MARCH 11, 2026

GRANITE PEAK
ENVIRONMENTAL

Prepared By:
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SUPPLEMENTAL WORK PLAN
FORMER DOLLAR RENT-A-CAR
1921 1ST AVENUE NORTH
BILLINGS, MONTANA 59101

Big Sky Economic Development
Brownfield Program
201 North Broadway
Billings, MT 59101
406.869.8407

Supplemental Work Plan

Facility ID 56-13982 (TID 30644); Release 3965; Work Plan 35162

Former Dollar Rent-a-Car
1921 1st Avenue North
Billings, MT 59101

Prepared For:
Big Sky Economic Development
201 North Broadway
Billings, MT 59101

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Version 2

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Former Dollar Rent-a-Car
Billings, Montana

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Gene Hauck Landowner Endless Holdings, LLC	Date
Dianne Lehm Senior Project Manager Big Sky Economic Development	Date
Jonathon Love Environmental Project Officer Montana Department of Environmental Quality	Date
Curtis Jeffries Brownfields Project Officer U.S. Environmental Protection Agency	Date

David Sanborn
Project Manager
Granite Peak Environmental

Date

Christin Hileman
QA/QC Manager
Granite Peak Environmental

Date

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Distribution List

This Supplemental Work Plan will be distributed to representatives of the following organizations. The representatives below are responsible for distributing the work plan to all necessary parties within their organization.

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1.0 Introduction

Granite Peak Environmental, LLC (Granite Peak) prepared this Supplemental Work Plan (SWP) on behalf of Big Sky Economic Development (BSED) and the Landowner, Gene Hauck, to assist with additional groundwater monitoring at the Former Dollar Rent-a-Car (site), located at 1921 1st Avenue North in Billings, Montana; Facility ID 56-13982 (TID 30644), Release 3965 (**Figures 1** and **2**). This SWP was requested by the landowner and drafted for the Montana Department of Environmental Quality (DEQ) Contaminated Site Cleanup Bureau. The purpose of groundwater monitoring under this SWP is to further evaluate the extent and magnitude of petroleum contamination in groundwater on site. This SWP will be reviewed and approved by the Montana DEQ, the U.S. Environmental Protection Agency (EPA), and the landowner prior to initiation of work.

The general objectives of this investigation are to:

- Sample petroleum-impacted groundwater at well M3 for EPH, VPH and lead scavengers
- Absorb any remaining aged LNAPL in M3 using absorbent socks

2.0 Site Background

2.1 Site Description

The site is located at 1921 1st Avenue North in Billings, Montana (**Figure 1**). This commercial property is situated just east of downtown Billings at the northeastern corner of North 20th Street and 1st Avenue North (**Figure 2**). The site is approximately 0.32-acres and has an approximate latitude and longitude of 45.7872100º north and 108.4957550º west, respectively.

2.2 Site Setting

The site is a commercial lot located in a primarily commercial/industrial area of Billings. The site is a relatively flat lot covered by asphalt and concrete. One single-story structure is located on the site and is used as a real estate office.

2.3 Geology, Hydrogeology, and Soils

Billings is situated in the Yellowstone Valley below a prominent sandstone scarp, known as the "Rimrocks." The most prominent outcrop is the Eagle Sandstone, an Upper Cretaceous, very fine to fine-grained, cross-bedded sandstone. The Eagle Sandstone is underlain by The Telegraph Creek Formation, an Upper Cretaceous shale and sandy shale formation (Shelton, 1965).

The Yellowstone Valley is comprised of seven distinct terraces that were deposited during the Holocene and Pleistocene epochs by the ancestral Yellowstone River. The urban area of Billings is predominantly situated upon the second and third terraces (Mulder and Schmidt, 2011). The subject property lies on the second terrace which is a quaternary structure underlain with alluvial deposits approximately 20 to 40 feet above the present-day water level of the Yellowstone River, located southeast of downtown Billings. Sediments generally consist of 0-50 feet of silty clay, sandy clay, and clay-bound gravel overlying 0-40 feet of rounded gravel, pebbles, and cobbles in a silty-to-sandy matrix (Olson and Reiten, 2002).

The United States Department of Agriculture (USDA, 2024) soil survey lists the subject property as Haverson-Hysham loams. This soil is a well-drained linear soil from alluvium material. It is typical of terraces and floodplains. Minor components include Lohmiller and Glenberg.

Granite Peak performed two groundwater monitoring events in the Spring and Fall of 2025. The groundwater monitoring events recorded groundwater elevation data to create groundwater flow maps and elevation tables. The data collected in June 2025 showed depth to water ranging from 7.73 feet in M1R to 8.67 feet in M7 with a southeast flow direction. Groundwater data from November 2025 showed depth to water ranging from 8.69 feet in M1R to 9.5 feet in M7 with a similar southeast flow direction. The data collected, including groundwater elevations and figures can be found in the September 5, 2025, Remedial Investigation Report (Granite Peak, 2025) and the February 3, 2026, Groundwater Monitoring Report (Granite Peak, 2026). Groundwater elevations from the November 2025 groundwater monitoring event are provided on **Table 1**.

2.4 Current Ownership of the Site

The site is currently owned by Endless Holdings, LLC.

2.5 Previous Investigations

Granite Peak received environmental reports from Montana DEQ Case Manager Jonathon Love regarding the site during completion of a Phase I Environmental Site Assessment (Granite Peak, 2024). The reports provided information concerning the petroleum release at the site, including remedial investigations and groundwater monitoring events that have occurred onsite. Granite Peak has compared previous groundwater results to updated Montana DEQ Risk Based Screening Levels (RBSLs) (DEQ, 2024), and cumulative data tables are presented in **Table 2.**

According to the Olympus Technical Services, Inc.'s 2013 Annual Groundwater Monitoring Report (Olympus, 2014), in June 2000, a 550-gallon waste oil tank was discovered and removed during construction activities at the subject property. **Figure 3** shows the location of the former tank. At that time, approximately 450 gallons of oily sludge were removed from the tank and approximately 200 tons of contaminated soil were excavated around the tank (**Figure 3**). The soil sample collected beneath a concrete slab below the UST had a Total Extractable Hydrocarbons (TEH) concentration of 1,880 mg/kg, C9-C12 aliphatics of 2.1 mg/kg, and Total Purgeable Hydrocarbons (TPH) of 3.0 mg/kg.

In July 2004, a remedial investigation was conducted at the site that included the installation of monitoring wells M1 and M2. The soil sample collected from 10 to 11.5 feet below ground surface (bgs) during installation of M1 had a TEH concentration of 14,000 mg/kg, C19-C26 aliphatics level of 10,500 mg/kg, and C11-C12 aromatics of 1,360 mg/kg, all of which exceeded their respective Montana DEQ RBSLs at the time of the investigation. As shown on Table 1 in the 2025 Remedial Investigation Work Plan, these results no longer exceed updated RBSLs. In addition, the groundwater sample collected from well M1 had a C19-C36 aliphatics concentration of 4,700 µg/l, which at the time of this investigation was above the RBSL. As shown on **Table 2**, this result also no longer exceeds updated RBSLs. A hydrocarbon scan analysis performed on the sample collected from well M1 indicated that the hydrocarbon profile resembled a mixture of lubricating oil (>90%) and diesel fuel.

Following the July 2004 investigation and groundwater monitoring event, a down-gradient well (M3) was installed in August 2006 (**Figure 3**). Soil samples from M3 showed elevated levels of volatile petroleum hydrocarbons (VPH) and extractable petroleum hydrocarbons (EPH), including concentrations of C9-C10 aromatics, TEH, and other aliphatics that exceeded RBSLs at the time of this investigation. The C9-C10 aromatics concentration of 133 mg/kg is the only result that exceeds updated RBSLs from the 2004 soil sampling event.

In June 2008, light non-aqueous phase liquid (LNAPL), or free product was found in down-gradient wells M1 and M3 at a thickness of 1.1 to 1.6 feet (**Table 2**). In 2009, free product removal from the impacted wells was attempted, with 25 gallons recovered in April 2009, and 38 gallons recovered in May 2009.

In July 2012, an additional down-gradient well, M4, was installed at the location shown in **Figure 3**. Soil samples from M4 and groundwater samples collected from M4 did not exceed VPH or EPH RBSLs. Due to LNAPL presence, samples could not be collected from wells M1 (0.56 feet) and M3 (0.38 feet) (**Table 2**). In 2013, groundwater samples collected from M4 did not exceed VPH or EPH RBSLs and a groundwater sample was not collected from M2 due to VPH and EPH constituents not exceeding RBSLs since sampling began at M2.

Between June 4 and June 5, 2025, Granite Peak advanced five boreholes at the site, both near the former waste oil UST as well as downgradient from it, to investigate petroleum contamination in soils. Surface soil (<2 feet bgs) and subsurface soil (>2 feet bgs) were screened and collected in accordance with the Remedial Investigation Work Plan. All soil samples were analyzed for VPH, EPH screen, lead scavengers, and VOCs. If the EPH screen exceeded 200 mg/kg on any sample, it was also analyzed for EPH fractions and PAHs. As requested by Montana DEQ, three soil samples were analyzed for RCRA 8 metals.

Granite Peak attempted to locate all previously installed monitoring wells (M1, M2, M3, and M4) to determine if they were suitable for sampling. Granite Peak was able to locate wells M2, M3, and M4 and determined they were usable. However, M1 could not be located and was required to be replaced. On June 4 and 5, 2025, Granite Peak installed and developed four new groundwater monitoring wells (M1R, M5, M6, and M7). The existing and new wells were subsequently sampled from June 5 to June 9, 2025 for the same contaminants of concern as soils. The analytical results did not identify any exceedances of direct contact screening levels in subsurface soils or groundwater. However, two contaminants, barium and lead, exceeded leaching to groundwater screening levels in subsurface soil sample M6-7. Groundwater data collected from this same location (M6) showed lead was not detected in groundwater and barium was only detected at 0.05 µg/L, which is significantly lower than its associated screening level of 1,000 µg/L. Therefore, it appeared that neither lead nor barium are leaching into groundwater at unsafe levels at this sampling location. Groundwater was not sampled at M3 due to the presence of LNAPL in the well.

To sample M3, Granite Peak spoke with Montana DEQ Project Officer Jonathan Love on ways to address the LNAPL. The following describes the implemented plan to remove LNAPL. On October 28, 2025, Granite Peak staff measured LNAPL thickness in monitoring well M3 to allow for well development and groundwater sampling during the November 2025 groundwater monitoring event. LNAPL was measured at 0.55 feet thick. Following this measurement, Granite Peak extended a small PVC-pipe with an absorbent pad affixed to the end to absorb LNAPL from the top of the water column. This process was repeated until product was not detected in the well. Following the absorption of all LNAPL, groundwater was measured at 9.15 feet below top of casing (btoc).

On November 4, 2025, one week following the LNAPL absorption in monitoring well M3, Granite Peak staff developed M3 in accordance with DEQ's guidance. Prior to development, staff measured LNAPL at 0.13' thick. The well was then developed by surging and pumping a minimum of 10 saturated casing volumes of groundwater.

From November 4 to November 6, 2025, Granite Peak staff completed a second groundwater monitoring event on the seven monitoring wells located on site. In accordance with the January 2025 RIWP, water level measurements and groundwater samples were collected form the monitoring wells to evaluate groundwater quality trends. All samples were analyzed for VPH, EPH, and lead scavengers and it was determined that no VOC or PAH sampling would be required during this second event. Additionally, two samples were analyzed for RCRA-8 metals in accordance with guidance from the DEQ Project Manager. Analytical results showed some detections, but no exceedances of RBSLs. Updated cumulative groundwater results can be found on **Table 2,** and **Figures 3 and 4** show the groundwater monitoring event, elevation, and flow direction.

2.6 Known or Suspected Contamination

As discussed in **Section 2.5**, subsurface soil and groundwater samples from the June 2025 investigation did not show any results above direct contact screening levels. Two results for barium and lead in soil sample M6-7 showed exceedances of leaching to groundwater screening levels, but groundwater samples in the same well (M6) showed results below screening levels. M3 was not sampled in June of 2025 due to the presence of LNAPL.

The November 2025 groundwater investigation showed similar results, with no exceedances of RBSLs. Detections were seen for EPH in M1R, DCA in M5, VPH, EPH, and metals in M6, and VPH, EPH, and metals in M7. None of these results exceeded RBSLs.

Sampling of groundwater in M3 was completed in November of 2025, a task that had not been completed since August of 2006. A thin layer of LNAPL was still present on the top of the water column in the well, but following absorption, the well was developed and sampled. Detections of VPHs, DCA, and EPH were found in analytical results, but all remained below RBSLs.

At this time, there are no soil or groundwater contaminants found on site above RBSLs, but since M3 was only sampled once, it was determined that additional groundwater sampling should occur to see that constituents remain below RBSLs through the high and low groundwater of 2026.

3.0 Investigation

3.1 Petroleum Data Quality Objectives

Groundwater Data Quality Objectives (DQOs) for this investigation are presented in **Table 3**. The primary objectives of this SWP are to assist in the removal of LNAPL from the M3 monitoring well using absorbent socks and then perform groundwater sampling to evaluate petroleum impacted groundwater for EPH, VPH and lead scavengers.

3.2 Health and Safety

Granite Peak staff associated with this project have been trained appropriately and have sufficient experience to complete this job in an efficient, but more importantly, safe manner. Safety is of the utmost concern, and all necessary precautions will be taken to make sure human health and the environment are protected during the site investigation. Granite Peak staff will review and follow the Site-Specific Health and Safety Plan (HASP) provided in **Appendix A**. All field staff will have up-to-date Occupational Safety and Health Administration (OSHA) 40-hour Hazardous Waste Operations and Emergency Response safety training (HAZWOPER) and associated 8-hour refresher training. Subcontractors, if necessary, will also be required to have the appropriate training to complete the work. All necessary training and certificates will be retained on the Granite Peak server and be available upon request.

The field team will operate under the direction of the Granite Peak Project Manager, who is identified in the EPA-approved QAPP (Granite Peak, 2026). All field staff will review this SAP and associated Standard Operating Procedures (SOPs) (**Appendix B**) prior to beginning field work to understand the purpose and investigative approach. Daily safety meetings and project briefings will be held by the Field Lead prior to commencing work each day. Field personnel, including the Field Lead, are identified in **Appendix A**.

All project management and field personnel have the authority to stop work at any time if the site becomes inaccessible or unsafe conditions arise. If a stop work order is issued, or if any other issues arise that require corrective action, the Field Lead will notify the Granite Peak Project Manager immediately so the issue can be properly assessed, addressed, and documented in a manner consistent with the EPA-approved QAPP (Granite Peak, 2026). Corrective actions will be determined by the Project Manager on a case-by-case basis and may include identifying alternative sampling locations or methods and/or postponing field activities. The Granite Peak Project Manager will coordinate and communicate any changes to the sampling approach with DEQ and EPA Project Officers, as needed.

3.3 Data Collection, Analysis, and Management

All field work will be performed by Granite Peak employees and subcontractors, as needed, in accordance with this DEQ and EPA-approved work plan, as well as the access agreement executed between the owner and Granite Peak.

The analytical laboratory will be notified prior to the work to ensure all sample equipment, container arrangements, and expected sample delivery times are confirmed. Granite Peak will also confirm all extraction methods and holding times with the laboratory prior to the start of work. All critical supplies and field consumables will be managed by the Field Lead under the direction of the Project Manager. A Field Preparation Plan (FPP) showing appropriate communication lines, investigative approach, proposed sample numbers, analytical methods, containers, and holding times are included in this SAP as **Appendix C**. The FPP will be edited and finalized by the Field Lead based on final approval of the work plan by the DEQ and EPA. The Project Manager will be responsible for checking the form for accuracy. Both the Field Lead and the Project Manager will sign the FPP prior to commencing field activities.

All samples will be labelled, packaged, and delivered on ice immediately following sample collection in accordance with SOP-2 (**Appendix B**). All samples will be delivered to the laboratory under chain-of-custody in accordance with SOP-3 (**Appendix B**). All samples will be analyzed by the laboratory on standard turnaround times of ten business days unless otherwise specified.

All equipment used to collect data will be calibrated, operated, and maintained in accordance with SOP-13 (**Appendix B**).

All data and information gathered during the investigation will be recorded on the appropriate field forms including daily field logs, groundwater monitoring forms, and field notes in accordance with SOP-1 (**Appendix B**). Daily reviews with the project manager will be completed to ensure the correct number and type of samples are collected. Should any issues with the sampling approach or collection methods be discovered, the project manager will immediately direct the field staff to correct the situation. All field logs, forms and notes will be saved electronically on the Granite Peak secure server.

3.4 LNAPL Absorption

Absorbent socks, also known as soak socks, are economical, highly absorbent socks that can be lowered into 2-inch diameter or larger wells. These socks selectively absorb floating hydrocarbons suspended at the top of the well while minimizing water retention. Absorbent socks will be lowered into M3 and used to remove old product (LNAPL) from the well prior to sampling events to ensure accurate sampling and data collection. Absorbent socks will be installed by attaching a catch cord

to the socks and lowering them until the sock is covering the top of the water column/in the location of the LNAPL. The sock will remain in the well, until removed by field staff and properly disposed of. Absorbent socks will be placed in M3 upon the approval of this Supplemental Work Plan (Spring 2026) and will be replaced monthly by Granite Peal staff until the end of groundwater monitoring (Fall 2026). No groundwater sampling will occur within 48 hours of removing an absorbent sock to avoid interference to the water column.

3.5 Groundwater Compliance Monitoring

Granite Peak will conduct groundwater monitoring events during seasonally high and low groundwater, expected in Spring and Fall of 2026, respectively. The well to be sampled during each monitoring event is M3. Prior to sampling, the absorbent sock will be removed, and the water level will be measured with an interface probe to evaluate groundwater elevation in accordance with SOP-12 (**Appendix B**). The well will be purged using a low-flow bladder pump or peristaltic pump prior to sampling and continue until field parameters including specific conductivity (SC), pH, dissolved oxygen (DO), oxidation reduction potential (ORP), turbidity, and temperature have stabilized in accordance with SOP-14 (**Appendix B**). During and after purging, the water level will be measured and recorded. Groundwater samples will be collected in accordance with SOP-7 (**Appendix B**) and labeled, packaged, and delivered under chain-of custody to Energy Laboratories in Billings, Montana in accordance with SOP-2 and SOP-3 (**Appendix B**). Groundwater samples will be analyzed for the contaminants shown in **Table 3-1**.

Table 3-1: Contaminants of Potential Concern with Proposed Laboratory Analytical Methods

Contaminants of Potential Concern (COPCs)	Analytical Method	Surface Soil	Subsurface Soil	Groundwater
Volatile Petroleum Hydrocarbons (VPH)	VPH MT & EPA 8260			X
Extractable Petroleum Hydrocarbons (EPH)	MT EPH Screen			X
Lead Scavengers*	EPA 8260 & 8011			X

*Lead Scavengers will be sampled in the Spring event and if no exceedances are present, they will not be sampled in the Fall event. If an exceedance is present, Lead Scavengers will be sampled in the Fall event.

3.6 Equipment Decontamination During Investigation

Granite Peak will decontaminate field and sampling equipment to be utilized on site to prevent cross-contamination in accordance with SOP-4 (**Appendix B**). Granite Peak staff will decontaminate all non-disposable sampling equipment that may contact potentially contaminated sources. While wearing disposable gloves, Granite Peak staff will visually inspect sampling equipment for evidence of contamination, and if found, remove with a brush. The process of decontamination will then include a wash and scrub with a degreasing solution, a deionized (DI) water rinse, a 10% dilute methanol rinse, and finally a thorough rinse with DI water. All disposable field sampling or collection materials will be discarded in a garbage bag and disposed of properly.

