | Year

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator) | U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator) | Month | Day | Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name | Signature | Month | Day | Year

GENERATOR | INT'L | TRANSPORTER | DESIGNATED FACILITY

GENERATOR'S/SHIPPER'S INITIAL COPY

Beartooth Environmental, Inc.
5635 Silver Saddle Dr.
Shepherd, MT 59079
Phone (406) 373-2220 Fax (406) 373-6300

WORK ORDER AUTHORIZATION

Generator: Montana Department of Environmental Quality
Attn: Mike Gipson
Address: 1225 Cedar Street
Helena, MT 59620
Phone: 406-444-6422

Work order 8722
EPA ID #: CESQG

Site: 715 Central Avenue
Billings, MT 59102

Manifest #: MT2018152A

Manifest Mailed to: Trihydro, 2707 Broadwater Ave
Helena, MT 59602

Bill to Customer: Trihydro, 2707 Broadwater Ave
Helena, MT 59602

Cust. P.O. #:

Site Contact: Sarah Seitz
Phone: 406-558-4850 Mobile: 303.910.6187

Pickup for Disposal

Quantity	Size/Type	Material	Manifest	Profile #	Disp. Site
14	55/DM	Non Hazardous Soil		CH1671222	Harbors DR

Equip./Materials:	Volume Of Waste:

The Undersigned hereby authorizes and requests Beartooth Environmental Services to perform the work specified above.

Name (Please Print)

Signature / Title — Date: 6/20/18

Beartooth Environmental Representative — Date: 6-26-18

65652

CITY OF BILLINGS PUBLIC WORKS DEPARTMENT

LIQUID WASTE/SEPTAGE PERMIT – MANIFEST

Manifest No.

Domestic Septage Grease Trap Wastes Industrial/Other (attach Discharge Authorization)

No Appointment Appointment Date_____ Time_____

This Section to be filled in by Generator

Generator Business/Residence Name MT Department of Environmental Quality

Address 533 South 20th Street West Phone No. _____

Authorized Representative Lucas Darnell

Description of Waste Purge Water

Volume of Waste 300 gallons

"I certify that the information furnished herein is true, accurate and complete, and that any test results of the waste submitted to the Department accurately represent the waste presented for disposal, and, for nonseptage waste, that I have contacted the Department and received approval for disposal of this waste. I certify that the waste contains no materials prohibited by Section 26-604, BMCC or hazardous materials as defined by any applicable local, state or federal law. I understand that violation of any of the rules and regulations of the Department or ordinances and resolutions of the City will subject me to revocation of disposal privileges under this program and to any penalties available under the law."

Generator Signature _____ Date 10/30/18

(Authorized Representative/Homeowner) (or a copy of contract authorizing removal of wastes)

This Section to be filled in by Waste Hauler

Waste Hauler Business Name _____

Waste Received by Hauler on _____ at _____ AM PM

Truck No. _____

"I certify that the information furnished herein is true, accurate and complete. I certify that I have not added any materials prohibited by Section 26-604, BMCC or hazardous or other untested or unauthorized materials to this waste and agree that I will not dispose of any hazardous materials as defined by applicable local, state or federal law. I understand that violation of any of the rules and regulations of the Department or ordinances and resolutions of the city will subject me to revocation of disposal privileges and to any penalties available under the law."

