

Groundwater Monitoring Work Plan 35121

Former Prestige Auto

193 N Main Street

Kalispell, MT 59901

Facility ID 15-02272, Release 4202, Work Plan 35121

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February 26, 2026

WCEC Project No. 2602-0197

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1.0 Introduction

The scope of work (SOW) detailed in this Additional Corrective Action Work Plan includes additional groundwater monitoring and sump sampling at the Former Prestige Auto facility (Facility ID 15-02272, Release 4202) in Kalispell, Montana. West Central Environmental Consultants (WCEC) was retained by the Montana Department of Transportation (MDT) to complete additional corrective actions at the facility as requested by the Montana Department of Environmental Quality (MTDEQ) in correspondence dated January 16, 2026. Additional groundwater data is recommended to assess the ongoing status of petroleum contamination and potentially design additional remediation.

1.1 Site Location & Background

The site is located at the southwest corner of Idaho Street (US 2) and Main Street (US 93) in downtown Kalispell. Subsurface soils at the site consist of glacial lacustrine silts and clays with intermittent sand and gravel lenses. Depth to groundwater at the site area typically ranges from 5 feet to 10 feet below ground surface (bgs). Groundwater flow in the vicinity of the facility is generally to the southeast based on previous groundwater monitoring data.

The site was historically operated as a service station under the name of Prestige Auto. The Montana Department of Transportation (MDT) obtained ownership of the property to expand right of way (ROW) of the busy intersection of US 2 and US 93. After obtaining ownership of the property, MDT inherited ownership of one 500-gallon used oil underground storage tank (UST) and discovered a second 2,000 gallon UST. During removal of the USTs on March 11, 1999, a third UST was also discovered. All three USTs were subsequently removed from the ground. Petroleum stained soil was encountered during their removal. Analytical results indicated impacts from waste oil, diesel fuel, and gasoline. Approximately 200 cubic yards of impacted soil were removed from the tank excavation and disposed at the Flathead Landfarm Treatment Facility. The over-excavation occurred to the south of the Former Prestige Auto building, located today in the parking lot that is used primarily by customers of the neighboring Moose's Saloon.

Five 2-inch monitoring wells (M1, M2, M3, M4, and M5) were installed to define the extent and magnitude of groundwater contamination. Groundwater contamination was evident in M1 and M2. A GeoProbe investigation was completed in July 2004, included installing six borings in the vicinity of the former UST basins and pump islands at the site. The GeoProbe investigation identified petroleum impacted soil located upgradient from M1, indicating other possible sources for petroleum hydrocarbons. Possible sources included former USTs or pump islands at the site, or unknown sources that are now under the expanded US 2. Hydrocarbon concentrations in soil exceed the risk-based screening levels (RBSLs) over an area of

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approximately 12,000 square feet to a depth of at least 20 feet bgs, and some impacted soil appears to be inaccessible, as it is underneath US 2 and upgradient of the USTs removed by MDT.

Research of the site, including MDT as-built plans dated 1949, aerial photographs from 1979, and DEQ UST files, indicated that there have been other historical UST systems on the site. One historical system was located to the west of the former Prestige Auto building, where a portion of the dispenser islands were located underneath US 93. Another system was to the north, located underneath US 2.

On September 29, 2005, a meeting was conducted by DEQ and MDT to assess viable options for soil removal at the intersection. DEQ and MDT concluded that excavation work should be postponed until impacted soil underlying the newly reconstructed and landscaped pedestrian area, sidewalk, and highways could be removed in a cost-effective manner. Since then, the former Prestige Auto groundwater contamination has been on a monitoring schedule.

On March 2018, six 1-inch monitoring wells and one soil boring were advanced to determine whether contamination threatened any water and sewer lines, whether the plume was defined within MDT ROW, and whether there were any potential impacts to receptors not originally identified during past investigations. While the 2018 investigation indicated that there were no threats to underground utilities, it did confirm that the plume extended past the MDT ROW and underneath a portion of the Moose's Saloon building. The piezometers and monitoring wells were sampled again in 2019, confirming the initial results of the 2018 investigation.