3.7 Investigative Derived Waste Plan

All purge water will be disposed of in accordance with the DEQ's Disposal of Untreated Purge Water from Monitoring Wells Flow Chart (DEQ, 2015).

3.8 Quality Assurance / Quality Control Sampling

Quality control samples collected during this investigation will include field duplicates and trip blanks in accordance with SOP-5 (**Appendix B**). One blind duplicate sample will be collected. Equipment rinse blanks are not proposed in this SWP as only one well is being sampled each event and full decontamination of all sampling equipment occurs prior to each sampling event. Trip blanks are supplied by the laboratory and will accompany each cooler where samples are to be analyzed for volatile organics. The following summarizes the QC samples that will be collected:

- One field duplicate sample will be collected during each groundwater sampling event. The sample will be a duplicate of the M3 groundwater sample and will be analyzed for EPH, VPH, and lead scavengers.
- One laboratory provided trip blank will accompany the samples in the cooler to the laboratory. The trip blank will be analyzed for VPH analysis.

A Field Preparation Plan will be used by Granite Peak staff to ensure that samples collected in the field are in accordance with the approved work plan (**Appendix C**).

4.0 Reporting

4.1 Report of Findings

Granite Peak will prepare one Groundwater Monitoring Report upon completion of the Spring and Fall groundwater monitoring events. The report will be provided to all associated parties, including Montana DEQ, the EPA, BSED, and the landowner. The report will summarize the work completed, identify any deviations to the scope proposed within this work plan, and provide recommendations for additional investigation and/or cleanup, as warranted. Based on the Cleanup Guidance for Petroleum Releases (DEQ, 2020), the report will include the following:

- Cover Letter
- Text summarizing the groundwater investigation
- Cumulative groundwater tables
- Tables and field logs summarizing field parameters
- Site Figures
- Field notes, field photos, daily field logs, groundwater sampling forms, and any other pertinent information to this investigation will be included as appendices to the report.
- Analytical data packages
- Summary of quality control samples and findings and data validation results
- Findings and completeness of the investigation

Groundwater results will be compared to Montana DEQ Tier 1 Risk Based Screening Levels (RBSLs) based on the sample depth and site use plan (DEQ, 2024). A comparison of screening levels to laboratory report limits for groundwater is provided in **Appendix D**. A summary of the comparisons is provided below:

- Groundwater – Compared to Montana DEQ Tier 1 Groundwater RBSLs and Standards.

Granite Peak will validate all data collected in accordance with DEQ's Data Validation Summary Form (**Appendix E**). Data qualifiers will be applied to the data, if necessary, consistent with DEQ guidelines. Granite Peak will review all data, including qualifiers, and will report whether any data qualifiers impact the quality of the data reported.

5.0 Schedule

The first round of groundwater monitoring will be initiated upon review and approval of this work plan by the landowner, BSED, DEQ, and EPA. Upon approval of the work plan, the investigation will proceed in Spring 2026. The field investigation will take approximately one day. Laboratory results will be available approximately four weeks after sampling. The second round of groundwater monitoring will be conducted in Fall 2026. A Groundwater Monitoring Report showing cumulative data from both events will be prepared within four weeks following receipt of laboratory analytical results from the Fall 2026 groundwater sampling event.

6.0 References

Granite Peak Environmental, LLC (Granite Peak), 2026. Programmatic Quality Assurance Property Plan. Big Sky Economic Development Brownfields Program. January.

_____, 2024. Phase I Environmental Site Assessment, Former Dollar Rent-a-Car, 1921 1st Avenue North, Billings, Montana 59101. Prepared for Big Sky Economic Development Brownfields Program. November 2024.

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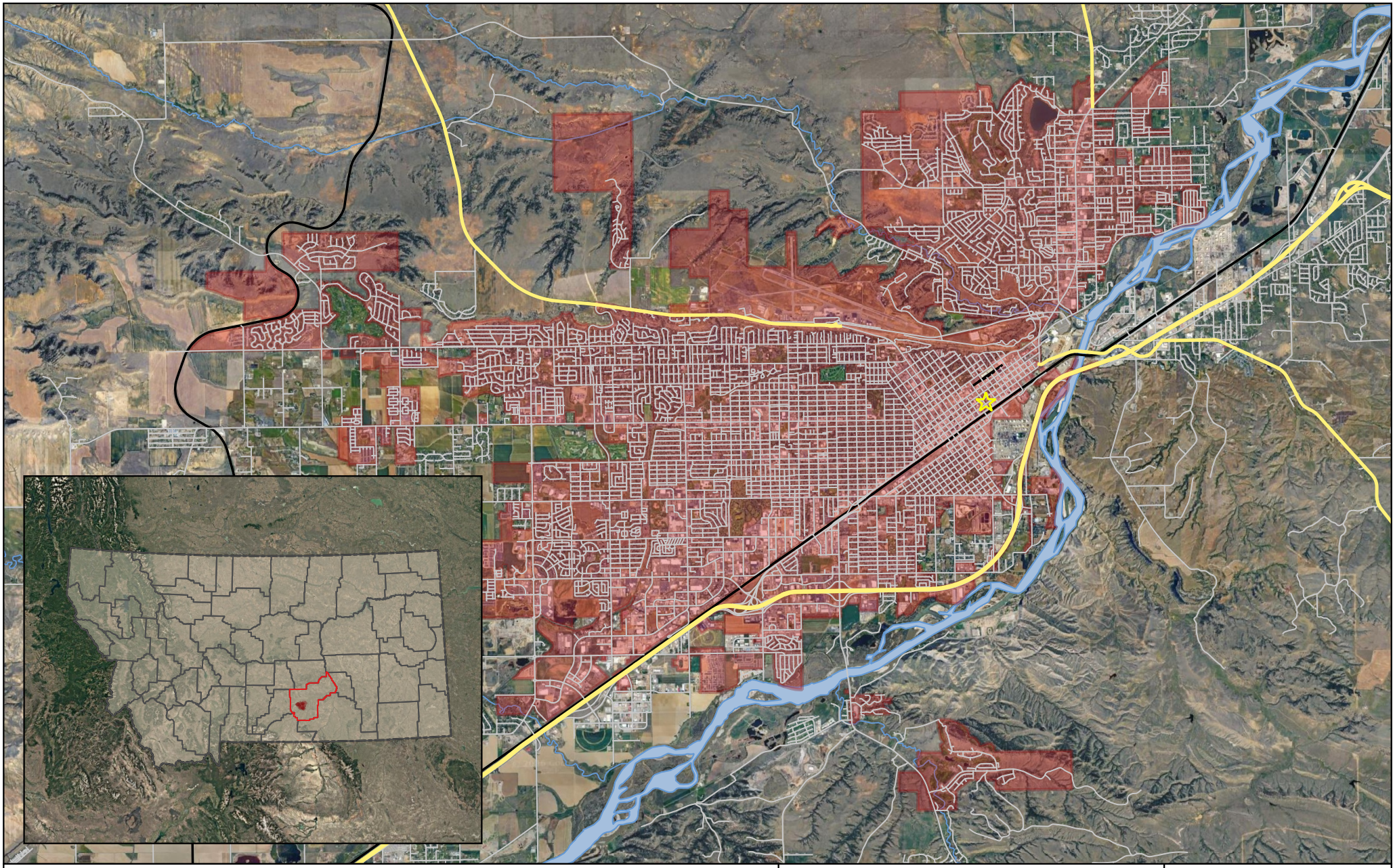
Shelton, 1965. Trend and Genesis of Lowermost Sandstone Unit of Eagle Sandstone at Billings, Montana. *AAPG Bulletin* 1965;49(9):1385–1397.

United States Department of Agriculture (USDA), 2024. Web Soil Survey. Accessed in December at https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx.

FIGURES



Former Dollar Rent-a-Car
1921 1st Ave N
Billings, MT 59101

FIGURE 1
Area Map

GRANITE PEAK ENVIRONMENTAL

DATE: 03/05/2026	DRAWN BY: SJ	Imagery ©2025 Google

N

Site Boundary

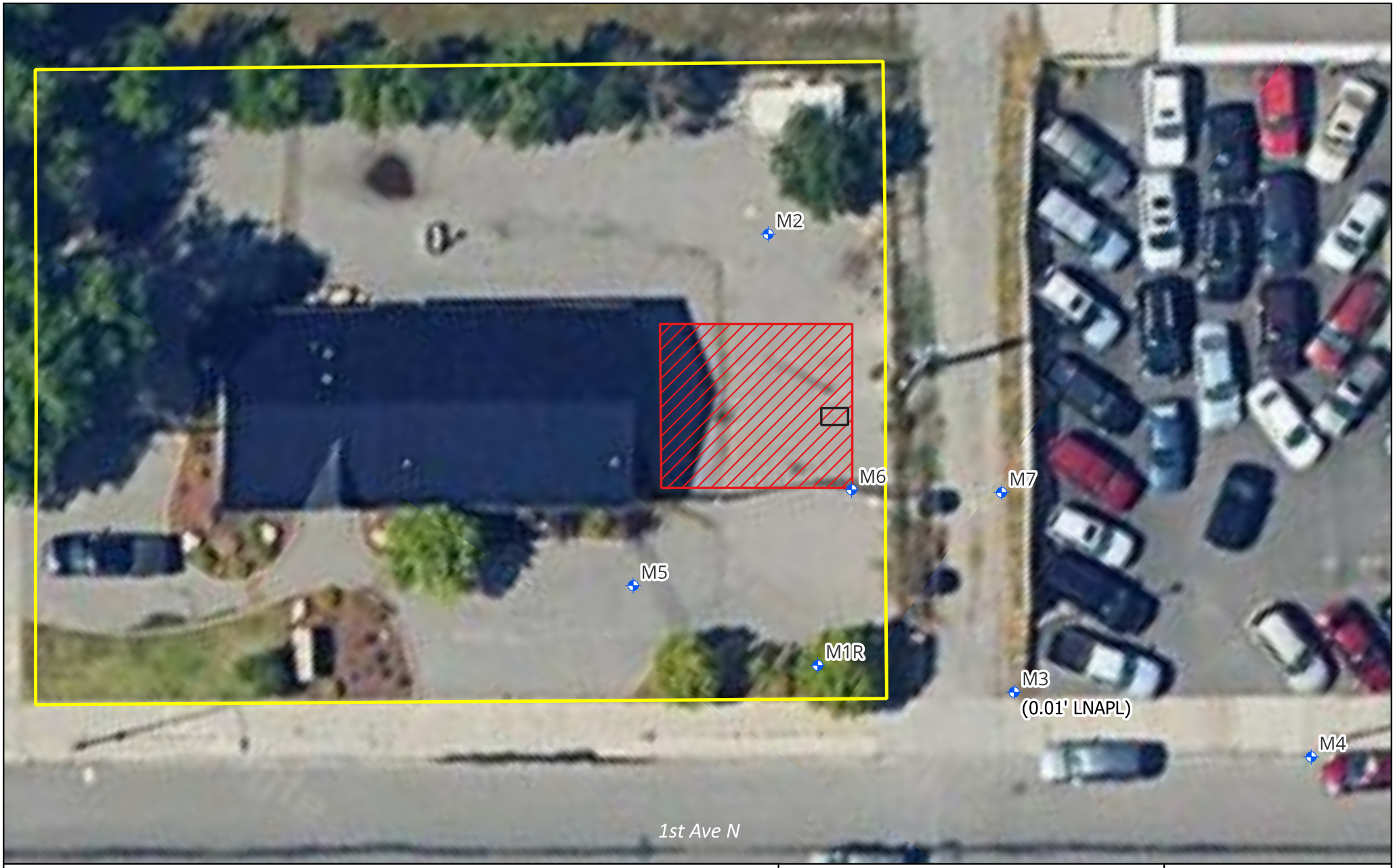
0 100 200 ft

Former Dollar Rent-a-Car
1921 1st Ave N
Billings, MT 59101

FIGURE 2
Site Map

GRANITE PEAK ENVIRONMENTAL

DATE: 03/05/2026	DRAWN BY: SJ	Imagery ©2025 Google



N

0 25 50 ft

Monitoring Well
UST
Excavated Area – 2000
Site Boundary

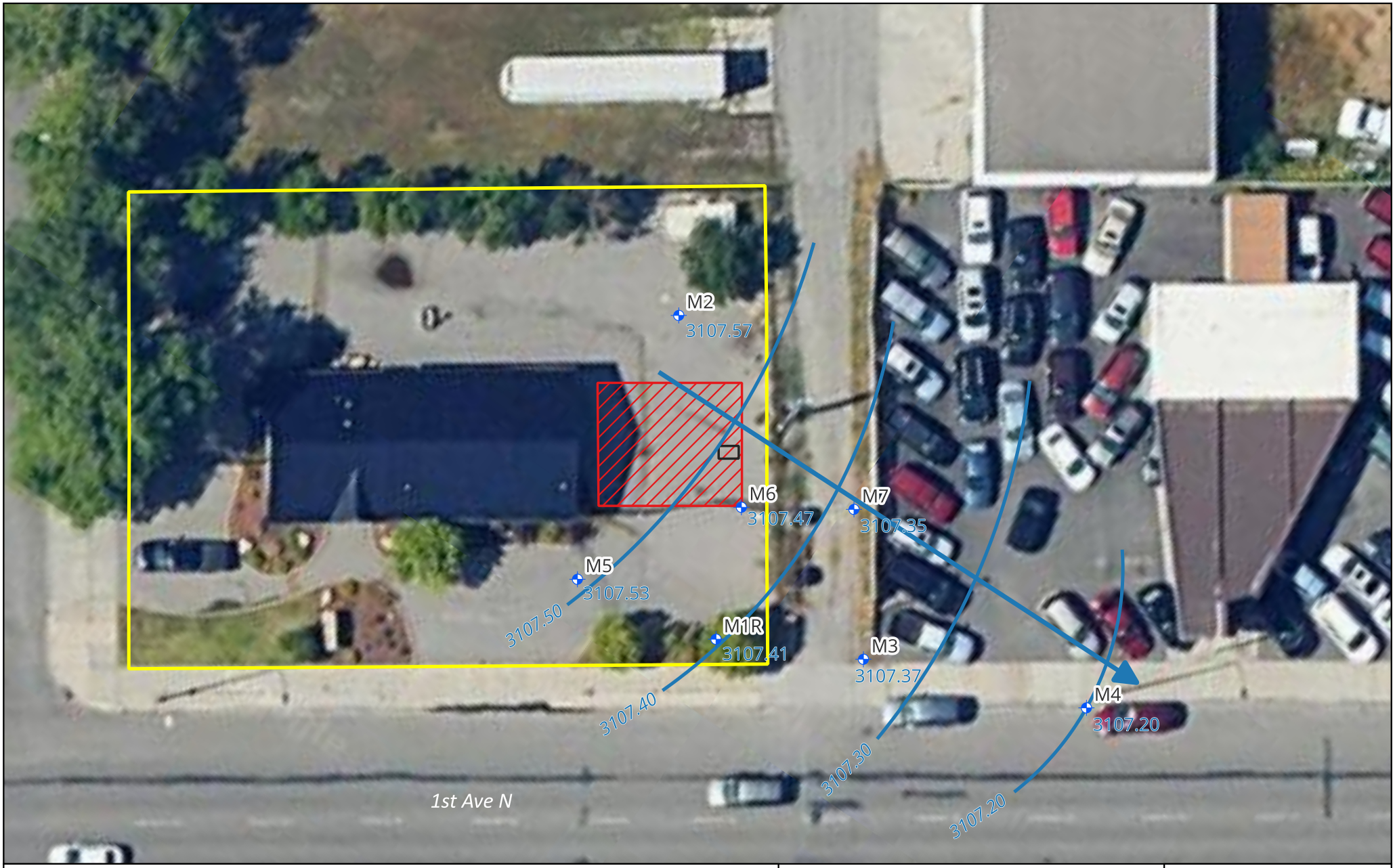
November 2025 Groundwater Monitoring Event

Former Dollar Rent-a-Car
1921 1st Ave N
Billings, MT 59101

FIGURE 3

GRANITE PEAK ENVIRONMENTAL

DATE: 12/22/2025	DRAWN BY: SJ	Imagery ©2025 Google



0 25 50 ft

Monitoring Well
Groundwater Contours
UST
Excavated Area – 2000
Site Boundary

November 2025 Groundwater Elevations and Flow Direction

Former Dollar Rent-a-Car
1921 1st Ave N
Billings, MT 59101

DATE: 12/22/2025 | DRAWN BY: SJ | Imagery ©2025 Google

FIGURE 4

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TABLES

Table 1 - November 2025 Groundwater Elevations

Former Dollar Rent-a-Car
1921 1st Avenue North Billings, MT 59101
Facility ID 56-13982 (TID 30644); Release 3965; Work Plan 34984

Well ID	Northing (International Foot)	Easting (International Foot)	Casing Elevation (International Foot)	Date of DTW Measurements	Depth to Water (Feet BTOC)	Elevation of SWL (International Foot)
M1R	562125.88	2224661.45	3116.10	11/5/2025	8.69	3107.41
M2	562178.57	2224615.45	3116.65	11/4/2025	9.08	3107.57
M3	562140.10	2224689.86	3116.62	11/6/2025	9.25	3107.37
M4	562159.16	2224734.80	3116.18	11/5/2025	8.98	3107.20
M5	562119.42	2224630.05	3116.48	11/4/2025	8.95	3107.53
M6	562152.17	2224649.91	3116.31	11/5/2025	8.84	3107.47
M7	562165.63	2224669.84	3116.85	11/5/2025	9.50	3107.35

Notes:

Northing/Easting coordinates are in Montana State Plan 2500
Elevations are NAVD 88 (GEOID 2011)
All well location measurements are from the professional well survey completed at the site during the June 2025 investigation
DTW - Depth to Water
BTOC - Below Top of Casing
SWL - Static Water Level