Driver/Operator Signature _____

This Section to be filled in by Water Reclamation Facility (WRF) Personnel

Discharge Refused: Coupon Issue Missing Signatures/Authorization pH Issue No Appointment

Designated Discharge Location: Waste Disposal Station Grease Disposal Station Other_____

Volume: _____ (est gallons) Discharge Coupons attached: yes no #_____(1 per1000 gal)

If sampled, Sample ID # _____ pH _____(must be between 5.5 – 11.0)

Comment: _____

WRF Employee Signature _____Date _____at_____ AM PM

Signature verifies that the above named hauler delivered the described wastes in the designated volume for proper disposal

** SEE BACK OF FORM FOR MATERIALS PROHIBITED UNDER SECTION 26-604 BMCC

Distribution:

White Copy – City Yellow Copy – Waste Hauler Pink Copy – Waste Generator

U-41-12 Rev. 07/2017

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	CESQG		800-884-2587	

5. Generator's Name and Mailing Address
MT Dept of Environ Quality (Trihydro)
2707 Broadwater Ave Attn Sarah Seitz
Helena, MT 59601
Generator's Phone: 406-444-6422

Generator's Site Address (if different than mailing address)
533 South 20th Street West
Billings, MT 59102

6. Transporter 1 Company Name: MP Environmental, Inc
U.S. EPA ID Number: CAT000624247

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Billings Waste Water Treatment Plant
725 U S 87
Billings, MT 59101 USA
Facility's Phone: 406-657-8356

U.S. EPA ID Number: NA

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non Hazardous, Non D.O.T Regulated (Clean Well Purge Water)	1	TT	300	G	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
1) Clean Well Purge Water, Approved by Boris Krizek for Disposal

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name | Signature | Month | Day | Year

GENERATOR

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

INT'L

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name | Signature | Month | Day | Year

Transporter 2 Printed/Typed Name | Signature | Month | Day | Year

TRANSPORTER

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) | Month | Day | Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name | Signature | Month | Day | Year

DESIGNATED FACILITY

Beartooth Environmental, Inc.
5635 Silver Saddle Dr.
Shepherd, MT 59079
Phone (406) 373-2220 Fax (406) 373-6300

WORK ORDER AUTHORIZATION

Generator: Montana Department of Environmental Quality (Trif
Attn: Lucas Darnell
Address: 1225 Cedar Street
Helena, MT 59620
Phone: 406-444-6422

Work order 8941
EPA ID #: CESQG

Site: 533 South 20th Street West
Billings, MT 59102

Manifest # :

Manifest Mailed to: Trihydro, 2707 Broadwater Ave
Helena, MT 59602

Cust. P.O. # :

Bill to Customer: Trihydro, 2707 Broadwater Ave
Helena, MT 59602

Site Contact: Sarah Seitz
Phone: 406-558-4850 Mobile: 303.910.6187

Pickup for Disposal

Quantity	Size/Type	Material	Manifest	Profile #	Disp. Site
1	Bulk	Decant Water to Billings Waste Water Treatment Plant		NA	WWTP

Equip./Materials:	Volume Of Waste:

The Undersigned hereby authorizes and requests Beartooth Environmental Services to perform the work specified above.

L. Darnell
Name (Please Print)

10/30/18
Signature / Title Date

Beartooth Environmental Representative Date

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CESQG
2. Page 1 of 1
3. Emergency Response Phone: 406-855-0321
4. Waste Tracking Number: MT201862618

5. Generator's Name and Mailing Address
Montana Department of Environmental Quality
715 Central Ave
Billings, MT 59101 USA
Generator's Phone: 406-558-4180

Generator's Site Address (if different than mailing address)

6. Transporter 1 Company Name: MP Environmental, inc
U.S. EPA ID Number: CAT000824247

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Billings Waste Water Treatment Plant
725 U.S. 87
Billings, MT 59101 USA
Facility's Phone: 406-657-8356
U.S. EPA ID Number: NA

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
	1. Non Hazardous, Non D.O.T. (Clean Purge Water)	1	TT	23,200	P	
	2.					
	3.					
	4.					

13. Special Handling Instructions and Additional Information
1) Clean Purge Water (Approved by Boros Krzenk for disposal)

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: [illegible] Signature: Month 6 Day [illegible] Year 15

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: [illegible] Signature: [illegible] Month [illegible] Day [illegible] Year [illegible]
Transporter 2 Printed/Typed Name: Signature: Month Day Year

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator) Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: Signature: Month Day Year

GENERATOR | INT'L | TRANSPORTER | DESIGNATED FACILITY

GENERATOR'S/SHIPPER'S INITIAL COPY

Beartooth Environmental, Inc.
5635 Silver Saddle Dr.
Shepherd, MT 59079
Phone (406) 373-2220 Fax (406) 373-6300

WORK ORDER AUTHORIZATION

Generator: Montana Department of Environmental Quality
Attn: Mike Gipson
Address: 1225 Cedar Street
Helena, MT 59620
Phone: 406-444-6422

Work order 8723
EPA ID #: CESQG

Site: 715 Central Avenue
Billings, MT 59102

Manifest # :

Manifest Mailed to: Trihydro, 2707 Broadwater Ave
Helena, MT 59602

Cust. P.O. # :

Bill to Customer: Trihydro, 2707 Broadwater Ave
Helena, MT 59602

Site Contact: Sarah Seitz
Phone: 406-558-4850 Mobile: 303.910.6187

Pickup for Disposal

Quantity	Size/Type	Material	Manifest	Profile #	Disp. Site
1	Bulk	Decant Water to Billings Waste Water Treatment Plant		NA	WWTP

Equip./Materials:	Volume Of Waste:

The Undersigned hereby authorizes and requests Beartooth Environmental Services to perform the work specified above.

L. Darnell
Name (Please Print)

Signature / Title — Date 6/29/18

Beartooth Environmental Representative — Date 6/29/18

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CESQG
2. Page 1 of 1
3. Emergency Response Phone: 406-855-0321
4. Waste Tracking Number: MT 201862618A

5. Generator's Name and Mailing Address
Montana Department of Environmental Quality
715 Central Ave
Billings, MT 59101 USA
Generator's Phone:

Generator's Site Address (if different than mailing address)

6. Transporter 1 Company Name: MP Environmental, Inc
U.S. EPA ID Number: CAT000624247

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Billings Waste Water Treatment Plant
725 U.S. Hwy 87
Billings, MT 59101 USA
Facility's Phone:
U.S. EPA ID Number: NA

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non Hazardous, Non D.O.T. (clean purge water)	1	TT	1,201	P	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
1) Clean Purge Water (Approved by Boros Krzenk for disposal)

14. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name | Signature | Month | Day | Year

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name | Signature | Month | Day | Year
Transporter 2 Printed/Typed Name | Signature | Month | Day | Year

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator) | U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator) | Month | Day | Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name | Signature | Month | Day | Year

GENERATOR | INT'L | TRANSPORTER | DESIGNATED FACILITY

GENERATOR'S/SHIPPER'S INITIAL COPY

Beartooth Environmental, Inc.
5635 Silver Saddle Dr.
Shepherd, MT 59079
Phone (406) 373-2220 Fax (406) 373-6300

WORK ORDER AUTHORIZATION

Generator: Montana Department of Environmental Quality
Attn: Mike Gipson
Address: 1225 Cedar Street
Helena, MT 59620
Phone: 406-444-6422

Work order 8732
EPA ID #: CESQG

Site: 715 Central Avenue
Billings, MT 59102

Manifest # :

Manifest Mailed to: Trihydro, 2707 Broadwater Ave
Helena, MT 59602

Cust. P.O. # :

Bill to Customer: Trihydro, 2707 Broadwater Ave
Helena, MT 59602

Site Contact: Sarah Seitz
Phone: 406-558-4850 Mobile: 303.910.6187

Pickup for Disposal

Quantity	Size/Type	Material	Manifest	Profile #	Disp. Site
1	Bulk	Decant Water to Billings Waste Water Treatment Plant		NA	WWTP

Equip./Materials:	Volume Of Waste:

The Undersigned hereby authorizes and requests Beartooth Environmental Services to perform the work specified above.