Table 2. Cumulative Groundwater Sample Results

Facility Name: Former Dollar Rent-A-Car (Facility ID: 56-13982; Release: 3965)					Volatile Petroleum Hydrocarbons (VPH) (µg/L)										Lead Scavengers (µg/L)		Extractable Petroleum Hydrocarbons (EPH) (µg/L)				RCRA-8 Metals (µg/L)							
Sample Information and Field Data[+]																												
Well ID	Location	Screen Interval (ft bgs)	Date	NAPL Thickness (ft)	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	C9-C10 Aromatics	C5-C8 Aliphatics	C9-C12 Aliphatics	TPH	DCA	EDB	EPH Screen	C9-C18 Aliphatics	C19-C36 Aliphatics	C11-C22 Aromatics	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
MT-DEQ RBSLs & Human Health Standards[1]					30	5	1,000	700	10,000	100	980	700	3,000	NSL	4	0.017	NSL	3,000	100,000	1,100	10	1,000	5	100	15	2	50	100
M1	Cross-gradient	8 - 18'	7/23/2004	NA	--	--	--	--	--	--	--	--	--	--	--	--	**9,200**	**<320**	**4,700**	**600**	--	--	--	--	--	--	--	--
			3/30/2005	NA	<1.0	<0.5	<1.0	**3.5**	**14**	<10	**735**	**113**	**1,360**	**1,710**	--	--	**28,000**	**290**	**24,000**	**3,000**	--	--	--	--	--	--	--	--
			8/10/2006	0.75	<1.0	<0.5	<0.5	**1.2**	**9.3**	**0.92**	**166**	**28**	**167**	**345**	--	--	**14,900**	--	--	--	--	--	--	--	--	--	--	--
			6/18/2008	1.12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
			5/27/2009	0.50	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
			7/20/2012	0.56	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
			6/24/2013	0.80	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
			12/13/2013	0.09	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
M1R	Cross-gradient	5 - 15'	6/6/2025	NA	<1.0	<0.50	<0.50	<0.50	<0.50	<1.0	<20	<20	<20	--	<0.50	<0.010	**1,220**	<300	<300	<300	--	--	--	--	--	--	--	--
			11/5/202	NA	<1.0	<0.50	<0.50	<0.50	<0.50	<1.0	<20	<20	<20	ND	**0.27**	<0.010	<300	--	--	--	--	--	--	--	--	--	--	--
M2	Upgradient	8 - 18'	7/23/2004	NA	--	--	--	--	--	--	--	--	--	--	--	--	<300	--	--	--	--	--	--	--	--	--	--	--
			3/30/2005	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
			8/10/2006	NA	<1.0	<0.5	<0.5	<0.5	<0.5	<1.0	<20	<20	<20	<20	--	--	<330	--	--	--	--	--	--	--	--	--	--	--
			6/18/2008	NA	<1.0	<0.5	<0.5	<0.5	<0.5	<1.0	<20	<20	<20	<20	--	--	<306	--	--	--	--	--	--	--	--	--	--	--
			5/27/2009	NA	<1.0	<0.5	<0.5	<0.5	<0.5	<1.0	<20	<20	<20	<20	--	--	<306	--	--	--	--	--	--	--	--	--	--	--
			7/20/2012	NA	<1.0	<0.5	**0.45**	<0.5	**0.53**	<1.0	<20	<20	<20	<20	--	--	<333	--	--	--	--	--	--	--	--	--	--	--
			6/24/2013	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
			12/13/2013	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
			6/5/2025	NA	<1.0	<0.50	<0.50	<0.50	<0.50	<1.0	<20	<20	<20	--	<0.50	<0.010	<300	--	--	--	--	--	--	--	--	--	--	--
			11/4/2025	NA	<1.0	<0.50	<0.50	<0.50	<0.50	<1.0	<20	<20	<20	ND	<0.50	<0.010	<300	--	--	--	--	--	--	--	--	--	--	--
M3	Down-gradient	7.5 - 17.5'	8/10/2006	NA	<1.0	**0.62**	**2.1**	**10**	**24**	**1.5**	**211**	**49**	**220**	**397**	NA	NA	**27,000**	**290**	**15,000**	**2,500**	--	--	--	--	--	--	--	--
			6/18/2008	1.60	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
			5/27/2009	0.02	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
			7/20/2012	0.38	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
			6/24/2013	0.37	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
			12/13/2013	0.01	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
			6/9/2025	0.05	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
			11/6/2025	0.01	<1.0	<0.50	<0.50	<0.50	<0.50	<1.0	**11**	<20	**21**	**33**	**0.26**	<0.010	**1,840**	<300	<300	<300	--	--	--	--	--	--	--	--
M4	Down-gradient	7.5 - 17.5'	7/20/2012	NA	<1.0	<0.5	**0.46**	<0.5	**1.2**	<1.0	<20	<20	<20	**17**	--	--	**423**	--	--	--	--	--	--	--	--	--	--	--
			6/24/2013	NA	<1.0	<0.5	<0.5	<0.5	<0.5	<1.0	<20	<20	<20	<20	--	--	**484**	--	--	--	--	--	--	--	--	--	--	--
			12/13/2013	NA	<1.0	<0.5	<0.5	<0.5	<0.5	<1.0	<20	<20	<20	<20	--	--	**1,200**	<300	<300	<300	--	--	--	--	--	--	--	--
			6/6/2025	NA	<1.0	<0.50	<0.50	<0.50	<0.50	<1.0	<20	<20	<20	--	<0.50	<0.010	<300	--	--	--	--	--	--	--	--	--	--	--
			11/5/2025	NA	<1.0	<0.50	<0.50	<0.50	<0.50	<1.0	<20	<20	<20	ND	<0.50	<0.010	**311**	--	--	--	--	--	--	--	--	--	--	--
M5	Cross-gradient/upgradient	5 - 15'	6/6/2025	NA	<1.0	<0.50	<0.50	<0.50	<0.50	<1.0	<20	<20	<20	--	**0.32**	<0.010	<300	--	--	--	--	--	--	--	--	--	--	--
			11/4/2025	NA	<1.0	<0.50	<0.50	<0.50	<0.50	<1.0	<20	<20	<20	ND	**0.38**	<0.010	<300	--	--	--	**0.003**	<0.05	<0.001	<0.005	<0.001	<0.005	<0.005	<0.001
M6	Cross-gradient	5 - 15'	6/6/2025	NA	<1.0	<0.50	<0.50	**1.7**	**1.2**	<1.0	**39**	<20	**57**	--	<0.50	<0.010	**1,060**	<300	**214**	<300	**0.003**	**0.05**	<0.001	<0.005	<0.001	<0.0001	<0.001	<0.001
			11/5/2025	NA	<1.0	<0.50	<0.50	**0.56**	<0.50	<1.0	**25**	<20	**35**	**59**	<0.50	<0.010	**742**	--	--	--	--	--	--	--	--	--	--	--
M7	Cross-gradient	5 - 15'	6/9/2025	NA	<1.0	<0.50	**0.61**	**0.70**	**0.63**	<1.0	**62**	**31**	**83**	--	<0.50	<0.010	**2,180**	<300	**810**	**159**	**0.003**	**0.05**	<0.001	<0.005	<0.001	<0.0001	<0.001	<0.001
			11/5/2025	NA	<1.0	<0.50	<0.50	<0.50	<0.50	<1.0	**32**	**20**	**42**	**80**	<0.50	<0.010	**1,620**	<300	**332**	<300	**0.004**	**0.08**	<0.001	<0.005	<0.001	<0.005	<0.005	<0.001

Notes:

NA - No Free Product

-- - Not Analyzed

NS - Not Sampled due to Free Product

[1] RBSL: Risk-Based Screening Levels and Human Health Standard from RBCA Guidance (DEQ, 2024)

[+] EPH Fractionation with PAHs was completed for samples with an EPH Screen result exceeding 1,000 ug/L during the June 2025 sampling event. No values exceeded established RBSLs. Additionally, a short list of VOCs was completed for all samples during this event with no results exceeding RBSLs. This data is provided in Table 4 of this report.

BOLD	Analyte detected at a level below RBSL
	Data from the November 2025 groundwater monitoring event
100	Exceeds RBSL

Table 3
Data Quality Objectives
Groundwater Investigation
Former Dollar Rent-a-Car, Billings, Montana

Step 1: Problem Statements	Step 2: Identifying the Decisions	Step 3: Decision Inputs	Step 4: Study Boundaries	Step 5: Decision Rules	Step 6: Tolerance Limits on Errors	Step 7: Optimization of Sample Design
A Phase I ESA identified petroleum related RECs for the site: Petroleum related concerns include the site's unresolved LUST and a sump in the garage with an unknown discharge location. Following a 2025 remedial investigation, groundwater at M3 needs further sampling to determine if petroleum constituents remain in groundwater from the 550-gallon waste oil tank release.	Project decisions to be made include: To what extent has the petroleum release impacted groundwater at Well M3?	Subsurface groundwater samples will be collected and analyzed for COPCs at well M3. M3 was first sampled on August 10, 2006 and again on November 6, 2025. To confirm COPCs do not exceed MT DEQ RBSLs and/or EPA screening levels, M3 will be sampled in the Spring and Fall of 2026. Concentration of COPCs will be compared to MT DEQ RBSLs and/or EPA screening levels or standards.	The site is located at 1921 1st Avenue North in Billings, Montana. This commercial property is situated just east of downtown Billings at the northeastern corner of the intersection of North 20th Street and 1st Avenue North. The site is approximately 0.32-acres and has an approximate latitude and longitude of 45.7872100º north and 108.4957550º west, respectively. Groundwater monitoring wells extend off the property to the east and southeast. The monitoring well addressed in the SWP (M3) is located approximately 15 feet east of the southeast property corner in the alley.	If groundwater COPC concentrations exceed MT DEQ RBSLs or standards, or LNAPL is present, additional assessment and/or cleanup may be required. If concentrations are below RBSLs and screening levels, and LNAPL is not present, an additional assessment may not be needed to resolve the release.	Several steps will be taken to limit data variability and errors during the investigation, including: 1) Field personnel will follow the quality assurance and quality control procedures outlined in the programmatic QAPP (Granite Peak, 2026). 2) Trained field personnel will complete the investigations. 3) Appropriate duplicate samples will be collected to evaluate lab accuracy, field decontamination, and cross contamination during sample delivery. 4) Samples will be analyzed by accredited analytical laboratories.	The findings of the Phase I ESA and previous Phase II assessments were used to develop a site specific CSM and the proposed assessment strategy. The soil and groundwater sampling strategy was designed to evaluate the areas on and off the site with the highest potential for containing COPCs. The assessment strategy was designed to obtain the data needed to develop a remedial action plan for the release at the site.

MT DEQ RBSLs- Montana Department of Environmental Quality Risk-based Screening Levels
COPCs - Contaminants of Potential Concern
CSM - Contaminated Site Model
QAPP - Quality Assurance Project Plan

APPENDIX A
HEALTH AND SAFETY PLAN

GRANITE PEAK ENVIRONMENTAL

Health and Safety Plan

Site Information

Site Details	
Site Name	Former Dollar Rent-a-Car
Site Address	1921 1st Avenue North
Proposed Date of Activities	Spring 2026
Type of Project	Supplemental Work Plan

Work Plan

The primary objectives of this SWP are to assist in the removal of LNAPL from the M3 monitoring well using absorbent socks and then perform groundwater sampling to evaluate petroleum impacted groundwater for EPH, VPH and lead scavengers. Activities at the site will be as follows:

- Absorbent socks will be lowered into M3 and used to remove old product (LNAPL) from the well prior to sampling events
- Evaluate petroleum impacted groundwater at well M3 for EPH, VPH and lead scavengers

A list of Granite Peak employees, their title, and their role and responsibility for this Supplemental Work Plan are provided in the table below:

Name	Title	Site Role/Responsibility
David Sanborn	Project Manager	Project Organization, Regulatory and Client Correspondence.
Karlyn Soriano	Field Lead and Site Safety Officer	Project Coordination, Health and Safety Oversite, Project Reporting
Karlyn Soriano	Field Personnel	Field Investigation, Data Collection and Documentation

Mrs. Soriano has completed an initial 40-hour Hazardous Waste Operations and Energy Response (HAZWOPER) training as well as a current 8-hour annual HAZWOPER refresher training.

Site Description

The site is located at 1921 1st Avenue North in Billings, Montana (**Figure 1**). This commercial property is situated just east of downtown Billings at the northeastern corner of the intersection of North 20th Street and 1st Avenue North (**Figure 2**). The site is approximately 0.32-acres and has an approximate latitude and longitude of 45.7872100º north and 108.4957550º west, respectively.

Site History

The site is a commercial lot located in a primarily commercial/industrial area of Billings. The subject property is a relatively flat lot covered by asphalt and concrete. One single story structure

is located on the site and is used as a real estate office. The site had a petroleum release from a 550-waste oil tank.

Driving To and From Site

Granite Peak field staff will follow these steps while driving to and from site:

- Knowledge of the route and road conditions prior to mobilization;
- Conduct a vehicle inspection at the beginning of each day a vehicle will be used;
- Wear a seatbelt whenever the vehicle is operating;
- Have an emergency roadside kit, fire extinguisher, and first aid kit;
- Knowledge of the road conditions prior to mobilization;
- Practice defensive driving;
- Build time into your trip schedule to stop for food, rest breaks, **PHONE CALLS AND TEXTS** or other business;
- Secure cargo that may move around while the vehicle is in motion.

Project Tasks and Potential Site Hazards

A list of project tasks that will be completed during this project are provided in the table below:

Project Tasks			
	Site Reconnaissance	X	Groundwater Sampling
	Exploratory Borehole Drilling	X	Groundwater Depth Measurement
	Surveying	X	Free Product Measurement
	Test Pitting	X	Free Product Removal
	Monitoring Well Installation		Soil Stockpile Testing
	Monitoring Well Development		Remedial Excavation
	Soil Sample Collection		Underground Storage Tank (UST) Removal
	Vapor Intrusion Sampling		Remediation System Monitoring
	Other: Utility Locate		Other

Job Safety Analysis (JSAs) associated with hazards specific to project tasks are provided in **Attachment A**. Potential site hazards are provided in the table below:

Potential Site Hazards			
X	Driving		Loud Noises/Vibration
	Remote Site		Slip, Trips, Falls
	Poor Cell Service	X	Pinch Points/Sharp Tools
X	Vehicular Traffic On Site*		Excavation
X	Physical		Confined Spaces
X	Chemical		Overhead Hazards
	Biological		Below Grade Hazards
	Radiological		Working From Heights
X	Heat Stress		Unstable/Uneven Terrain
X	Cold Stress		Frequent Heavy Lifting
	Electrical	X	Awkward Postures
	Heavy Equipment/Machinery	X	Repetition

	Burn		Exposure to Gases
	Splash		Puncture
	Other:		Other

**If local Traffic will be interrupted on state roads, a Traffic Control Plan should be implemented with the Department of Transportation.*

Field Personnel have a chance to be exposed to the contaminants listed below at concentrations which may be hazardous to the health of site personnel:

- Extractable Petroleum Hydrocarbons (EPH) –Soils and Groundwater
- Volatile Petroleum Hydrocarbons (VPH) – Soils and Groundwater
- Lead Scavengers EDB & DCA – Soils and Groundwater

Site Monitoring Procedures

Instrument Type		Contaminant	Frequency
X	Visual and Olfactory	Petroleum	Periodic during Subsurface Soil Sampling or Excavating
	Other		

Hazard Communication

Granite Peak Environmental will comply with the OSHA Hazard Communication Standard 29 CFR 1910.1200 including the Global Harmonization System requirements. In general, personnel will be informed of the substance of the Hazard Communication Standard, the hazardous properties of chemicals they work with, and measures to take to protect themselves from these chemicals. Listed below are the chemicals that will be used on site:

Chemical Name	Amount on Site	Comments
Alconox	10 ml per sample vial	4 lb container will be stored and used for decontamination. 1- 2% solutions will be made with the other 98-99% being distilled water.
Hydrochloric Acid	10 ml per sample vial	Hydrochloric Acid is used as a preservative in the amount of 10 ml per 40 ml sample vial.
Methanol	10 ml per sample vial or 10% solution	Sampling: Methanol is used as a preservative usually in the amount of 10 ml per 40 ml sample vial Decontamination: 1 gallon container will be stored and used for decontamination. 10% solutions will be made with the other 90% being distilled Water.

Sodium Thiosulfate	10 ml per sample vial	Sodium Thiosulfate is used as a preservative in the amount of 10 ml per 40 ml sample vial.

Safety Data Sheets (SDS) for each chemical listed above are provided in **Attachment B**. These SDS's will be readily available to all personnel at all times on the site. For each chemical that will be used on site, personnel must review the chemical's SDS and will be trained on the safe use of each chemical, prior to using these them on site.

Personal Protective Equipment (PPE)

Personnel working on site are required to wear a minimum of Level D while on-site. In addition, safety glasses, reflective vests, hard hats, steel toe boots and hearing protection (as needed) will be worn. The Site Safety Officer will select the appropriate level of PPE for on-site work. A review of the required PPE will take place at the safety meeting prior to the start of any field operations. The type of PPE selected will be based on the hazards at the site.

Level of Protection	Specific Equipment (e.g. Clothing Materials, Respirators (if needed))
Level D	Hard hat, steel toed boots, safety glasses, long sleeve shirt, pants, ear protection during equipment operation, and nitrile gloves during sampling activities.

Emergency Information

Hospital Name and Address: Intermountain Health St. Vincent Regional Hospital
Phone Numbers (Hospital ER): 406-657-7000
Distance: 1.8 miles
The route to the Hospital from the site is provided in **Attachment C**.

Contacts in Case of Injury, Illness, or Near Miss:

Project Manager: David Sanborn	Cell Phone: 406-529-2933
Health and Safety Officer: Karlyn Soriano	Cell Phone: 208-631-4095

Ambulance: 9-1-1
Poison Control (Montana): (800) 222-1222
Police: 9-1-1
Fire: 9-1-1
Location of Nearest Telephone: Cell phones are carried by field personnel:
Nearest Fire Extinguisher: Located in field personnel trucks.
Nearest First-Aid Kit: Located in field personnel trucks

Emergency Procedures

Get Help

- Send another worker to phone 9-1-1 (if necessary)

- As soon as possible, notify Granite Peak's Project Manager

Reduce risk to injured person

- Turn off equipment
- Move person from injury location (if in life-threatening situation only)
- Keep person warm
- Perform CPR (if necessary)

Transport injured person to medical treatment facility (if necessary)

- By ambulance (if necessary) or Granite Peak vehicle
- Stay with person at medical facility
- Keep Granite Peak's Project Manager updated on the situation.

Additional Information

- Work areas will be marked with cones, barricades and/or caution tape. High-visibility vests will be worn by on-site personnel to ensure they can be seen by vehicle and equipment operations.

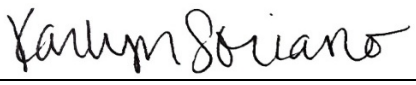
Sampling, Managing and Handling Drums and Containers

If drums and containers are needed for petroleum contaminated soil, they shall meet appropriate Department of Transportation (DOT), OSHA and U.S. Environmental Protection Agency (EPA) regulations for the waste that they contain. Field Personnel will try and minimize the amount of drum or container used. Field Personnel will consult with the site owner to find a place to safely store drums. Drums will be labeled to match the contents. Once the project is complete, Granite Peak will coordinate the proper removal and disposal of the drums on site, if any.

HASP Approval

Tyler Powers - HASP Author	3/5/2026 Date

David Sanborn - Project Manager	3/5/2026 Date



Karlyn Roberts- Health & Safety Officer	3/5/2026 Date

Attachment A
Job Safety Analysis (JSAs)

Job Safety Ananlysis (JSA)

Job Title: Driving	**JHA Number: 01**	**Revision Date: October 24, 2022**
Project Name: Former Dollar Rent-a-Car	**Project Number: 5003.00**	
Required Personal Protective Equipment: N/A		
Tools and Equipment: Valid Drivers License, Roadside Safety Kit, First Aid Kit, Fire Extinguisher		

Sequence of Job Steps	Potential Hazards/Injury Sources	Safe Action or Procedure
Vehicle Check	1. Injury to the driver of the vehicle	1. Conduct vehicle check in an area with limited traffic. Use cones to mark off truck while conducting vehicle inspection.
General Vehicle Operations	1. Auto Accidents 2. Injury to the driver of the vehicle 3. Injury to other drivers or pedestrians	1. Visually check entire vehicle, including tires, breaks, and lights. 2. Check fluids, change if needed. 3. Clean vehicle windows of dirt, ice, or snow before you drive. 4. Check your surroundings before you enter your vehicle and before your drive or reverse. 5. Strap down loose equipment in truck bed. 6. Adjust mirrors, seat, and fasten seat belt before driving. 7. Check fuel supply and fill vehicle up if needed. 8. Ensure a roadsite safety kit and fire extinguisher are inside vehicle. 9. Drive defensively: Be aleart, concentrate on driving, anticipate others actions, know your surroundings and destinations. Do not eat, drink or smoke while driving. Keep radio volume low so you can hear warning noises. DO NOT USE CELL PHONE WHILE DRIVING. Follow all road safety rules.
Parking	1. Vehicle too close to passing traffic 2. Vehicle on uneven, soft ground 3. Vehicle may roll 4. Heat of undercarriage may start a fire when parked in tall grass	1. Drive to area clear of traffic, if possible. If not, use cones to mark off vehicle and warn oncoming drivers. Turn on flashers. 2. Choose a firm and level parking area. 3. Use parking brake and place blocks. 4. Avoid parking in tall grass. Have fire extinguisher availble.

Name	Date	Signature

Job Safety Ananlysis (JSA)

Job Title: General Field Activities	**JHA Number: 02**	**Revision Date: October 24, 2022**
Project Name: Former Dollar Rent-a-Car	**Project Number: 5003.00**	
Required Personal Protective Equipment: Hard Hat, Steel Toed Boots, Safety Glasses, and Hi-Viz Vest. Nitrile Gloves and Hearing Protection, if needed.		
Tools and Equipment:		

Sequence of Job Steps	Potential Hazards/Injury Sources	Safe Action or Procedure
Lifting	1. Strain or pain	1. Lift with legs not your back. Have a coworker or subcontractor help you lift heavy objects.
Job Site Tasks	1. Hand/Power Tool Use 2. Open Holes 3. Slip/Trip/Falls 4. Pinch Points 5. Working Around Heavy Machinery	1. Inspect tools and make sure they are in good condition. Use the right tool for the job. 2. Mark off/Fench off open holes. Use caution. 3. Keep working area clean and clear. Be aware of your surroundings and use caution while walking on uneven or slippery surfaces. Wear adequate footwear. 4. Wear gloves and use hand tools the way they were designed. 5. Where adequate PPE. Have a clear site to the subcontractor and discuss verbal and nonverbal commands. Ask driller where you can safely set up based on the equipment being used.
Location Dependent	1. Extreme Weather 2.Heat Stress 3. Cold Stress 4. Chemical Exposure 5. Electrical Exposure 5. Excessive Noise Level	1. Wear appropriate clothing. Have shelter nearby. Take breaks if needed. 2. Wear breathable clothing. Have water available and drink adequate amounts. Take breaks in shaded areas or in vehicle with AC. 3. Wear multiple non-cotton layers. Drink warm fluids. Take breaks in shelter or vehicle with heat on. 4. Wear adequate PPE (nitrile gloves, respirators etc.). Review SDS of chemicals being used. 5. Do not used damaged eletrical tools. Be aware of power lines onsite and work from a safe distance. 6. Wear hearing protection. Work from a distance of the noise to reduce the noise level reaching you.

Name	Date	Signature

Attachment B
Safety Data Sheets (SDS)

Safety Data Sheet

Effective date: 11 May 2020 **Revision**: 11 May 2020
Trade Name: Alconox®

1 Identification of the substance/mixture and of the supplier

1.1 GHS Product identifier

Trade Name: Alconox®
Product number: 1101, 1103, 1104, 1104-1, 1112, 1112-1, 1125, 1150

1.2 Application of the substance / the mixture: Cleaning material/Detergent

1.2.1 Recommended dilution ratio: 1 – 2% in water

1.3 Details of the supplier of the Safety Data Sheet

Manufacturer:
Alconox Inc.
30 Glenn St
White Plains, NY 10603
(914) 948-4040

Supplier:

Emergency telephone number:
ChemTel Inc
North America: 1-888-255-3924
International: +1 813-248-0573

2 Hazards identification

2.1 Classification of the substance or mixture:

In compliance with EC regulation No. 1272, 29CFR1910/1200 and GHS requirements.

Hazard-determining components of labeling:
Tetrasodium Pyrophosphate
Sodium tripolyphosphate
Sodium Alkylbenzene Sulfonate

2.2 Label elements:

Eye damage, category 1.

Skin irritation, category 2.

Product at recommended dilution:
Eye irritation, category 2B

Hazard pictograms:

Signal word: Danger

Hazard statements:
H315 Causes skin irritation.
H318 Causes serious eye damage.

Precautionary statements:
P264 Wash skin thoroughly after handling.

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P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P321 Specific treatment (see supplemental first aid instructions on this label).
P332+P313 If skin irritation occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P501 Dispose of contents and container as instructed in Section 13.

Hazardous Elements at Use Dilution:

Hazard Pictograms:

Signal Word: Warning
Hazard Statements:
H320 Causes eye irritation

Precautionary statements:
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P501 Dispose of contents and container as instructed in Section 13

Additional information: None.

Hazard description
Hazards Not Otherwise Classified (HNOC): May cause surfaces to become slippery if wet. Use caution in areas of foot traffic if on floors.

Information concerning particular hazards for humans and environment:
The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.

Classification system:
The classification is according to EC regulation No. 1272, 29CFR1910/1200 and GHS Requirements, and extended by company and literature data. The classification is in accordance with the latest editions of international substances lists and is supplemented by information from technical literature and by information provided by the company.

3 Composition/information on ingredients

3.1 Chemical characterization: Not determined or not available.

3.2 Description: None
3.3 Hazardous components (percentages by weight)

Identification	Chemical Name	Classification	Wt. %
CAS number: 7758-29-4	Sodium tripolyphosphate	Skin Irrit. 2; H315 Eye Irrit. 2; H319	12-28
CAS number: 68081-81-2 or 68411-30-3	Sodium Alkylbenzene Sulfonate	Acute Tox. 4; H303 Skin Irrit. 2; H315 Eye Dam. 1; H318	8-22
CAS number: 7722-88-5	Tetrasodium Pyrophosphate	Skin Irrit. 2; H315 Eye Irrit. 2; H319	2-16

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Hazardous components at use dilution (percentages by weight):

Identification	Chemical Name	Classification	Wt. %
CAS number: 7758-29-4	Sodium tripolyphosphate	Eye Irrit. 2; H319	0.12 - 0.28
CAS number: 68081-81-2 or 68411-30-3	Sodium Alkylbenzene Sulfonate	Eye Irrit. 2; H319	0.08 – 0.22
CAS number: 7722-88-5	Tetrasodium Pyrophosphate	Eye Irrit. 2; H319	0.02 – 0.16

3.4 Additional Information: None.

4 First aid measures

4.1 Description of first aid measures

General information: None.

After inhalation:

Maintain an unobstructed airway.
Loosen clothing as necessary and position individual in a comfortable position.

After skin contact:

Wash affected area with soap and water.
Seek medical attention if symptoms develop or persist.

After eye contact:

Rinse/flush exposed eye(s) gently using water for 15-20 minutes.
Remove contact lens(es) if able to do so during rinsing.
Seek medical attention if irritation persists or if concerned.

After swallowing:

Rinse mouth thoroughly.
Seek medical attention if irritation, discomfort, or vomiting persists.

4.2 Most important symptoms and effects, both acute and delayed

None

4.3 Indication of any immediate medical attention and special treatment needed:

No additional information.

First aid measure at recommended dilution:

General information: None.

After inhalation:

Maintain an unobstructed airway.
Loosen clothing as necessary and position individual in a comfortable position.

After skin contact:

Wash affected area with soap and water.

After eye contact:

Rinse/flush exposed eye(s) gently using water for 15-20 minutes.
Remove contact lens(es) if able to do so during rinsing.

After swallowing:

Rinse mouth thoroughly. Seek medical attention if irritation, discomfort, or vomiting develops.

5 Firefighting measures

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5.1 Extinguishing media

Suitable extinguishing agents:

Use appropriate fire suppression agents for adjacent combustible materials or sources of ignition.

For safety reasons unsuitable extinguishing agents: None

5.2 Special hazards arising from the substance or mixture:

Thermal decomposition can lead to release of irritating gases and vapors.

5.3 Advice for firefighters

Protective equipment:

Wear protective eye wear, gloves and clothing.
Refer to Section 8.

5.4 Additional information:

Avoid inhaling gases, fumes, dust, mist, vapor and aerosols.
Avoid contact with skin, eyes and clothing.

6 Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures:

Ensure adequate ventilation.
Ensure air handling systems are operational.

6.2 Environmental precautions:

Should not be released into the environment.
Prevent from reaching drains, sewer or waterway.

6.3 Methods and material for containment and cleaning up:

Wear protective eye wear, gloves and clothing.

6.4 Reference to other sections: None

7 Handling and storage

7.1 Precautions for safe handling:

No expected hazards under normal use condition.

Avoid breathing mist or vapor if aerosolized.
Do not eat, drink, smoke or use personal products when handling chemical substances.

7.2 Conditions for safe storage, including any incompatibilities:

Store in a cool, well-ventilated area.

7.3 Specific end use(s):

No additional information.

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8 Exposure controls/personal protection

8.1 Control parameters:

a) 7722-88-5, Tetrasodium Pyrophosphate, ACGIH TWA 10 mg/m3
b) 7758-29-4, Sodium Tripolyphosphate, ACGIH TWA 10 mg/m3
c) Dusts, non-specific OEL, Irish Code of Practice
   (i) Total inhalable 10 mg/m3 (8hr)
   (ii) Respirable 4 mg/m3 (8hr)
   (iii) Tetrasodium Pyrophosphate, OSHA TWA 5 mg/m3, (8hr)

8.2 Exposure controls

Appropriate engineering controls:

Emergency eye wash fountains and safety showers should be available in the immediate vicinity of use or handling.

Respiratory protection:

Not needed under normal use conditions.

Protection of skin:

Select glove material impermeable and resistant to the substance.

Eye protection:

Safety goggles or glasses, or appropriate eye protection. Recommended to comply with ANSI Z87.1 and/or EN 166.

General hygienic measures:

Wash hands before breaks and at the end of work.
Avoid contact with skin, eyes and clothing.

Exposure Control and Personal Protective Equipment at recommended dilution:

Under normal use and operational conditions, no special personal protective equipment or engineering controls will be necessary. Handle with care.

9 Physical and chemical properties

Appearance (physical state, color):	White and cream colored flakes - powder	**Explosion limit lower**: **Explosion limit upper**:	Not determined or notavailable. Not determined or notavailable.
Odor:	Not determined or not available.	**Vapor pressure at 20°C**:	Not determined or notavailable.
Odor threshold:	Not determined or not available.	**Vapor density**:	Not determined or notavailable.
pH-value:	9.5 (1% aqueous solution)	**Relative density**:	Not determined or notavailable.

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Melting/Freezing point:	Not determined or not available.	**Solubilities**:	Not determined or notavailable.
Boiling point/Boiling range:	Not determined or not available.	**Partition coefficient (n-octanol/water)**:	Not determined or notavailable.
Flash point (closed cup):	Not determined or not available.	**Auto/Self-ignition temperature**:	Not determined or notavailable.
Evaporation rate:	Not determined or not available.	**Decomposition temperature**:	Not determined or notavailable.

Flammability (solid, gaseous):	Not determined or not available.	**Viscosity**:	a. Kinematic: Not determined or not available. b. Dynamic: Not determined or not available.
Density at 20°C:	Not determined or not available.		

10 Stability and reactivity

10.1 Reactivity: Not determined or not available.
10.2 Chemical stability: Not determined or not available.
10.3 Possibility hazardous reactions: Not determined or not available.
10.4 Conditions to avoid: Not determined or not available.
10.5 Incompatible materials: Not determined or not available.
10.6 Hazardous decomposition products: Not determined or not available.

11 Toxicological information

11.1 Information on toxicological effects:

Acute Toxicity:

Oral:

: LD50 > 5000 mg/kg oral rat - Product.

Chronic Toxicity: No additional information.

Skin corrosion/irritation:

Sodium Alkylbenzene Sulfonate: Causes skin irritation.

Serious eye damage/irritation:

Sodium Alkylbenzene Sulfonate: Causes serious eye damage.

Tetrasodium Pyrophosphate: Risk of serious damage to eyes.

Product information at recommended dilution:

Eye irritation may occur upon direct contact with eyes. No specific hazards for skin contact, inhalation, or chronic exposure are expected within normal use parameters.

Respiratory or skin sensitization: No additional information.

Carcinogenicity: No additional information.

IARC (International Agency for Research on Cancer): None of the ingredients are listed.

NTP (National Toxicology Program): None of the ingredients are listed.

Germ cell mutagenicity: No additional information.

Reproductive toxicity: No additional information.

STOT-single and repeated exposure: No additional information.

Additional toxicological information: No additional information.

12 Ecological information

12.1 Toxicity:

Sodium Alkylbenzene Sulfonate: Fish, LC50 1.67 mg/l, 96 hours.
Sodium Alkylbenzene Sulfonate: Aquatic invertebrates, EC50 Daphnia 2.9 mg/l, 48 hours.
Sodium Alkylbenzene Sulfonate: Aquatic Plants, EC50 Algae 29 mg/l, 96 hours.
Tetrasodium Pyrophosphate: Fish, LC50 - other fish - 1,380 mg/l - 96 h.
Tetrasodium Pyrophosphate: Aquatic invertebrates, EC50 - Daphnia magna (Water flea) - 391 mg/l - 48 h.

12.2 Persistence and degradability: No additional information.

12.3 Bioaccumulative potential: No additional information.

12.4 Mobility in soil: No additional information.

General notes: No additional information.

12.5 Results of PBT and vPvB assessment:

PBT: No additional information.

vPvB: No additional information.

12.6 Other adverse effects: No additional information.

13 Disposal considerations

13.1 Waste treatment methods (consult local, regional and national authorities for proper disposal)

Relevant Information:

It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities. (US 40CFR262.11).

14 Transport information

14.1 UN Number: ADR, ADN, DOT, IMDG, IATA	None
14.2 UN Proper shipping name: ADR, ADN, DOT, IMDG, IATA	None
14.3 Transport hazard classes: ADR, ADN, DOT, IMDG, IATA	**Class:** None **Label:** None **LTD. QTY:** None

US DOT
Limited Quantity Exception: None

Bulk:
RQ (if applicable): None
Proper shipping Name: None
Hazard Class: None
Packing Group: None
Marine Pollutant (if applicable): No additional information.

Non Bulk:
RQ (if applicable): None
Proper shipping Name: None
Hazard Class: None
Packing Group: None
Marine Pollutant (if applicable): No additional information.

Comments: None	**Comments:** None
14.4 Packing group: ADR, ADN, DOT, IMDG, IATA	None
14.5 Environmental hazards:	None
14.6 Special precautions for user:	None
Danger code (Kemler):	None
EMS number:	None
Segregation groups:	None

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Not applicable.

14.8 Transport/Additional information:

Transport category:	None
Tunnel restriction code:	None
UN "Model Regulation":	None

15 Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture.

North American

SARA

Section 313 (specific toxic chemical listings): None of the ingredients are listed.
Section 302 (extremely hazardous substances): None of the ingredients are listed.

CERCLA (Comprehensive Environmental Response, Clean up and Liability Act) Reportable

Spill Quantity: None of the ingredients are listed.

TSCA (Toxic Substances Control Act):

Inventory: All ingredients are listed as active.
Rules and Orders: Not applicable.

Proposition 65 (California):

Chemicals known to cause cancer: None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for females: None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for males: None of the ingredients are listed.

Chemicals known to cause developmental toxicity: None of the ingredients are listed.

Canadian

Canadian Domestic Substances List (DSL):
All ingredients are listed.

EU

REACH Article 57 (SVHC): None of the ingredients are listed.

Germany MAK: Not classified.
EC 648/2004 – This is an industrial detergent. Contains >30% phosphate, 15-30% anionic surfactant, <5% EDTA salts
EC 551/2009 – This is not a laundry or dishwasher detergent
EC 907/2006 – Contains no enzymes, optical brighteners, perfumes, allergenic fragrances, or preservative agents

Asia Pacific

Australia

Australian Inventory of Chemical Substances (AICS): All ingredients are listed.

China

Inventory of Existing Chemical Substances in China (IECSC): All ingredients are listed.

Japan

Inventory of Existing and New Chemical Substances (ENCS): All ingredients are listed.

Korea

Existing Chemicals List (ECL): All ingredients are listed.

New Zealand

New Zealand Inventory of Chemicals (NZOIC): All ingredients are listed.

Philippines

Philippine Inventory of Chemicals and Chemical Substances (PICCS): All ingredients are listed.

Taiwan

Taiwan Chemical Substance Inventory (TSCI): All ingredients are listed.

16 Other information

Abbreviations and Acronyms: None

Summary of Phrases

Hazard statements:
H315 Causes skin irritation.
H318 Causes serious eye damage.

NFPA: 1-0-0
HMIS: 1-0-0

At recommended dilution:
NFPA: 1-0-0
HMIS: 1-0-0

Precautionary statements:
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P321 Specific treatment (see supplemental first aid instructions on this label).
P332+P313 If skin irritation occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P501 Dispose of contents and container as instructed in Section 13.

Manufacturer Statement:

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

SAFETY DATA SHEET

Creation Date 24-August-2009 **Revision Date** 24-December-2021 **Revision Number** 7

1. Identification

Product Name **Hydrochloric Acid**

Cat No. : **A144-212; A144-212LC; A144-500; A144-500LB; A144-500LC; A144-612GAL; A144C-212; A144C-212EA; A144P-19; A144P-20; A144S-212; A144S-212EA; A144S-500; A144SI-212**

Synonyms Muriatic acid

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Importer/Distributor
Fisher Scientific
112 Colonnade Road,
Ottawa, ON K2E 7L6,
Canada
Tel: 1-800-234-7437

Fisher Scientific UK
Bishop Meadow Rd, Loughborough,
Leicestershire, LE11 5RG
Great Britain
Tel: 01509 231166

Emergency Telephone Number CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification

WHMIS 2015 Classification Classified as hazardous under the Hazardous Products Regulations (SOR/2015-17)

Corrosive to metals	Category 1
Skin Corrosion/Irritation	Category 1 B
Serious Eye Damage/Eye Irritation	Category 1
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word
Danger

Hazard Statements
May be corrosive to metals
Causes severe skin burns and eye damage

May cause respiratory irritation

Precautionary Statements
Prevention
Keep only in original container
Do not breathe dust/fumes/gas/mist/vapours/spray
Wash face, hands and any exposed skin thoroughly after handling
Use only outdoors or in a well-ventilated area
Wear protective gloves/protective clothing/eye protection/face protection
Response
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower
IF INHALED: Remove person to fresh air and keep comfortable for breathing
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Immediately call a POISON CENTER/doctor
Wash contaminated clothing before reuse
Absorb spillage to prevent material damage
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Store in corrosive resistant polypropylene container with a resistant inliner
Store in a dry place
Disposal
Dispose of contents/container to an approved waste disposal plant

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Water	7732-18-5	62-65
Hydrochloric acid	7647-01-0	35-38

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

Inhalation Remove to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.

Ingestion Do NOT induce vomiting. Call a physician or poison control center immediately.

Most important symptoms/effects Causes burns by all exposure routes. Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue

and danger of perforation

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Substance is nonflammable; use agent most appropriate to extinguish surrounding fire.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Corrosive material. Causes burns by all exposure routes. Thermal decomposition can lead to release of irritating gases and vapors.