L. Darrell
Name (Please Print)

Signature / Title

6/25/18
Date

Beartooth Environmental Representative

Date

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number: CESQG
2. Page 1 of 1
3. Emergency Response Phone: 406-855-0321
4. Waste Tracking Number: MT051018

5. Generator's Name and Mailing Address
Montana Department of Environmental Quality
715 Central Ave
Billings, MT 59101 USA
Generator's Phone: 406-558-4180

Generator's Site Address (if different than mailing address)

6. Transporter 1 Company Name: MP Environmental, Inc
U.S. EPA ID Number: CAT000624247

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Billings Waste Water Treatment Plant
725 U.S. 87
Billings, MT 59101 USA
Facility's Phone: 406-657-8356
U.S. EPA ID Number: NA

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.
1.	Non-Hazardous, Non-D.O.T. (Clean well Purge water)	1	TT	12,000	~~G~~ P SW
2.					
3.					
4.					

13. Special Handling Instructions and Additional Information
1) Clean well purge water, Approved by Boris Krizek for disposal

14. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: L. Dawn
Signature:
Month 5 Day 11 Year 18

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Tim Malson
Signature:
Month 5 Day 11 Year 18

Transporter 2 Printed/Typed Name
Signature
Month Day Year

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in item 17a

Printed/Typed Name
Signature
Month Day Year

GENERATOR | INT'L | TRANSPORTER | DESIGNATED FACILITY

169-BLC-O 5 11977 (Rev. 9/09)

DESIGNATED FACILITY TO GENERATOR

CITY OF BILLINGS PUBLIC WORKS DEPARTMENT
NON HAZARDOUS INDUSTRIAL WASTE/OTHER WASTE
DISCHARGE AUTHORIZATION

Attached to Manifest # _____

SAMPLING AND SITE INSPECTION

Type of Waste: Groundwater		**Estimated Gallons: 700**
Sampling location (s): Billings, MT	Sampling Equipment Used: peristaltic pump	Sample Type : Composite / Grab Composite
Potentially Toxic Materials: a. From MSDS _____ b. From City Sewer Ordinance _____		COMMENTS:

WITNESS

I certify that I was present at the time the above sample was taken and verify the information noted.

Signature of Authorized Agent — Date 4/30/2018 — Time 1500

SAMPLER

I certify that I have obtained a representative sample of the above described waste.

WWTP Representative — Date 4/30/18 — Time 1500

GENERATOR OF WASTE Cell:

Name of Company: **Montana DEQ**	Contact Name/ Phone # : Mike Gipson/406 444 6422
Location: **Helena, MT 59620**	Mailing Address: **1225 Cedar St**
Type of Industry / Business Activities: Government/Remediation	

The Generator of the waste materials delivered to the Public Works Department Water Reclamation Facility this _____ day of _____, 20____ acknowledges that acceptance of the waste material at the Water Reclamation Facility does not constitute a release by the City of Billings, Public Works Department, of further or future liability which may result from this waste alone, or this waste in combination with other accepted waste, at the Water Reclamation Facility, if said waste, or combination thereof, are hazardous waste materials, or exhibit the characteristics of a hazardous waste material. Furthermore, the Generator of such materials acknowledges and agrees that it will reimburse the City of Billings Public Works Department for any costs which may be incurred as a result of the acceptance of the waste of the Generator at the Water Reclamation Facility or by any resulting hazardous waste disposal liability which may be imposed at the facility as a result of any such acceptance.