Hazardous Combustion Products
Hydrogen chloride gas.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
3	0	0	N/A

6. Accidental release measures

Personal Precautions Use personal protective equipment as required. Ensure adequate ventilation. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Do not get in eyes, on skin, or on clothing.

Environmental Precautions Should not be released into the environment. See Section 12 for additional Ecological Information.

Methods for Containment and Clean Up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Do not breathe mist/vapors/spray. Do not get in eyes, on skin, or on clothing. Do not ingest. If swallowed then seek immediate medical assistance.

Storage. Keep containers tightly closed in a dry, cool and well-ventilated place. Corrosives area. Incompatible Materials. Metals. Strong oxidizing agents. Bases. sodium hypochlorite. Amines. Fluorine. Cyanides. Alkaline.

8. Exposure controls / personal protection

Exposure Guidelines

Component	Alberta	British Columbia	Ontario TWAEV	Quebec	ACGIH TLV	OSHA PEL	NIOSH IDLH
Hydrochloric acid	Ceiling: 2 ppm Ceiling: 3 mg/m^3	Ceiling: 2 ppm	CEV: 2 ppm	Ceiling: 2 ppm	Ceiling: 2 ppm	Ceiling: 5 ppm Ceiling: 7 mg/m^3	IDLH: 50 ppm Ceiling: 5 ppm

						(Vacated) Ceiling: 5 ppm (Vacated) Ceiling: 7 mg/m³	Ceiling: 7 mg/m³

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures

Ensure that eyewash stations and safety showers are close to the workstation location.
Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source

Personal protective equipment

Eye Protection Goggles
Hand Protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Glove material	Breakthrough time	Glove thickness	Glove comments
Butyl rubber	> 480 minutes	0.5 mm	As tested under EN374-3
Nitrile rubber	> 480 minutes	0.35 mm	Determination of Resistance to
Neoprene gloves	> 480 minutes	0.5 mm	Permeation by Chemicals

Inspect gloves before use. observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information) gloves are suitable for the task: Chemical compatability, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion. gloves with care avoiding skin contamination.

Respiratory Protection

When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.
To protect the wearer, respiratory protective equipment must be the correct fit and be used and maintained properly
Recommended Filter type: Particulates filter conforming to EN 143 or Acid gases filter: Type E, Yellow.

When RPE is used a face piece Fit Test should be conducted

Environmental exposure controls

No information available.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice. Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Wash hands before breaks and after work.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	pungent
Odor Threshold	No information available
pH	< 1
Melting Point/Range	-35 °C / -31 °F
Boiling Point/Range	57 °C / 135 °F @ 760 mmHg
Flash Point	No information available
Evaporation Rate	No information available

Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	125 mbar @ 20 °C
Vapor Density	1.27
Specific Gravity	1.18
Solubility	Soluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	1.8 mPa.s @ 15°C
Molecular Formula	HCl
Molecular Weight	36.46

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat.

Incompatible Materials Metals, Strong oxidizing agents, Bases, sodium hypochlorite, Amines, Fluorine, Cyanides, Alkaline

Hazardous Decomposition Products Hydrogen chloride gas

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions Contact with metals may evolve flammable hydrogen gas.

11. Toxicological information

Acute Toxicity

Product Information

Oral LD50 Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.

Dermal LD50 Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.

Vapor LC50 Based on ATE data, the classification criteria are not met. ATE > 20 mg/l.

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Water	-	-	-
Hydrochloric acid	238 - 277 mg/kg (Rat)	> 5010 mg/kg (Rabbit)	1.68 mg/L (Rat) 1 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Causes burns by all exposure routes

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Water	7732-18-5	Not listed	Not listed	Not listed	Not listed	Not listed
Hydrochloric acid	7647-01-0	Not listed	Not listed	Not listed	Not listed	Not listed

IARC (International Agency for Research on Cancer)

IARC (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans

Group 2B - Possibly Carcinogenic to Humans

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity
Do not empty into drains. Large amounts will affect pH and harm aquatic organisms.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Hydrochloric acid	-	282 mg/L LC50 96 h Gambusia affinis mg/L LC50 48 h Leucscus idus	-	56mg/L EC50 72h Daphnia

Persistence and Degradability Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT
- **UN-No** UN1789
- **Proper Shipping Name** HYDROCHLORIC ACID
- **Hazard Class** 8
- **Packing Group** II

TDG
- **UN-No** UN1789
- **Proper Shipping Name** HYDROCHLORIC ACID
- **Hazard Class** 8
- **Packing Group** II

IATA
- **UN-No** UN1789
- **Proper Shipping Name** Hydrochloric acid
- **Hazard Class** 8
- **Packing Group** II

IMDG/IMO

UN-No	UN1789
Proper Shipping Name	Hydrochloric acid
Hazard Class	8
Packing Group	II

15. Regulatory information

International Inventories

Component	CAS-No	DSL	NDSL	TSCA	TSCA Inventory notification - Active-Inactive	EINECS	ELINCS	NLP
Water	7732-18-5	X	-	X	ACTIVE	231-791-2	-	-
Hydrochloric acid	7647-01-0	X	-	X	ACTIVE	231-595-7	-	-

Component	CAS-No	IECSC	KECL	ENCS	ISHL	TCSI	AICS	NZIoC	PICCS
Water	7732-18-5	X	KE-35400	X	-	X	X	X	X
Hydrochloric acid	7647-01-0	X	KE-20189	X	X	X	X	X	X

Legend:
X - Listed '-' - Not Listed
KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
IECSC - Chinese Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
ENCS - Japanese Existing and New Chemical Substances
AICS - Australian Inventory of Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances

Canada

SDS in compliance with provisions of information as set out in Canadian Standard - Part 4, Schedule 1 and 2 of the Hazardous Products Regulations (HPR) and meets the requirements of the HPR (Paragraph 13(1)(a) of the Hazardous Products Act (HPA)).

Component	Canada - National Pollutant Release Inventory (NPRI)	Canadian Environmental Protection Agency (CEPA) - List of Toxic Substances	Canada's Chemicals Management Plan (CEPA)
Hydrochloric acid	Part 1, Group A Substance		

Other International Regulations

Authorisation/Restrictions according to EU REACH

Component	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Hydrochloric acid	-	Use restricted. See item 75. (see link for restriction details)	-

https://echa.europa.eu/substances-restricted-under-reach

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS-No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Water	7732-18-5	Listed	Not applicable	Not applicable	Not applicable
Hydrochloric acid	7647-01-0	Listed	Not applicable	Not applicable	Not applicable

Component	CAS-No	Seveso III Directive (2012/18/EC) -	Seveso III Directive (2012/18/EC) -	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)

		Qualifying Quantities for Major Accident Notification	Qualifying Quantities for Safety Report Requirements		
Water	7732-18-5	Not applicable	Not applicable	Not applicable	Not applicable
Hydrochloric acid	7647-01-0	25 tonne	250 tonne	Not applicable	Annex I - Y34

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 24-August-2009
Revision Date 24-December-2021
Print Date 24-December-2021
Revision Summary SDS sections updated. 2. 3. 11.

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Creation Date 27-Apr-2009 **Revision Date** 24-Dec-2021 **Revision Number** 9

1. Identification

Product Name **Methanol**

Cat No. : **A412-1; A412-4; A412-4LC; A412-20; A412-200; A412200-001; A412-200LC; A412-500; A412CU-1300; A412P-4; A412SK-4; A412FB-19; A412FB-50; A412FB-115; A412FB-200; A412POP-19; A412POPB-200; A412RB50; A412RB-115; A412RB-200; A412RS-19; A412RS-28; A412RS-50; A412RS-115; A412RS-200; A412SS-115; XXA412ETU200LI; NC1282211; XXA412ETWD200LI; NC1380933; A412RS-1350ASME; NC1561769; A412RS200ASME; NC1568698; NC1822351; XXA412ETU20LI; A412ETRS1350ASM; NC1871449; A412RS1350; NC1882599; XXA412ET200LI; NC1911795; A412RS1250; NC2012101; A412SS-19; NC2047038**

CAS No 67-56-1
Synonyms Methyl alcohol

Recommended Use Laboratory chemicals.
Uses advised against .

Details of the supplier of the safety data sheet

Company
Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 2
Acute oral toxicity	Category 3
Acute dermal toxicity	Category 3
Acute Inhalation Toxicity - Vapors	Category 3
Specific target organ toxicity (single exposure)	Category 1
Target Organs - Optic nerve, Central nervous system (CNS).	

Specific target organ toxicity - (repeated exposure) Target Organs - Kidney, Liver, spleen, Blood.	Category 1

Label Elements

Signal Word
Danger

Hazard Statements
Highly flammable liquid and vapor
Causes damage to organs
Causes damage to organs through prolonged or repeated exposure
Toxic if swallowed, in contact with skin or if inhaled

Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Wear protective gloves/protective clothing/eye protection/face protection
Use only outdoors or in a well-ventilated area
Do not breathe dust/fume/gas/mist/vapors/spray
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Keep cool
Response
IF exposed: Call a POISON CENTER or doctor/physician
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician
Skin
Call a POISON CENTER or doctor/physician if you feel unwell
Wash contaminated clothing before reuse
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Ingestion
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
Rinse mouth
Fire
In case of fire: Use CO2, dry chemical, or foam for extinction
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)

Other hazards

Poison, may be fatal or cause blindness if swallowed. Vapor harmful. CANNOT BE MADE NON-POISONOUS.
WARNING. Reproductive Harm - https://www.p65warnings.ca.gov/.

3. Composition/Information on Ingredients

Component	CAS No	Weight %
Methyl alcohol	67-56-1	>95

4. First-aid measures

General Advice Immediate medical attention is required. Show this safety data sheet to the doctor in attendance.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

Inhalation Remove to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.

Ingestion Do NOT induce vomiting. Call a physician or poison control center immediately.

Most important symptoms and effects Difficulty in breathing. May cause blindness: Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam. Water mist may be used to cool closed containers.

Unsuitable Extinguishing Media Water may be ineffective

Flash Point 9.7 °C / 49.5 °F

Method - No information available

Autoignition Temperature 455 °C / 851 °F

Explosion Limits

Upper 31.00 vol %

Lower 6.0 vol %

Sensitivity to Mechanical Impact No information available

Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Flammable. Risk of ignition. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Containers may explode when heated. Vapors may form explosive mixtures with air.

Hazardous Combustion Products
Carbon monoxide (CO). Formaldehyde.

Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full

protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
1	3	0	N/A

6. Accidental release measures

Personal Precautions Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Use personal protective equipment as required. Ensure adequate ventilation. Remove all sources of ignition. Take precautionary measures against static discharges.

Environmental Precautions Should not be released into the environment. See Section 12 for additional Ecological Information.

Methods for Containment and Clean Up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Do not breathe mist/vapors/spray. Do not get in eyes, on skin, or on clothing. Use only under a chemical fume hood. Do not ingest. If swallowed then seek immediate medical assistance. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Take precautionary measures against static discharges.

Storage. Keep container tightly closed in a dry and well-ventilated place. Keep away from open flames, hot surfaces and sources of ignition. Flammables area. Incompatible Materials. Strong oxidizing agents. Strong acids. Acid anhydrides. Acid chlorides. Strong bases. Metals. Peroxides.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Methyl alcohol	TWA: 200 ppm STEL: 250 ppm Skin	(Vacated) TWA: 200 ppm (Vacated) TWA: 260 mg/m^3 (Vacated) STEL: 250 ppm (Vacated) STEL: 325 mg/m^3 Skin TWA: 200 ppm TWA: 260 mg/m^3	IDLH: 6000 ppm TWA: 200 ppm TWA: 260 mg/m^3 STEL: 250 ppm STEL: 325 mg/m^3	TWA: 200 ppm STEL: 250 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures Use only under a chemical fume hood. Use explosion-proof electrical/ventilating/lighting equipment. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures When using do not eat, drink or smoke. Provide regular cleaning of equipment, work area and clothing.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	Alcohol-like
Odor Threshold	No information available
pH	Not applicable
Melting Point/Range	-98 °C / -144.4 °F
Boiling Point/Range	64.7 °C / 148.5 °F @ 760 mmHg
Flash Point	9.7 °C / 49.5 °F
Evaporation Rate	5.2 (ether = 1)
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	31.00 vol %
Lower	6.0 vol %
Vapor Pressure	128 hPa @ 20 °C
Vapor Density	1.11
Specific Gravity	0.791
Solubility	Miscible with water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	455 °C / 851 °F
Decomposition Temperature	No information available
Viscosity	0.55 cP at 20 °C
Molecular Formula	C H4 O
Molecular Weight	32.04
VOC Content(%)	100
Surface tension	0.02255 N/m @ 20°C

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Heat, flames and sparks. Keep away from open flames, hot surfaces and sources of ignition.

Incompatible Materials Strong oxidizing agents, Strong acids, Acid anhydrides, Acid chlorides, Strong bases, Metals, Peroxides

Hazardous Decomposition Products Carbon monoxide (CO), Formaldehyde

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation

Methyl alcohol	LD50 = 1187 – 2769 mg/kg (Rat)	LD50 = 17100 mg/kg (Rabbit)	LC50 = 128.2 mg/L (Rat) 4 h

Toxicologically Synergistic Products Carbon tetrachloride

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation May cause skin and eye irritation

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Methyl alcohol	67-56-1	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects Component substance is listed on California Proposition 65 as a developmental hazard.

Teratogenicity No information available.

STOT - single exposure Optic nerve Central nervous system (CNS)
STOT - repeated exposure Kidney Liver spleen Blood

Aspiration hazard No information available

Symptoms / effects,both acute and delayed May cause blindness: Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

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Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Methyl alcohol	Not listed	Pimephales promelas: LC50 > 10000 mg/L 96h	EC50 = 39000 mg/L 25 min EC50 = 40000 mg/L 15 min EC50 = 43000 mg/L 5 min	EC50 > 10000 mg/L 24h

Persistence and Degradability Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its volatility.

Component	log Pow
Methyl alcohol	-0.74

13. Disposal considerations

Waste Disposal Methods Should not be released into the environment.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Methyl alcohol - 67-56-1	U154	-

14. Transport information

DOT

UN-No UN1230

Proper Shipping Name METHANOL
Hazard Class 3
Packing Group II

TDG

UN-No UN1230
Proper Shipping Name METHANOL
Hazard Class 3
Subsidiary Hazard Class 6.1
Packing Group II

IATA

UN-No UN1230
Proper Shipping Name METHANOL
Hazard Class 3
Subsidiary Hazard Class 6.1
Packing Group II

IMDG/IMO

UN-No UN1230
Proper Shipping Name METHANOL
Hazard Class 3
Subsidiary Hazard Class 6.1
Packing Group II

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Methyl alcohol	67-56-1	X	ACTIVE	-

Legend:
TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Methyl alcohol	67-56-1	X	-	200-659-6	X	X	X	X	X	KE-23193

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

U.S. Federal Regulations

SARA 313

Component	CAS No	Weight %	SARA 313 - Threshold Values %
Methyl alcohol	67-56-1	>95	1.0

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Methyl alcohol	X		-

OSHA - Occupational Safety and Health Administration: Not applicable

CERCLA: This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Methyl alcohol	5000 lb	-

California Proposition 65: This product contains the following Proposition 65 chemicals.

Component	CAS No	California Prop. 65	Prop 65 NSRL	Category
Methyl alcohol	67-56-1	Developmental	-	Developmental

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Methyl alcohol	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): Y
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security: This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade: Serious risk, Grade 3

Authorisation/Restrictions according to EU REACH

Component	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Methyl alcohol	-	Use restricted. See item 69. (see link for restriction details)	-

https://echa.europa.eu/substances-restricted-under-reach

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Methyl alcohol	67-56-1	Listed	Not applicable	Not applicable	Not applicable

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Methyl alcohol	67-56-1	500 tonne	5000 tonne	Not applicable	Not applicable

16. Other information

Prepared By: Regulatory Affairs

Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date	27-Apr-2009
Revision Date	24-Dec-2021
Print Date	24-Dec-2021
Revision Summary	This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Creation Date 06-Aug-2009 **Revision Date** 24-Dec-2021 **Revision Number** 6

1. Identification

Product Name **Sodium thiosulfate pentahydrate**

Cat No. : **S445-3; S445-10; S445-50; S445-500; S474-3; S474-12; S474-500; S475-12; S475-50KG; S475-212; NC2030212**

CAS No 10102-17-7
Synonyms Sodium hyposulfite pentahydrate; Disodium thiosulfate pentahydrate (Crystalline/USP/FCC/EP/BP/Certified ACS)

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Combustible dust	Yes

Label Elements

Signal Word
Warning

Hazard Statements
May form combustible dust concentrations in air

Precautionary Statements
Storage
Store in a well-ventilated place. Keep container tightly closed
Hazards not otherwise classified (HNOC)
None identified

3. Composition/Information on Ingredients

Component	CAS No	Weight %
Sodium thiosulfate pentahydrate	10102-17-7	<= 100
Sodium thiosulfate	7772-98-7	-

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Get medical attention immediately if symptoms occur.

Inhalation Remove to fresh air. If breathing is difficult, give oxygen. Get medical attention immediately if symptoms occur.

Ingestion Do NOT induce vomiting. Get medical attention.

Most important symptoms and effects No information available.

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Dust can form an explosive mixture with air. Containers may explode when heated. Thermal decomposition can lead to release of irritating gases and vapors. Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
Sulfur oxides. Sodium oxides.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
1	1	1	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment as required. Avoid dust formation.

Environmental Precautions Should not be released into the environment. See Section 12 for additional Ecological Information.

Methods for Containment and Clean Up Sweep up and shovel into suitable containers for disposal. Avoid dust formation.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Ensure adequate ventilation. Avoid contact with skin, eyes or clothing. Avoid ingestion and inhalation. Avoid dust formation.

Storage. Keep containers tightly closed in a dry, cool and well-ventilated place. Incompatible Materials. Strong oxidizing agents.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limitsestablished by the region specific regulatory bodies.

Engineering Measures Ensure adequate ventilation, especially in confined areas. Use explosion-proof electrical/ventilating/lighting equipment. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	White
Odor	Odorless
Odor Threshold	No information available
pH	6.0-8.4 10% aq. sol
Melting Point/Range	48.5 °C / 119.3 °F
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	Not applicable

Specific Gravity	No information available
Solubility	Soluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	> 45°C
Viscosity	Not applicable
Molecular Formula	Na2 O3 S2 . 5 H2 O
Molecular Weight	248.18

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Hygroscopic. Air sensitive. Light sensitive.

Conditions to Avoid Avoid dust formation. Incompatible products. Excess heat. Exposure to moist air or water. Exposure to light. Exposure to air.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products Sulfur oxides, Sodium oxides

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Oral LD50	Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.
Dermal LD50	Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.
Mist LC50	Based on ATE data, the classification criteria are not met. ATE > 5 mg/l.

Component Information

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Sodium thiosulfate pentahydrate	10102-17-7	Not listed	Not listed	Not listed	Not listed	Not listed
Sodium thiosulfate	7772-98-7	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Do not empty into drains. Do not flush into surface water or sanitary sewer system.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Sodium thiosulfate pentahydrate	Not listed	Pimephales promelas: LC50>10000mg/L/96h	Not listed	Not listed

Persistence and Degradability Soluble in water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility . Will likely be mobile in the environment due to its water solubility.