SIGNATURE OF AUTHORIZED AGENT & TITLE: DEQ project officer DATE: 5/02/2018

WASTE CHARACTERIZATION

Constituent	TCLP Concentration, mg/L	TCLP Limits mg/L	Local Limits Value	Local Limits Units	Constituent	TCLP Concentration mg/L	TCLP Limits mg/L	Local Limits Mass lbs/day	Local Limits lbs/day
1. Arsenic	0.026J	5.0	1.33	lbs/day	11. Silver	0.0017J	5.0	1.80	mg/l
2. Barium	0.0061J	100			12. Zinc	0.028J	N/A	24.87	mg/l
3. Cadmium	ND(0.0023)	1.0	0.03	mg/l	13. TPH	0.43	N/A	100	mg/l
4. Chromium	ND(0.0025)	5.0	27.25	mg/l	14. Benzene	ND(0.086)	0.5	0.75	mg/l
4.a. Chromium VI	0.0035J		3.39	mg/l	15. BETX	0.00058	N/A	0.75	mg/l
5. Copper	ND(0.0042)		5.18	mg/l	16. pH	8.5	2 - 12.5	2-12.5	s.u.
6. Lead	ND(0.015)	5.0	1.04	mg/l	17. Flashpoint ,°C	ND(200)	>60 OC		
7. Mercury	ND(0.18)	0.2	0.0057	mg/l	18. R-Cyanide, ppm	0.0034J	250 mg/kg	0.66	mg/l
8. Molybdenum	ND(0.0081)				19. R-Sulfide, ppm	ND (0.045)	500 mg/kg		
9. Nickel	ND(0.0057)		8.87	mg/l	20. Methylene chloride	ND(0.0012)		0.80	mg/l
10. Selenium	ND(0.032)	1.0	3.87	lbs/day	21. Tetrachloroethene	0.0183		1.6	mg/l

✓Hauled waste, which exceeds any above listed constituent(s), shall not be disposed of at the WWTP.
✓If suspected to be present Herbicides/Pesticides, Organochlorine Pesticides, Volatile Organics, Semi-Volatile Organics may be required monitoring and must meet the limitations as listed under 40 CFR 261.24.

Environmental Affairs Approval	Y/N	Signature:	Date: 05/08/18
Water Quality Division Approval	Y/N	Signature:	Date:

CITY OF BILLINGS PUBLIC WORKS DEPARTMENT
NON HAZARDOUS INDUSTRIAL WASTE/OTHER WASTE
DISCHARGE AUTHORIZATION
Attached to Manifest # _____

SAMPLING AND SITE INSPECTION

Type of Waste: Groundwater (purge and well development)		**Estimated Gallons**: 2700 - 2800 gallons
Sampling location (s): Billings, MT	Sampling Equipment Used: Peristaltic Pump	Sample Type : Composite / (Grab)
Potentially Toxic Materials: a. From MSDS _____ b. From City Sewer Ordinance _____		COMMENTS: *Two samples taken as composite samples of purge and well development groundwater. Analytical results for both samples included below.

WITNESS

I certify that I was present at the time the above sample was taken and verify the information noted. 5/3/18

Signature of Authorized Agent — Date: 5/31/18 — Time: 8:00am

Mike Gipson
Printed Name of Authorized Agent

SAMPLER

I certify that I have obtained a representative sample of the above described waste.

Representative — Date: 6/25/18 — Time: 1600

Luke Darnell
Printed Name of Representative

GENERATOR OF WASTE

Name of Company: **Montana Department Environmental Quality**	Contact Name/ Phone # : **Mike Gipson / 406-444-6422** MGipson@mt.gov
Location: **Helena, MT 59620**	Mailing Address: **1225 Cedar St.**
Type of Industry / Business Activities:	

The Generator of the waste materials delivered to the Public Works Department Water Reclamation Facility **this _____ day of _____, 20____** acknowledges that acceptance of the waste material at the Water Reclamation Facility does not constitute a release by the City of Billings, Public Works Department, of further or future liability which may result from this waste alone, or this waste in combination with other accepted waste, at the Water Reclamation Facility, if said waste, or combination thereof, are hazardous waste materials, or exhibit the characteristics of a hazardous waste material. Furthermore, the Generator of such materials acknowledges and agrees that it will reimburse the City of Billings Public Works Department for any costs which may be incurred as a result of the acceptance of the waste of the Generator at the Water Reclamation Facility or by any resulting hazardous waste disposal liability which may be imposed at the facility as a result of any such acceptance.