Component	log Pow
Sodium thiosulfate	-4.35

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Sodium thiosulfate pentahydrate	10102-17-7	-	-	-
Sodium thiosulfate	7772-98-7	X	ACTIVE	-

Legend:
TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Sodium thiosulfate pentahydrate	10102-17-7	X	-	-	X	X	X	X	X	-

Sodium thiosulfate	7772-98-7	X	-	231-867-5	X	X	X	X	X	KE-31633

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations Not applicable

U.S. Department of Transportation
Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Authorisation/Restrictions according to EU REACH

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Sodium thiosulfate pentahydrate	10102-17-7	Listed	Not applicable	Not applicable	Not applicable
Sodium thiosulfate	7772-98-7	Listed	Not applicable	Not applicable	Not applicable

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Sodium thiosulfate pentahydrate	10102-17-7	Not applicable	Not applicable	Not applicable	Not applicable
Sodium thiosulfate	7772-98-7	Not applicable	Not applicable	Not applicable	Not applicable

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
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Print Date 24-Dec-2021
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

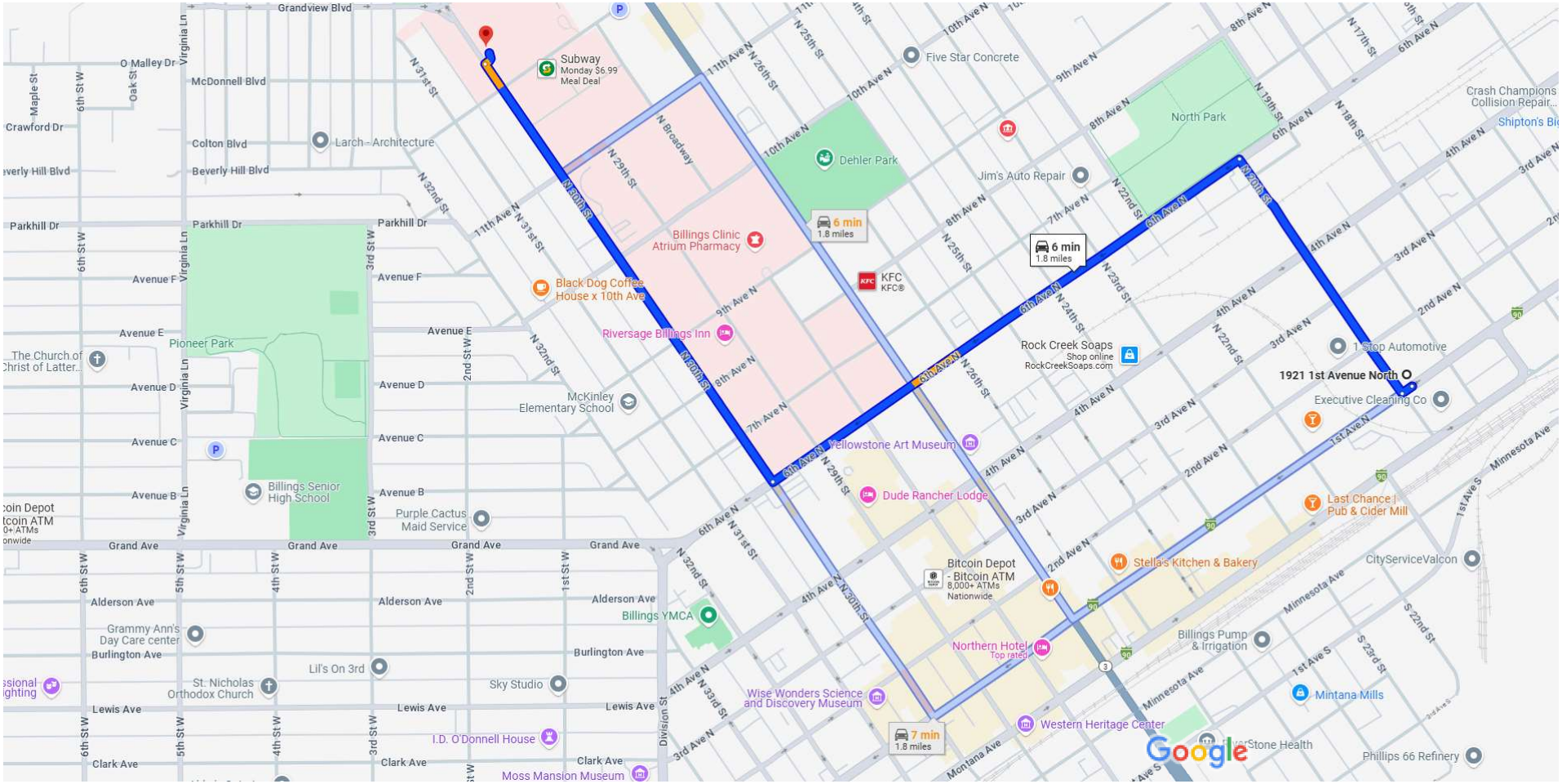
End of SDS

Attachment C
Route To Hospital

Google Maps

1921 1st Ave N, Billings, MT 59101 to Intermountain Health St. Vincent Regional Hospital, 1233 N 30th St, Billings, MT 59101

Drive 1.8 miles, 6 min



Map data ©2025 500 ft

via 6th Ave N and N 30th St	Fastest route	6 min 1.8 miles
via 1st Ave N and N 30th St	Some traffic, as usual	7 min 1.8 miles

via 1st Ave N and N 27th St — 6 min

Some traffic, as usual — 1.8 miles

Explore nearby Intermountain Health St. Vincent Regional Hospital

Restaurants | Hotels | Gas stations | Parking Lots | More

Attachment D
Tailgate Safety Meeting Form

Tailgate Safety Meeting Form

The tailgate safety meeting should include a discussion of emergency response, site communications and site hazards. Use the HASP and JSAs to help identify hazards.

Date: _____

Site Safety Officer: _____

Site Activities: _____

_____

Attendees:

Print Name and Signature:

_____ _____

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APPENDIX B
STANDARD OPERATING PROCEDURES

SOP-1 Field Documentation

This Standard Operating Procedure (SOP) describes procedures for documentation of field activities and guidance on types and specificity of data to be recorded. This standard is also applicable to photographic documentation collected to support field observations of site conditions and field data entry.

Equipment and Materials Needed

- Daily Field Record
- Field Forms
- Camera
- Waterproof pens with non-erasable ink

Daily Field Record

Daily Field Record templates should be printed out in hard copy prior to field work commencing. Field Personnel shall prepare one template for each of the number of proposed field days and should account for extra days in the field or lost or damaged records. At a minimum, the first page of the Daily Field Records shall contain the following information:

- Project Name
- Project Number
- Date
- Page Number
- Property Address
- Property City, State, Zip Code
- Field Activity or Activities
- Weather
- Field Personnel
- Subcontractor (if onsite)

Daily Field Records should be numbered if multiple pages are needed for one day. Separate Daily Field Records should be used for each day personnel are on site. All entries shall be preceded by a time of the event. Entries will contain a complete record of the investigation activities. Investigations can include, but are not limited to, the following activities:

- Details of work, particularly any deviations from Sampling and Analysis Plan (SAP) or SOPs
- Field observations
- Names and titles of site visitors
- Location
- Field measurements where a designated field form might not be used (PID's during excavations, Water Level Measurements, etc.)
- Equipment maintenance
- Documentation for investigation derived wastes
- Site entry and departure

Field Forms

Field forms are also used for data collection during a variety of activities. The forms include Borehole Logs, Monitoring Well Construction Forms, Well Development Forms, Groundwater Sampling Forms, etc. It is not necessary to duplicate records on Field Forms into Daily Field Records. Entries that are typically recorded on field forms consist of the following:

- Sample name

- Sample location, Borehole ID, Monitoring Well ID
- Drilling Specifications
- Borehole descriptions (Blow Count, PID readings, Depth, Lithological descriptions, etc)
- Equipment Calibration
- Groundwater measurements, and YSI readings, observations
- Sampling method, including any deviations from the SAP or SOPs
- Sample ID
- Sampler
- Time and date of samples collected
- Sample Parameters
- Sample Preservations
- Sample Methods

Entry Changes

All Field Documentation entries shall be printed legibly using a pen with waterproof, non-erasable ink. Any lines or pages inadvertently left blank or mistakes will have a single line drawn through them with the logging person's initials and date written on the line. Only the person making the entry may change it. If there is a change in personnel recording field notes during a particular day, the new personnel shall be identified prior to making entries. The new personnel shall sign and date the logbook at the beginning and end of his/her entry.

SOP-2 Sample Identification, Labeling, Documentation, & Packaging for Transport

This Standard Operating Procedure (SOP) describes methods for identifying, logging, packing, preserving, and transporting environmental samples for chemical or physical analysis.

Equipment and Materials Needed

- Sample Containers
- Sample Labels
- Sampling Forms
- Sample Collection Form
- Pens with waterproof, non-erasable ink
- Chain-of-custody (COC) forms
- Custody Seals
- Packing tape
- Coolers
- Ice
- Gallon-size Ziplock bags
- Shipping Labels

Sample ID

Multiple samples of different media may be collected at each sample location. The sample ID will consist of three sampling components: a site identification code for the site; a sample type code for the sample media; and a sample location number. Sample IDs will not change or be based upon the laboratory analysis requested. An example sample ID with each component noted above is provided below:

Example: AES-MW-01

Where: AES – Any Environmental Site (create an acronym on the site name)

MW – Monitoring well

01 – Monitoring well number 1

The site identification code (e.g., AES in the sample above) will remain the same for all samples collected at the site.

The sample type code (MW) could change depending on the media and sample type. The following are typical sample type codes to be used for samples:

- BH – borehole sample
- SD – sediment sample
- SS – soil sample
- SV – soil vapor probe sample
- SW –Excavation side wall sample or surface water sample
- PB – Pit bottom sample
- TP – test pit sample
- MW – monitoring well sample

If additional sampling type codes are required, they will be specified in the site-specific work plan. In addition, if a borehole location is to be installed and then completed as a monitoring well, the sample type

code for the borehole (soil) samples can be denoted as MW for consistency. This will be specified in the site-specific work plan and documented in field notes by field personnel.

The sample number will often be only two digits. If the number of samples collected at an environmental site will exceed 100, 3 digits (e.g., 001) should be used. For quality control samples (QC) samples, the type of QC sample will replace the sample number component. An example is provided below:

Example: AES-BH-ERB

Where: AES – Any Environmental Site (create an acronym on the site name)

BH – Borehole

ERB – Equipment Rinse Blank

The following are typical sample type codes to be used for QC samples:

- ERB – Equipment Rinse Blank
- TB – Trip Blank
- FB – Field Blank
- DUP – Field Duplicate
- MS/MSD – Matrix Spike/ Matrix Spike Duplicate

An additional code can be added to a sample ID to denote additional details about the sample. For example, when collecting soil samples within a borehole, the depth of the sample collection should be added at the end of the sample ID. An example is provided below:

Example: AES-BH-01-7'

Where: AES – Any Environmental Site (create an acronym on the site name)

BH – Borehole

01 – Monitoring well number 1

7' – 7 feet (the sample was taken at a depth of 7 feet)

Sample Labeling

The following information will be included on each sample label: Site name/client, sample identification, name of sampler, sample collection date and time, depth of sample (if applicable), and analyses or tests requested. Information known prior to field activities (site name/client, analyses requested, etc.) can be preprinted on sample labels.

Sample Documentation

The following itemized lists will be used as a general reference for completion of sample documentation:

- Record all pertinent sample activity in the Daily Field Record in accordance with SOP-01, Field Documentation.
- Record all samples to be packed and shipped on a Sample Collection Form. Update the Sample Collection Form each day a sample is collected.

SOP-7 Subsurface Soil Sampling

This Standard Operating Procedure (SOP) describes the guidelines for obtaining subsurface soil samples as stated in the Sampling and Analysis Plan (SAP) or as otherwise specified. Soil sampling is conducted for the purpose of chemical analyses and geotechnical testing to evaluate subsurface conditions.

Equipment and Materials Needed

- Sample bottles/containers and labels
- Sample cutting/extracting equipment (hand augers, split spoons, direct push drilling equipment, excavators)
- Stainless Steel Mixing Bowl
- Hand-Lens
- Daily Field Record
- Borehole Log
- Depth and length measurement devices with 0.01-foot measurements
- Camera
- Stakes and fluorescent flagging tape
- Decontamination materials
- Coolers and ice
- Chain of custody (COC) forms
- Custody Seals
- Gallon size Ziploc bags
- Photoionization detector (PID)
- Clear plastic packaging tape
- Personal Protective Equipment (PPE) – Level D unless otherwise specified in the Site-Specific Health & Safety Plan

Sampling Methods

There are several different methods used for subsurface soil sampling. The most common methods are hand-auger, split-spoon, direct-push, or excavator. Field personnel shall classify all subsurface soils, regardless of sampling method, using procedures provided by the Unified Soil Classification System (USCS, ASTM D2487-17). Soil samples for volatile organics will be collected as soon after sample retrieval as possible. After collecting subsurface soil samples, field personnel shall place extra soil in a Ziploc bag to take a field screening of the soil using a PID. The USCS classification and PID reading, as well as the sample depth and location, should be recorded in the Daily Field Record and/or in the appropriate field form. The procedures for hand-auger, split-spoon, direct-push, and excavator are described below.

Hand Auger

1. Locate sample location.
2. Remove all surface materials (e.g., excess gravel, vegetation, etc.) from the sample location.
3. If multiple samples need to be collected, bring several stainless-steel augers to avoid contamination or decontaminate after each use.
4. Empty the contents of the auger into a stainless-steel bowl.
5. Remove gravel from the bowl. If volatile organics analysis is not required, mix the remaining sample in the bowl.
6. Samples for chemical analyses and/or geotechnical testing shall be collected using the laboratory-approved and analytical-method required sample containers.
7. Immediately store samples in a cooler with ice.

SOP-7 Subsurface Soil Sampling

Split Spoon Sampler

1. Locate sample location.
2. Remove all surface materials (e.g., excess gravel, concrete, asphalt vegetation, etc.) from the sample location.
3. Driller should have at least two standard 2-inch outside diameter (OD), 1 3/8-inch inside diameter (ID), 24-inch-long split spoons.
4. Record the weight of the drop hammer being used and the height the drop hammer will fall. Standard measurements are a 140 lb hammer falling 30 inches.
5. Set up worktable. Ensure there is enough space to lay the sampler down.
6. Once drilling starts, record number of blow counts to complete sampling over each 6-inch depth interval. Record on Borehole Log.
7. Remove sampler and place on worktable.
8. Record the density of the sampled material by summing the blow counts for the second and third 6 inches of penetration (N-Value) per ASTM D 1586-99. Record on Borehole Log.
9. Record the lithology of the subsurface soil using USCS, water saturation if present, percent recovery (inches driven/inches recovered) and any other observations on the Borehole Log for that 24-inch-long sampler.
10. Place the soil in a stainless-steel bowl.
11. Remove gravel from the bowl. If volatile organics analysis is not required, mix the remaining sample in the bowl.
12. Samples for chemical analyses and/or geotechnical testing shall be collected using the laboratory-approved and analytical-method required sample containers.
13. Immediately store samples in a cooler with ice.
14. Using other sampler, repeat steps 6-13.

Excavator

1. Locate excavation.
2. Excavate to the depth specified in the SAP. Place excavated material in an area that is away from excavation and in an area that will allow for quick and safe removal.
3. If pit exceeds 5 feet in depth, OSHA standards for shoring or sloping must be implemented to prevent burials.
4. Personnel should work with the excavator to collect soil for sampling to avoid entering the excavation.
5. Collect soil from the bucket or directly from the wall or pit bottom of the excavation. Disturbed samples should be collected using a stainless-steel scoop, shovel, or trowel. Undisturbed samples shall be collected using a hand auger and/or other coring tool.
6. Place the soil in a stainless-steel bowl.
7. Remove gravel from the bowl. If volatile organics analysis is not required, mix the remaining sample in the bowl.
8. Samples for chemical analyses and/or geotechnical testing shall be collected using the laboratory-approved and analytical-method required sample containers.
9. Immediately store samples in a cooler with ice.
10. Backfill the excavation with material specified in the SAP. If using excavated material, backfill in reverse order of excavation to ensure topsoil is placed at the top of the pit. Compact backfill repeatedly to avoid compression in the excavation footprint. If an excavation is left overnight, fence of the excavated area and add proper signage and flagging tape.

References

ASTM International, D2487-17 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System). April 2020
ASTM International, D1586-99 Standard Method for Penetration Test and Split-Barrel Sampling of Soils.
Montana DEQ, Soil Sampling Guidance. June 2016
Pace Analytical, Analytical Guide. December 2021.

SOP-12 Groundwater and LNAPL Measurement

This Standard Operating Procedure (SOP) describes methods to measure groundwater and Light Non-Aqueous Phase Liquids (LNAPL) elevations and thicknesses in groundwater monitoring wells as required in the site-specific Sampling and Analysis Plan (SAP).

Equipment and Materials Needed

- Daily Field Report
- Groundwater Sampling Form (if applicable)
- Electronic water level indicator
- Electronic oil/water interface probe
- Decontamination Supplies
- Personal Protective Equipment (PPE) – Level D unless otherwise specified in the Site-Specific Health & Safety Plan

Groundwater Level Measurement Procedures

- Open monitoring well casing using caution so that items do not fall into the monitoring well.
- Locate the fixed reference point. Fixed reference points should be placed on the north top of casing.
- Check the water level indicator battery by pressing the test button to ensure the device is operating properly before taking the level measurement.
- Lower the sounder wire of the electronic water level slowly until it just makes contact with the water in the well and the indicator light goes on or the pulsating alarm is sounded.
- Record the position of the wire relative to the reference point at the north top of casing.
- Record the water level reading to the nearest 0.01 foot.
- Repeat to confirm depth.
- Withdraw the sounder from the monitoring well.
- Decontaminate the sounder wire and probe in accordance with SOP-4.

LNAPL Level Measurement Procedures

- Open monitoring well casing using caution so that items do not fall into the monitoring well.
- Locate the fixed reference point. Fixed reference points should be placed on the north top of casing.
- Check the interface probe battery by pressing the test button to ensure the device is operating properly before taking the level measurement.
- Lower the interface probe slowly until it just makes contact with the LNAPL in the monitoring well and the LNAPL indicator light goes on or the continuous alarm is sounded.
- Record the position of the wire relative to the reference point at the north top of casing.
- Record the LNAPL level reading to the nearest 0.01 foot.
- Repeat to confirm depth.
- Continue to lower the interface probe, through the LNAPL layer, until it makes contact with the water level in the monitoring well and the water indicator light goes on or the pulsating alarm is sounded.
- Record the water level reading to the nearest 0.01 foot.
- Repeat to confirm depth.
- Withdraw the sounder from the monitoring well.
- Decontaminate the sounder wire and probe in accordance with SOP-4.

References

Montana DEQ, Groundwater Sampling Guidance. March 2018.
USEPA, Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers. May 2002

SOP-13 Equipment Calibration, Operation, & Maintenance

This Standard Operating Procedure (SOP) describes the guidelines for controls, calibration, and maintenance of measurement and testing equipment to be used for obtaining samples for chemical analyses, for measuring field parameters, and for testing various parameters/characteristics. The purpose of this SOP is to ensure the validity of field measurement data generated during field activities as required in the Sampling and Analysis Plan (SAP).