SIGNATURE OF AUTHORIZED AGENT & TITLE: _____ **DATE:** 6/25/2018

WASTE CHARACTERIZATION

Constituent	TCLP	TCLP	Local Limits	**Local Limits**	Constituent	TCLP	TCLP	Local Limits	**Local Limits**
	Concentration, mg/L	Limits mg/L	Value	Units		Concentration mg/L	Limits mg/L	Mass lbs/day	Limits lbs/day
1. Arsenic	*BDL (<0.1) / BDL (<0.1)	5.0	1.52	lbs/day	11. Silver	BDL (<0.05) / 0.0022	5.0	0.375	mg/l
2. Barium	0.042 / 0.032	100			12. Zinc	NT	N/A	12.76	mg/l
3. Cadmium	BDL (<0.015)/ BDL (<0.015)	1.0	0.04	mg/l	13. TPH	0.544 / 0.148	N/A	N/A	mg/l
4. Chromium	BDL (<0.05) / BDL (<0.05)	5.0	12.96	mg/l	14. Benzene	BDL (<0.001) / 0.00028	0.5	N/A	mg/l
4.a. Chromium VI	0.0061 / 0.0075		1.33	mg/l	15. BETX	BDL (<0.02) / 0.0086	N/A	N/A	mg/l
5. Copper	NT		2.91	mg/l	16. pH	7.9	2 - 12.5	5.5-12.5	s.u.
6. Lead	BDL (<0.05) / BDL (<0.05)	5.0	1.04	mg/l	17. Flashpoint ,°C	BDL (<60) / BDL (<60)	>60 OC		
7. Mercury	BDL (<0.0006) / BDL (<0.0006)	0.2	0.0017	mg/l	18. R-Cyanide, ppm (total, non-TCLP)	0.0087 / BDL (<0.02)	250 mg/kg	0.39	mg/l
8. Molybdenum	NT	N/A	N/A	mg/l	19. R-Sulfide, ppm (total, non-TCLP)	BDL (<0.1) / BDL (<0.1)	500 mg/kg	N/A	
9. Nickel	NT		3.44	mg/l	20. Methylene chloride (non-TCLP)	BDL (<0.004)/ BDL (<0.004)	N/A	N/A	mg/l
10. Selenium	BDL (<0.1) / BDL (<0.1)	1.0	5.17	lbs/day	21. Tetrachloroethene (non-TCLP)	0.0023 / 0.0238	N/A	N/A	mg/l

✓Hauled waste, which exceeds any above listed constituent(s), shall not be disposed of at the WWTP. ✓If suspected to be present Herbicides/Pesticides, Organochlorine Pesticides, Volatile Organics, Semi-Volatile Organics may be required monitoring and must meet the limitations as listed under 40 CFR 261.24			
Environmental Affairs Approval	**Y/N**	**Signature:**	**Date:**
Water Quality Division Approval	**Y/N**	**Signature:**	**Date:**
Revised: June, 2018			

CITY OF BILLINGS PUBLIC WORKS DEPARTMENT
NON HAZARDOUS INDUSTRIAL WASTE/OTHER WASTE
DISCHARGE AUTHORIZATION
Attached to Manifest # _____

SAMPLING AND SITE INSPECTION

Type of Waste: Groundwater (purge and well development)		**Estimated Gallons**: 300 gallons
Sampling location (s): Billings, MT	Sampling Equipment Used: Peristaltic Pump	Sample Type : Composite / Grab
Potentially Toxic Materials: a. From MSDS _____ b. From City Sewer Ordinance _____		COMMENTS:

WITNESS

I certify that I was present at the time the above sample was taken and verify the information noted.