Equipment and Materials Needed

- Daily Field Report
- Field Calibration Sheet
- Measurement and testing equipment
- Equipment/instrumentation-specific operation manuals
- Equipment/instrumentation-specific cases, batter chargers, and attachments
- Calibration standards (standard gases, calibration fluids and standards)

Calibration Procedures

Measuring equipment/instrumentation must be calibrated before initial use as recommended in the manufacturer's guide/operation manual. Equipment/instrumentation shall be re-calibrated at the beginning of each day that the equipment/instrumentation shall be used, long periods between uses, readings observed above or below the range of the instrument, and/or signs or evidence of equipment malfunction. Daily calibration and re-calibration activities will be recorded using a Field Calibration Sheet and will include the following information;

- Project Name and Number
- Name of Personnel
- Date and time of calibration or re-calibration
- Equipment/instrumentation manufacturer, make, and model
- Equipment/instrumentation serial or unique inventory number
- Calibration standards used
- Method of calibration
- Deviations, if any, from the manufacturer's recommended procedures or calibration frequency

Operation

Manufacturer's instructions will be followed for correct methods of operation. Equipment malfunctions and deviations, if any, from the manufacturer's recommended methods of operation will be documented in the Daily Field Report and/or Field Calibration Sheet. Readings obtained from each instrument shall be recorded in the Daily Field Report or on the appropriate field form. If readings are suspected to be inaccurate, field personnel will record inaccuracies on the Daily Field Report or on the appropriate field form and report them to the Project Manager.

Maintenance

Equipment/instrumentation will be maintained in accordance with the manufacturer's recommendations. Equipment/instrumentation that malfunctions or is scheduled for routine maintenance will be clearly labeled to prevent its continued use until repairs/maintenance is completed. The Field Lead will be responsible for ensuring that malfunctioning equipment is identified, marked for repair, repaired either in-house or by an outside company in accordance with manufacturer guidelines, checked following repair and returned to service. The Field Lead will maintain an equipment log, which contains the following;

- Equipment/instrumentation manufacturer, make, model

- Equipment/instrumentation serial or unique inventory number
- Recommended calibration frequency
- Recommended maintenance frequency
- Status (in service, not in use, or out of service for repair/maintenance
- Dates of status changes
- Inspection and maintenance/repair dates

References

Geotech. Manuals, Instructions & Quick Start Guides
https://www.geotechenv.com/geotech_manuals.html

SOP-14 Low-Flow Groundwater Sampling

This Standard Operating Procedure (SOP) describes the procedures and guidelines for conducting low-flow groundwater sampling. This SOP provides a method that minimizes the impact of the purging process on groundwater chemistry and volume of water for disposal.

Equipment and Materials Needed

- Monitoring Well Construction Form
- Daily Field Report
- Groundwater Sampling Form
- Figure of monitoring well locations
- Well Construction Information
- Tools and well keys to access monitoring well
- Water Level measuring device (electronic water level indicator or interface probe)
- Groundwater purging equipment (peristaltic pump, low-flow submersible pump or bladder pump). The state that the sample will be collected in may have a preferred method. Check the State Environmental Department's groundwater sampling guidelines.
- Appropriate tubing based on pump required
- Flow measurement (timer and graduated bucket)
- Power source
- Groundwater quality parameter monitoring instruments
- Flow-through cell and applicable tubing
- Instrument operation manuals
- Calibration standards
- Container for purge water containment, if applicable (5-gallon buckets or 55-gallon drums)
- Graduated bucket in liters
- Sample containers and labels
- Field filtration equipment, if applicable
- Chain of custody forms and seals
- Coolers, ice, and packing materials
- Decontamination materials
- Personal protection equipment

Low Flow Sampling Preparation

Sampling shall begin at the monitoring well with the least contamination and proceed systematically to the monitoring wells with the most contamination. If contamination is unknown, sampling shall begin away from the suspected source and proceed towards the suspected source.

When at a monitoring well location, field personnel must create a work area around the monitoring well to minimize cross-contamination. A work area shall be created to minimize the possibility of sampling equipment contacting the ground surface. Sampling equipment shall be organized and strategically placed to facilitate groundwater sampling procedures effectively. All sampling equipment that will be lowered in the well and reused shall be decontaminated before and after sampling. Field personnel should wear appropriate PPE, as stated in the Site-Specific Health & Safety Plan, and should always wear nitrile gloves while sampling groundwater.

Measurements Before Purging

Groundwater and LNAPL, if present, measurements shall be obtained in accordance with SOP-9. If LNAPL is present, a groundwater sample shall not be collected unless otherwise stated in the Site-

Specific Sampling and Analysis Plan (SAP). Field personnel shall obtain groundwater elevation from top of casing to the nearest 0.01 foot. In addition, the total well depth from top of casing should be obtained prior to sampling. If total well depth is required to be measured immediately prior to sampling, field personnel will take precautions to minimize the displacement of sediments within the well during measurement activities. Record groundwater elevations, total well depth, and LNAPL elevations, if present, on the Groundwater Sampling Form.

Calculate the standing water column and casing volume using the following formulas:

Standing Water Column (feet) = TD (ft btoc) – DTW (ft btoc)

Where: TD = Total Well Depth

FT BTOC = Feet Below Top of Casing

DTW = Depth to Water

Casing Volume (gallons) = Standing Water Column Height (feet) x Volume per One Foot of Casing^{WCS} (gallons/foot)

Where: WCV = Well Casing Specific (see table below)

Well Casing Volume Per One Foot			
Diameter*	Volume Per Foot of Casing (Gallons)	Diameter*	Volume Per Foot of Casing (Gallons)
0.5	0.0102	4.0	0.6528
1.0	0.0408	6.0	1.469
2.0	0.1632	8.0	2.611

* Casing diameter can be measured in the field but should be recorded on the Monitoring Well Construction Form of the monitoring well to be sampled.

Record the Standing Water Column Height and Casing Volume on the Groundwater Sampling Form.

In addition to depth to water, total well depth, standing water column height, casing diameter, and casing volume, depth to top of screened interval and depth to bottom of screened interval shall be known by field personnel prior to sampling and recorded on the Groundwater Sampling Form. Depth to top of screened interval and depth to bottom of screened interval will be located on the Well Construction Form of the monitoring well to be sampled.

Pump/Tubing Intake Positioning

Field Personnel shall determine and position the pump/tubing intake as appropriate relative to the position of the water level, screened interval, and intervals of different contaminant concentrations within the well screen, if applicable. For most sites with screened intervals of 10 feet long or shorter, the pump/tubing intake should be located at approximately the midsection of the saturated screened interval. Record the pump depth on the Groundwater Sampling Form. Attach all necessary tubing and safety cables, if using a pump, before lowering the pump into the monitoring well. Lower the pump slowly into the water well to the pre-determined depth. Connect tubing to the flow-through cell and groundwater quality measurement instrument. Minimize the length of tubing to avoid heating of the groundwater in the tubing. Connect tubing from the flow-through cell extending into a 5-gallon bucket. The 5-gallon bucket shall be used to collect the purge water.

Flow Rate and Drawdown

Field personnel shall re-gauge the depth to groundwater from the top of well casing. Turn on the pump at its lowest setting and determine the flow rate by measuring the volume of water removed over a one-minute period using a graduated bucket in liters. Field personnel shall monitor the water column drawdown and shall adjust the pump to avoid a drawdown of more than 0.3 feet. The flow rate of the pump shall generally be adjusted between 01 and 0.5 liters per minute. If drawn down exceeds 0.3 feet, continue purging until three casing volumes and/or water quality parameters stabilize. Record both the depth to groundwater, flow rate, and purge volume every 5 minutes.

Purging and Groundwater Quality Parameter Monitoring

Groundwater quality parameters are monitored every 5 minutes during purging as well as depth to groundwater and flow rate. Groundwater quality parameters to be monitored include temperature, pH, specific conductance (SC), dissolved oxygen (DO), oxidation-reduction potential (ORP), and turbidity. Field Personnel will monitor and record in the Groundwater Sampling Form all groundwater quality parameters every 5 minutes while continuously purging until groundwater quality parameters have stabilized or until three casing volumes have been purged. Groundwater quality parameter stabilization will be achieved when three consecutive readings, taken every 5 minutes, are within the parameter specific ranges listed in the table below:

Parameter	Stabilization Criteria
Temperature	± 3% (°C)
pH	± 0.1
Specific Conductance (SC)	± 3% (µS/cm)
Dissolved Oxygen (DO)	± 10% if > 0.5 or 3 consecutive readings at < 0.5 (mg/L)
Oxidation-Reduction Potential (ORP)	± 10 (mV)
Turbidity	± 10% or if > 5 NTU or 3 consecutive readings at < 5 NTU

Record all groundwater quality parameters every 5 minutes on the Groundwater Sampling Form. Once the groundwater parameters have stabilized, Field personnel shall cut the tubing, with decontaminated scissors, connecting to the flow through cell to start sample collection. Never collect groundwater samples with the tubing flowing out of the flow-through cell.

Sample Collection

Sample labels shall be attached to laboratory-provided sample containers and filled out before sample collection. Field personnel must wear new nitrile gloves that were not used during groundwater monitoring. Samples should be collected in order of analyte stability summarized below:

- Volatile organic compounds (VOCs)
- Semi-volatile organic compound (SVOCs)
- Non-filtered, non-preserved samples (ex. PCBs)
- Non-filtered, preserved samples (ex. Total Metals)
- Filtered, non-preserved samples
- Filtered, preserved samples (ex. Dissolved Metals)
- Miscellaneous parameters

Quality Control Samples will be collected consecutively to ensure appropriate duplicate sample collection. Immediately following collection, samples shall be placed in a cooler with ice.

Commonly Used Sample Containers

Analyte	Sample Container and Preservative
VPH/GRO	3 – 40 mL amber vials with 10 ml HCl
EPH/DRO	2 1L amber glass with HCl
8011 Lead Scavengers	3 – 40 mL amber vials with 10 ml NaThio
8260 Lead Scavengers/VOC's	3 – 40 mL amber vials with 10 ml HCl
Metals	1 – 250 mL plastic bottle with nitric acid
SVOC's	2 – 100 mL amber glass bottles
PAH's	2 – 40 mL vials

References

Montana DEQ, Groundwater Sampling Guidance. March 2018.
Pace Analytical, Analytical Guide. December 2021
USEPA, Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers. May 2002

- Determine number of coolers required to accommodate the shipment based on number of samples to be shipped, number of containers per sample and number of sample containers that will fit in each cooler.
- Have the lab provide shipping labels.
- Assign a Chain of Custody (COC) form to each cooler. (Note: More than one COC form may be needed to accommodate number of samples to be shipped in one cooler).
- Each day that samples are shipped, record COC form numbers, and shipping label numbers in Daily Field Record.
- Complete COC forms in accordance with SOP-03, Chain of Custody.
- Assign custody seals to each cooler.
- Obtain necessary field personnel 's full signature or initials on appropriate paperwork.

Sample Packaging for Transport

The steps outlined below will be followed to pack sample containers into coolers for shipment:

- Each glass sample container will be wrapped with protective packaging material.
- Packing material will be placed in the bottom of each cooler for cushioning.
- A plastic cooler bag will be placed in the cooler to contain all samples and ice.
- Sample containers will be placed inside each cooler, taking care not to overfill the cooler.
- Ice will be added into the plastic bag, in and around the sample container bags. Sample containers will be packaged so they are not in direct contact with ice (e.g., inside their own Ziplock bag). Once the plastic cooler bag containing samples has an adequate amount of ice, the bag will be sealed with zip ties.
- Packing material will be placed over the top of the plastic bag containing samples and ice.
- The COC records will be signed, and the date and time at which the coolers are sealed for transport by a shipping company or relinquished to delivery service or the laboratory sample receiving department will be indicated.
- Copies of COC records will be separated. The original signature copies will be sealed in Ziplock bag and taped to the inside lid of a cooler. A copy of each COC will be retained by the sampler.
- If any cooler has a drain, the drain will be taped shut.
- The lid to each cooler will be closed and custody seals will be affixed to each cooler between the lid and the body of the cooler. One custody seal will be placed on the front of the cooler, and one will be placed on the back. Custody seals will be covered with clear plastic tape.
- The cooler will be taped shut on both ends with several revolutions of tape.
- Samples will be packed and transported to the analytical laboratory within hold times, as indicated by the laboratory.

References

ASTM International, D3694-96 Standard Practices for Preparation of Sample Containers and for Preservation of Organic Constituents. December 2017

ASTM International, D4220-95 Standard Practices for Preserving and transporting Soil Samples. August 2017

ASTM International, D4840-99 Standard Guide for Sampling Chain-of-Custody Procedures. August 2018

ASTM International, D6911-03 Standard Guide for Packaging and Shipping Environmental Samples for Laboratory Analysis. December 2010

Pace Analytical, Quality Assurance Manuel, Quality Assurance/Quality Control Policies and Procedures, April 2019.

SOP-3 Chain of Custody

This Standard Operating Procedure (SOP) describes procedures for preparation and use of the chain of custody (COC) form that accompanies field-collected soil, sediment, water, air or geotechnical samples. Procedures are also provided for preparation and use of custody seals for securing openings of sample containers during transport of sample to the analytical laboratory. COC forms and custody seals are used to provide documentation of sample integrity from the time of sample receipt and acceptance by the analyzing laboratory or testing laboratory.

Equipment and Materials Needed

- COC forms (provided by laboratory)
- Custody seals (provided by laboratory)
- Gallon-size plastic sealable bags
- Clear plastic packing tape
- Ball point pen

Chain of Custody Form Items to Complete

The following general information must be completed on the COC form:

- Company name, address, email, telephone number
- Laboratory name, address, email, telephone number
- Report to email, copy to email
- Project name, project number
- Requested due date/turnaround time
- Site location (State)
- Sample ID
- Sample matrix
- Sample type
- Date and time of sample collection
- Number of containers
- Sample preservative (if applicable)
- Requested analysis
- Filtered (Y/N)
- Comments or special instructions to the laboratory
- Sampler's name, signature, date signed
- Relinquisher's name/affiliation, date, time

Chain of Custody Form and Procedures

- If a sampling event requires the use of more than one shipping container, copies must be made for each shipping container.
- It is acceptable to pre-type the company name, address, email, telephone number, laboratory name, address, email telephone number, report to email, copy to email, project name, project number and site location. These are the only fields that should be pre-typed.
- The COC form must be completed in black or blue ink and preferably with a ball point pen.
- Corrections must be made by drawing a single line through the data that is an error and initialing and dating at the end of the line. If multiple corrections are needed, copy correct information to a new COC and destroy copy with errors.

- If the number of samples included in the shipping container is less than the number of data entry lines on the COC, draw a single diagonal line running from left down to the lower right-hand corner of the field sample data area. The sampler's initials and date must be added along the line.
- Double check to see that the information on the COC form corresponds to the information recorded by the sampler on the sample labels.
- Seal the completed COC form in a Ziploc bag. Tape the bag to the inside of the cooler lid prior to sealing the cooler.
- If samples are to be shipped by a third-party carrier, the COC form must be relinquished to the shipping service. If samples are to be hand delivered to a laboratory by someone other than the sampler/relinquisher, the sampler/relinquisher must relinquish the samples by signing the appropriate lines on the COC.

References

ASTM International, D4840-99 Standard Guide for Sampling Chain-of-Custody Procedures. August 2018

Pace Analytical, Quality Assurance Manuel, Quality Assurance/Quality Control Policies and Procedures, April 2019.

SOP-4 Equipment Decontamination

This Standard Operating Procedure (SOP) describes the guidelines for decontamination of equipment prior to its initial use onsite, reuse at another sampling interval or location, and demobilization from Site as specified in the Sampling & Analysis Plan (SAP) or as otherwise specified.

Equipment and Materials Needed

- Decontamination detergents (e.g., Alconox)
- Deionized/distilled water
- 10% dilute nitric and/or methanol (if applicable)
- Brushes
- 5-gallon Buckets
- Spray bottles
- Nitrile Gloves
- Paper towels
- Ziplock bags
- Garbage Bags
- Personal Protective Equipment (PPE) – Level D unless otherwise specified in the Site-Specific Health & Safety Plan

Procedures

- Select an area to decontaminate equipment away from potential contaminants. The area will be preferably upwind and upgradient from the sampling area. The area shall be located where decontamination fluids and materials can be contained and discarded.
- Wear appropriate PPE (nitrile gloves, long sleeved pants/shirt, protective eyewear).
- Inspect equipment and physically remove visible contamination.
- Wash with Alconox or an equivalent degreasing detergent, rinse with distilled water, rinse with 10% dilute nitric acid, and finally, rinse with distilled water three times.
- If possible, use three buckets of each of the above washing agents.
- If sampling for organic contamination, use 10% dilute methanol instead of nitric acid.
- Air dry and place decontaminated equipment in a Ziplock bag or another inert material before moving to next sampling interval or location. If the equipment will not be used until the next sampling event, label the Ziplock bag with the date that the equipment was decontaminated.
- Deposit disposable items in a garbage bag and dispose of the garbage bag in a proper manner.
- Wash water may be disposed on onsite unless otherwise specified in the SAP.

References

ASTM International, D5088-20 Practices for Decontamination of Field Equipment Used at Waste Sites. May 2020

SOP-5 Quality Control Sampling

This Standard Operating Procedure (SOP) describes the guidelines for collecting Quality Control (QC) samples in the field. QC samples are collected alongside natural samples in the field to validate laboratory results. QC samples are collected by field personnel and submitted to the laboratory blind to be used as a comparison to the natural sample. All QC samples will be documented in the work plan or SAP prior to field work commencing. All QC samples are to be prepared in the field with the exception of Trip Blanks, which are provided by the laboratory. If Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples are requested, three duplicate samples should be collected and submitted to the laboratory.

Equipment and Materials Needed

- Field Forms
- Appropriate sample containers per media
- Chain of Custody Form

Common QC Samples and Frequency

QC Sample	Sample Label	Description/Purpose	Frequency
Duplicate Sample	DUP	A distinct sample collected at the same time and location as a first, natural sample. The duplicate is submitted to the laboratory without identifying it as a duplicate. Used to evaluate analytical precision.	1 per every 20 samples
Equipment Rinse Blank	ERB	A rinsate blank consists of a contaminant free water used to rinse the sampling equipment which is then collected for laboratory analysis. Used to evaluate the potential of cross contamination from sampling equipment.	1 per sampling event per media
Trip Blank	TB	A sample of analyte free media collected in the same type of container used for analytical testing. It is meant to remain unopened and to accompany the sample containers. Collected to ensure any analytes detected were not the result of contamination during the sampling / transport process.	1 per sampling event per media (only with volatile constituents)
Field Blank	FB	Analyte free water poured into a sampling container in the field and carried with other field samples. Collected to assess whether contamination may have occurred in the field during sampling.	1 per sampling event
Split Sample	SP	A distinct sample which is then split into two parts such that each part is representative of the original sample. Collected to compare test results between field kits or between two laboratories.	When requested
Matrix Spike/ Matrix Spike Duplicate	MS/MSD	A known concentration of analytes of interest added to a sample prior to preparation and analysis. Purpose is to document the accuracy and precision of the method for that specific sample.	1 per every 20 samples

*Sampling frequency is based on EPA guidance. Projects not overseen by EPA may not require the same QC sample frequencies and will be described within the site-specific work plan.

References

EPA, Quality Assurance Guidance for Conducting Brownfields Sites Assessments. September 1998

Pace Analytical (2019), Quality Assurance Manuel, Quality Assurance/Quality Control Policies and Procedures

APPENDIX C
FIELD PREPARATION PLAN

Field Preparation Plan

GRANITE PEAK ENVIRONMENTAL

Project:	Former Dollar Rent-a-Car	Project Number:	5003.00	Project Manager:	David Sanborn
Location:	1921 1st Avenue North, Billings, MT 59101	Investigation Dates:	Spring 2026 and Fall 2026	Field Staff:	Karlyn Soriano
Client:	BSED	Site Contact:	Gene Hauck	Last Update Date:	3/4/2026
Client Contact:	Dianne Lehm	DEQ/EPA Contact:	Jonathan Love/Curtis Jeffries	Completing Personnel:	Tyler Powers
Investigation Objectives:	•Sample groundwater in monitoring well M3 for EPH, VPH and Lead Scavengers				

Sampling Approach

Groundwater

Number of Samples	Analytical Analysis	Media	Sample Type	Analytical Method	Sample Containers	Preservative	Hold Times	Sample Notes
1	VPH	Groundwater	Natural	MTDEQ VPH	3 x 40ml vials	HCl	14 days	1 per well, zero headspace
1	EPH*	Groundwater	Natural	MTDEQ EPH	2 x 1L amber glass jar	HCl	14 days	1 per well
1	Lead Scavengers	Groundwater	Natural	EPA 8260	3 x 40ml vials	HCl	14 days	1 per well, zero headspace
1	VPH	Duplicate	QC	MTDEQ VPH	3 x 40ml vials	HCl	14 days	groundwater duplicate sample, zero headspace
1	EPH*	Duplicate	QC	MTDEQ EPH	2 x 1L amber glass jar	HCl	14 days	groundwater duplicate sample
1	Lead Scavengers	Duplicate	QC	EPA 8260	3 x 40ml vials	HCl	14 days	groundwater duplicate sample, zero headspace
1	VPH	Trip Blank	QC	MTDEQ VPH	2 x 40ml vials	HCl	14 days	laboratory provided, zero headspace

Laboratory: Energy Laboratories, Billings, MT

Shipping: None, hand deliver

Notes:
Check with Energy Laboratories on appropriate sample containers and methods when ordering.
*EPH Fractions will only be ran if EPH Screen results exceed 1,000 ug/L in groundwater.

Project Requirements

DEQ Approved	Owner Approved	Owner Notified	Budget Reviewed	WP Reviewed by Field Staff	Health & Safety Plan Reviewed	Utilities Located	Hold Times Appropriate	Project Review w/ Project Manager

Respond with Yes / No / Not Applicable

APPENDIX D
REPORTING LIMITS COMPARED TO SCREENING LEVELS

Comparison of Screening Levels to Laboratory Reporting Limits

Analysis	Method	Target Analyte	Groundwater Standard or RBSL[1]	Energy Laboratory Reporting Limit	Energy RL < Screening Level
Volatile Petroleum Hydrocarbons (VPH)	MT VPH (MADEP)	C5-C8 Aliphatics	700	100	Yes
		C9-C12 Aliphatics	3,000	100	Yes
		C9-C10 Aromatics	980	100	Yes
	EPA 8260	MTBE	30	1	Yes
		Benzene	5	1	Yes
		Toluene	1,000	1	Yes
		Ethylbenzene	700	1	Yes
		Xylenes	10,000	3	Yes
		Naphthalene	100	5	Yes
Extractable Petroleum Hydrocarbons (EPH)	MT EPH (MADEP)	EPH Screen	--	300	Yes
		C9-C18 Aliphatics	3,000	600	Yes
		C19-C36 Aliphatics	100,000	600	Yes
		C11-C22 Aromatics	1,100	600	Yes
Lead Scavengers	8011	1,2-Dibromoethane (EDB)	0.017	0.01	Yes
	8260	1,2-Dichloroethane (DCA)	4	0.5	Yes

Notes:

1 = Table 3 - Groundwater Standards and RBSLs (DEQ, 2024) ug/L = micrograms per liter if available. If not, Circular DEQ-7 Montana Numeric Water Quality Standards apply (DEQ, 2013).

-- = EPH fractions will be requested if EPH Screen results exceed 1000µg/L

All units in 'µg/L (microgram per liter)

RL = Reporting Limit

RBSL = Risk-Based Screening Level

MADEP = Massachusetts Department of Environmental Protection Method for the determination of VPH

APPENDIX E
DATA VALIDATION SUMMARY FORM

Montana DEQ - Waste Management and Remediation Division

Data Validation Summary Form (Version 1.3.0, Revised 1/26/18)

Please fill out the information below, using one form for each lab batch (one form can be used for multiple analytical methods). The form will grow and adjust, based on your responses. Please include a discussion regarding the sampling event in the report that is sent to DEQ with this form. For additional instructions, please click the Open Complete Instructions button.

Open Complete Instructions

Basic Questions View example (Note: example optimized for viewing in Chrome browser)

1. Site/Facility name	
2. Site code or facility ID (if applicable)	
3. Release ID (if applicable)	
4. Sample delivery group	
5. Name of DEQ-approved sampling plan	
6. Date DEQ approved the sampling plan	M/D/YY
7. Name of data validator	
8. Phone	
9. Date validated	M/D/YY

Field Collection Questions View example (Note: example optimized for viewing in Chrome browser)

10. Sample matrix	☐ Soil ☐ Sediment ☐ Surface water ☐ Groundwater ☐ Tap water ☐ Air (including soil gas) ☐ Other
11. Sample collection start date	M/D/YY
12. Sample collection end date	M/D/YY
13. Analytical methods used *Use Add Method button to list multiple methods. Enter any other methods in the field manually.*	Add Method / Delete Method — Analytical Method(s)

Laboratory-related Questions View example (Note: example optimized for viewing in Chrome browser)

14. Laboratory name and location				
15. Laboratory project ID				
16. Were samples received in good condition and at appropriate temperature, chain-of-custody forms complete, and all samples analyzed within holding times?	Yes ◯	No ◯	See Below ◯	Comments
16a. Were chain-of-custody forms complete?	Yes ◯	No ◯		Comments

16b. Were samples received in good condition, preserved, and at appropriate temperature (VOA no headspace, appropriate pH, temperature 4° C +/- 2° for most samples)?	Yes ○	No ○		Comments
16c. Were the samples analyzed within method-specified or technical holding times?	Yes ○	No ○		Comments
17. Were all laboratory quality control procedures complied with and is data validated without qualifiers?	Yes ○	No ○	See Below ○	Comments
17a. Were all calibration verification results within acceptable limits?	Yes ○	No ○		Comments
17b. Were laboratory (method) blank samples free of contamination?	Yes ○	No ○		Comments
17c. Are the percent recoveries and relative percent differences of matrix spike and matrix spike duplicates within quality control limits?	Yes ○	No ○		Comments
17d. Are the laboratory control samples the same matrix as the samples and prepared the same as associated samples?	Yes ○	No ○		Comments
17e. Were laboratory control samples and laboratory control sample duplicate percent recoveries and relative percent differences within laboratory control limits?	Yes ○	No ○		Comments
17f. Were surrogate recoveries within laboratory quality control limits?	Yes ○	No ○		Comments
17g. Were the laboratory duplicate relative percent differences within data validation quality control limits?	Yes ○	No ○		Comments
18. Were the total number of lab method blanks at least 5% of the total number of samples, or as required by the method?	Yes ○	No ○		Comments
19. Were the total number of lab matrix spike samples prepared at least 5% of the total number of samples, or as required by the method?	Yes ○	No ○		Comments

20. Please list any project samples used for matrix spike/matrix spike duplicates.

Add Sample	Lab ID	Field Sample ID	Comments
Delete Sample			

21. Is the total number of laboratory control samples at least 5% of the total number of samples?	Yes ○	No ○	Comments

Consultant/Validator Questions View example (Note: example optimized for viewing in Chrome browser)

22. Are the detection limits appropriate for the project (i.e. at or below screening levels)?	Yes ○	No ○	Comments
23. Are the reported units appropriate for the sample matrix (i.e. water results in ug/L, not mg/kg)?	Yes ○	No ○	Comments
24. Do the analytical methods comply with project requirements (e.g. in the SAP, work plan, or QAPP)?	Yes ○	No ○	Comments
25. Do the laboratory reports include all constituents requested to be analyzed on the chain-of-custody or under the sampling plan or other applicable document?	Yes ○	No ○	Comments
26. Is the number of sample blanks (e.g. equipment, trip, or field blanks) equal to at least 10% of the total number of samples, or as otherwise required?	Yes ○	No ○	Comments
27. Are field blanks free from contamination, duplicates collected as required, and field duplicate percent differences within data validation quality control limits?	Yes ○	No ○	See Below ○ Comments
27a. Were all blank samples free of analyte contamination?	Yes ○	No ○	Comments
27b. Were field duplicates collected as required?	Yes ○	No ○	Comments
27c. Are field duplicate relative percent differences within data validation quality control limits?	Yes ○	No ○	Comments

28. Please provide an Excel or CSV file to the DEQ project manager (via e-mail or CD) that lists all samples evaluated in this summary and lists any qualified data.
Please use the following format:

Lab ID	Field Sample ID	Qualifiers	Comments (indicate whether the issue biases the results high or low)
Example 48310-2.31E	Example GW-1	R	Sample dropped in lab and unrecoverable
Example 48310-2.32D	Example GW-2		

Please use the following format for qualifiers. See EPA's National Functional Guidelines for more information on qualifiers for unique samples such as dioxins.

Qualifier	Explanation
C	Pesticide and Arochlor results confirmed with GC/MS
J-	Estimated value, may be biased low
J	Analyte identified, but concentration is estimated
J+	Estimated value, may be biased high

NJ	Tentatively identified compound
R	Sample result rejected
U	Analyte analyzed for, but not detected above quantitation limit
UJ	Analyte not detected above CRQL, but CRQL may be inaccurate
X	Pesticide and Arochlor results attempted using GC/MS, but unsuccessful

If you wish to manually enter qualified sample results, please use the table below.

Add Sample	Lab ID	Field Sample ID	Qualifiers	Comments (indicate whether the issue biases the results high or low)
Delete Sample				

29. What is the percent completeness (samples planned versus valid samples collected)? Comments

30. Was the completeness goal met? Yes No Comments

31. Does all data conform to analytical methods and data quality objectives specified for this project? Yes No Comments

32. Other general comments or observations?

Split Samples

33. Did DEQ collect split samples? Yes No Comments

Print Form Save As Open Instructions Hide Instructions

Montana Department of Environmental Quality
Data Validation Guidelines for Evaluating Analytical Data
(updated January 26, 2018)

This document was assembled by the Montana Department of Environmental Quality Contaminated Site Cleanup Bureau (DEQ) to formalize technical direction for conducting data validation. Data validation is a standardized review process for judging the analytical quality and usefulness of a discrete set of chemical data and is necessary to ensure that data of known and documented quality are used in making environmental decisions.

While these guidelines are generally used by DEQ, there may be circumstances that warrant a higher level of data validation review and DEQ reserves the right to require additional validation. For investigations where x-ray fluorescence (XRF) or other field screening equipment is used, provide an evaluation including the comparison and correlation of field screening data to laboratory confirmation data in the data validation discussion (please see DEQ's frequently asked questions at http://deq.mt.gov/Land/StateSuperfund/FrequentlyAskedQuestions for specifics associated with the use of XRF equipment and data collection/evaluation).

Please complete a separate data validation report for each sample batch as determined by the laboratory (Note: large data collection events may result in multiple batches). A brief summary of this validation report and the acceptability and usability of the data should be included in the text of the project report with the validation report included as an appendix. The data validation should include an assessment of data using the precision, accuracy, representativeness, comparability, and completeness (PARCC) parameters:

Precision: The degree of mutual agreement between individual measurements of the same property under similar conditions.

Combined field and laboratory precision is evaluated by collecting and analyzing field duplicates and then calculating the

variance between the samples, typically as a relative percent difference (RPD). Laboratory analytical precision is evaluated by analyzing matrix spike/matrix spike duplicate (MS/MSD) samples and using the results to calculate an RPD.

Accuracy: The degree of agreement between an analytical measurement and a reference accepted as a true value.

The accuracy of a measurement system can be affected by errors introduced by field contamination, sample preservation, sample handling, sample preparation, and analytical techniques. Analysis of matrix spike/matrix spike duplicate (MS/MSD) samples, laboratory control spikes (LCS) or blank spikes, surrogate standards, and method blanks are typically used to calculate the percent recovery (%R) for evaluating accuracy.

Please note that some methods, such as EPH and VPH, require calibration data. For such methods, please provide and verify the calibration data.

Representativeness: The degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter at a sampling point, or an environmental condition that they are intended to represent.

Typically, representative data will be obtained through careful selection of sampling locations and analytical parameters; proper collection and handling of samples; and through use and consistent application of established field and laboratory procedures. Evaluation of field and laboratory blank samples for presence of contaminants can be useful in evaluating representativeness of sample results.

Completeness: A measure of the percentage of project-specific data that is valid.

Valid data are obtained when samples are collected and analyzed in accordance with quality control (QC) procedures outlined in the sampling and analysis plan (SAP), and when none of the QC criteria that affect data usability are exceeded. Once data validation is complete, the number of usable sample results is divided by the total number of sample results planned for the investigation to determine the percent completeness. A completeness goal should be developed for each project (i.e., 100% completeness for residential samples to ensure that all properties requiring sampling are sampled). A discussion of completeness must also examine the number of samples called for in the SAP compared to the number of samples actually collected. Variance between the planned and collected sample numbers should be explained.

Comparability: Expression of the confidence with which one data set can be compared with another.

Comparability of data is achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data.

For complete information regarding data validation, please see the EPA National Functional Guidelines at
http://www2.epa.gov/clp/contract-laboratory-program-national-functional-guidelines-data-review

Determination of Data Usability Qualifiers

Step 1: Review QC Parameter and Document Finding	Step 2: Determine Which Samples to Qualify	Step 3: Determine Which Results to Qualify	Step 4: Apply Qualifier and Bias Code
Lab Receipt of Samples			
Preservative (including sample temperature) outside of specifications.	Affected samples and professional judgment	Detected Results Non-detected Results	J- UJ or R
Samples not accounted for on Chain-of-Custody	Affected samples	All samples	R

Step 1: Review QC Parameter and Document Finding	Step 2: Determine Which Samples to Qualify	Step 3: Determine Which Results to Qualify	Step 4: Apply Qualifier and Bias Code
Samples analyzed outside of method specified or technical holding time.	Affected samples	Detected Results Non-detected Results	J- R (UJ for SVOC, pesticides, aroclors)
Samples analyzed grossly outside of method specified or technical holding time.	Affected samples	Detected Results Non-detected Results	J- R
Lab Quality Control			
Calibration verification results outside of acceptable limits.	Samples associated with initial and/or continuing calibration verification	Detected Results Non-detected Results	J UJ
Analyte detected in Method Blank (MB) at concentration less than Contract Required Quantitation Limit (CRQL)[1] (i.e. , J-flag)	Samples in preparation batch	Detected Results <=CRQL Detected Results >CRQL	U J (use professional judgment)
Analyte detected in Method Blank (MB) at concentration greater than or equal to CRQL	Samples in preparation batch	Detected Results < Blank Concentration Detected Results >= Blank Concentration	U Use professional judgment
Matrix Spike:			
%Recovery above specifications	Sample and professional judgment for samples in preparation batch from same matrix.	Detected Results Non-detected Results	J+ No qualifier
%Recovery below specifications and greater than 20% (30% for inorganics)	Sample and professional judgment for samples in preparation batch from same matrix.	Detected Results Non-detected Results	J- UJ
%Recovery below 20% (30% for inorganics)	Sample and professional judgment for samples in preparation batch from same matrix.	Detected Results Non-detected Results	J- R
Note: If the spiking amount is less than four times the result in the unspiked parent sample, the MS/MSD data may not represent the matrix effect. Professional judgment should be use in evaluating and qualifying the data.			
Laboratory Control Sample:			
%Recovery above specifications	Samples in preparation batch.	Detected Results Non-detected Results	J+ No qualifier
%Recovery below specifications and greater than 20% (40% for inorganics; see NFG for pesticides and Aroclors; 10% for dioxins)	Samples in preparation batch.	Detected Results Non-detected Results	J- UJ
%Recovery below 20% (40% for inorganics; see NFG for pesticides and Aroclors; 10% for dioxins)	Samples in preparation batch.	Detected Results Non-detected Results	J- R
Laboratory Duplicate Samples (including LCSD and MSD):			

Step 1: Review QC Parameter and Document Finding	Step 2: Determine Which Samples to Qualify	Step 3: Determine Which Results to Qualify	Step 4: Apply Qualifier and Bias Code
Relative Percent Difference outside specifications	Samples in preparation batch.	Detected Results	J
Surrogate Recoveries:			
Surrogate Recovery greater than Upper Acceptance Limit	Target analytes in sample	Detected Results Non-detected Results	J+ No qualification (UJ for dioxins)
Surrogate Recovery less than Lower Acceptance Limit and greater than 10%	Target analytes in sample	Detected Results Non-detected Results	J- UJ
Surrogate Recovery less than 10%	Target analytes in sample	Detected Results Non-detected Results	J- R (see NFG for dioxins)
Field QC Samples			
Blanks			
Analyte detected in Field Blank, Equipment Blank, and/or Trip Blank at concentration less than Contract Required Quantitation Limit (CRQL)1 (i.e. , J-flag)	Associated samples	Detected Results <CRQL Detected Results >=CRQL	U Use professional judgment
Analyte detected in Field Blank, Equipment Blank, and/or Trip Blank at concentration greater than or equal to CRQL	Associated samples	Detected Results < Blank Concentration Detected Results >= Blank Concentration	U Use professional judgment
Duplicates			
Field Duplicate Relative Percent Difference outside specifications and analyte concentration >=5x CRQL	Associated samples	Detected Results	J
Field Duplicate Relative Percent Difference outside specifications and analyte concentrations <5x CRQL with absolute difference between sample and duplicate > CRQL	Associated samples	Detected Results Non-detected Results	J UJ
Field Duplicate Relative Percent Difference outside specifications and analyte concentrations <5x CRQL with absolute difference between sample and duplicate <= CRQL	Associated samples	Detected Results Non-detected Results	No qualification No qualification
Consultant/Validator Questions			
Reported Units not appropriate for sample matrix	Affected samples	All results	Inquire, document, and use professional judgment
Analytical methods do not comply with project requirements. And/Or Detection Limits not appropriate for the project.	Affected samples	Detected Results Non-detected Results	Use professional judgment Use professional judgment, if Reporting Limits > Screening Levels; results may not be usable
QC Sample Frequency			

Step 1: Review QC Parameter and Document Finding	Step 2: Determine Which Samples to Qualify	Step 3: Determine Which Results to Qualify	Step 4: Apply Qualifier and Bias Code
Method Blanks analyzed less than 5% of total samples	Use professional judgment	Use professional judgment	Inquire, document, and use professional judgment
Matrix Spike samples analyzed less than 5% of total samples	Use professional judgment	Use professional judgment	Inquire, document, and use professional judgment
Laboratory Control Samples analyzed less than 5% of total samples	Use professional judgment	Use professional judgment	Inquire, document, and use professional judgment
Field, equipment, or trip blanks analyzed less than required	Use professional judgment	Use professional judgment	Inquire, document, and use professional judgment

Notes:

1. See the National Functional Guidelines (NFG) for contract required quantitation limit (CRQL) or blank results of common laboratory contaminants, including: methylene chloride, acetone, and 2-butanone.

2. Screening Levels (SLs) is a generic term which may include Risk Based Screening Levels, Regional Screening Levels, and/or site specific screening levels.