10/18/18 11:38

Signature of Authorized Agent Date Time

Mike Gipson

Printed Name of Authorized Agent

SAMPLER

I certify that I have obtained a representative sample of the above described waste.

10/18/18 1138

Representative Date Time

Syris Trahan

Printed Name of Representative

GENERATOR OF WASTE

Name of Company: **Montana Department Environmental Quality**	Contact Name/ Phone # : **Mike Gipson / 406-444-6422** MGipson@mt.gov
Location: **Helena, MT 59620**	Mailing Address: **1225 Cedar St.**

Type of Industry Business Activities: Groundwater Sampling Activities

The Generator of the waste materials delivered to the Public Works Department Water Reclamation Facility **this** _____ **day of** _____, **20**____ acknowledges that acceptance of the waste material at the Water Reclamation Facility does not constitute a release by the City of Billings, Public Works Department, of further or future liability which may result from this waste alone, or this waste in combination with other accepted waste, at the Water Reclamation Facility, if said waste, or combination thereof, are hazardous waste materials, or exhibit the characteristics of a hazardous waste material. Furthermore, the Generator of such materials acknowledges and agrees that it will reimburse the City of Billings Public Works Department for any costs which may be incurred as a result of the acceptance of the waste of the Generator at the Water Reclamation Facility or by any resulting hazardous waste disposal liability which may be imposed at the facility as a result of any such acceptance.

SIGNATURE OF AUTHORIZED AGENT & TITLE: _____ **DATE:** 10/18/18

WASTE CHARACTERIZATION

Constituent	TCLP	TCLP	Local Limits	Local Limits	Constituent	TCLP	TCLP	Local Limits	Local Limits
	Concentration, mg/L	Limits mg/L	Value	Units		Concentration mg/L	Limits mg/L	Mass lbs/day	Limits lbs/day
1. Arsenic	BDL (<0.19)	5.0	1.52	lbs/day	11. Silver	BDL (<0.0019)	5.0	0.375	mg/l
2. Barium	0.033	100			12. Zinc	0.028	N/A	12.76	mg/l
3. Cadmium	BDL (<0.0013)	1.0	0.04	mg/l	13. TPH	5.180	N/A	N/A	mg/l
4. Chromium	BDL (<0.0025)	5.0	12.96	mg/l	14. Benzene	0.00079	0.5	N/A	mg/l
4.a. Chromium VI	0.011		1.33	mg/l	15. BETX	0.003383	N/A	N/A	mg/l
5. Copper	BDL(0.0060)		2.91	mg/l	16. pH	7.7	2 - 12.5	5.5-12.5	s.u.
6. Lead	BDL (<0.0098)	5.0	1.04	mg/l	17. Flashpoint ,°C	>93.3°C	>60 OC		
7. Mercury	BDL (<0.078)	0.2	0.0017	mg/l	18. R-Cyanide, ppm (total, non-TCLP)	0.0169	250 mg/kg	0.39	mg/l
8. Molybdenum	0.012	N/A	N/A	mg/l	19. R-Sulfide, ppm (total, non-TCLP)	BDL (<0.045)	500 mg/kg	N/A	
9. Nickel	0.0082		3.44	mg/l	20. Methylene chloride (non-TCLP)	BDL (<0.00098)	N/A	N/A	mg/l
10. Selenium	BDL (<0.029)	1.0	5.17	lbs/day	21. Tetrachloroethene (non-TCLP)	0.505	N/A	N/A	mg/l

✓Hauled waste, which exceeds any above listed constituent(s), shall not be disposed of at the WWTP.
✓If suspected to be present Herbicides/Pesticides, Organochlorine Pesticides, Volatile Organics, Semi-Volatile Organics may be required monitoring and must meet the limitations as listed under 40 CFR 261.24

Environmental Affairs Approval	Y/N	**Signature:**	**Date:**
Water Quality Division Approval	Y/N	**Signature:**	**Date:**
Revised: June, 2018			