Cleanup alternatives were considered in a report dated July 14, 2017. The preferred alternative was an MNA strategy, however, this alternative was made based on the assumption that nearby receptors were not threatened by the existing plume. The 2018 Remedial Investigation identified that a portion of the plume extends underneath the Moose's Saloon building, prompting MDT to re-examine the remedial alternatives analysis. The first alternative in the Remedial Alternatives Analysis was to inject an oxygen releasing compound or an oxidation product. The 2018 investigation indicated that the source located underneath Highway 2 may not be as substantial as originally assumed. However, a portion of the Highway 2 could be made accessible to an injection technology with a temporary lane closure. The rest of the site conditions, while not conducive to over-excavation activities due to extensive landscaping, are not prohibitive to an injection technology utilizing a smaller GeoProbe. Even if the injection technology cannot fully achieve RBSLs, infrastructure was left in place by the 2018 investigation to evaluate whether a future injection technology can successfully reduce the footprint of the plume to within MDT ROW.

On December 28, 2020, MDT prepared a Remedial Alternatives Analysis (RAA) Report that compared excavation activities, soil vapor extraction / air sparging, and two in-situ chemical oxidation (ISCO) products. The RAA recommended proceeding with the injection of two Regenesix products: PersulfOx® and PetroFix®.

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MDT subsequently solicited proposals for completion of an Oxidant Injection Pilot Study using the specified products. A work plan was prepared by WCEC as a component of the RFP response [WCEC, 2021].

WCEC conducted the oxidant injection pilot study at the facility in October 2021 [WCEC, 2022]. During the week of October 4, 2021, 2,000 lbs of PetroFix® activated carbon was injected in two transects along the north and south boundaries of the property. Horizontal spacing of the PetroFix® injection borings was approximately 4 feet with a targeted injection interval of 5 to 15 feet bgs. Monitoring wells M6 and M11 were abandoned on October 6, 2021 after being utilized as PetroFix® injection points. WCEC installed replacement monitoring wells M6R and M11R on October 6, 2021. During the week of October 25, 2021, 5,070 lbs of PersulfOx® oxidant compound was injected in the center of the property. A total of 46 PersulfOx® injection borings were installed, with four angled borings underneath a landscaped area that was inaccessible to the drill rig in the vicinity of monitoring well M1. Horizontal spacing of the PersulfOx® injection borings was approximately 6 to 8 feet with a targeted injection interval of 5 to 15 feet bgs.

MDT environmental personnel completed pre- and post-injection groundwater monitoring activities in September 2021, February 2022, and November 2022 showing concentrations remained above RBSLs. In December 2023 WCEC installed 17 boreholes, abandoned piezometers M7, M8, M9, and M10 and installed 2 inch monitoring wells M7R, M8R, and M9R. WCEC personnel conducted groundwater monitoring activities in January 2024 and April 2025. Soil data showed Groundwater concentrations remain above RBSLs.

2.0 Scope of Work

2.1 Required Scope of Work

The scope of work requested by the MTDEQ and MDT consists of:

- Conduct a groundwater monitoring event from M1, M2, M6R, M7R, M8R, M9R and M11R for a total of seven monitoring wells. Collect field parameters temperature, pH, specific conductivity, conductivity, dissolved oxygen (DO), DO%, and ORP. Analyze groundwater samples for VPH, EPH, and intrinsic biodegradation indicators (IBI) such as Nitrate, Sulfate, Ferrous Iron, Manganese, and Methane.
- Collect a water sampling from the sump located in the basement of Moose's Saloon. Analyze sample for VPH, EPH, and and intrinsic biodegradation indicators (IBI) such as Nitrate, Sulfate, Ferrous Iron, Manganese, and Methane.
- Validate all laboratory analytical data using DEQ's Data Validation Summary Form (DVSF) found online under the Guidance dropdown at the Petroleum Tank Cleanup Section (PTCS) webpage.
- Prepare an updated Release Closure Plan (RCP); discuss results with MDT & DEQ's project manager. Use the RCP format found online under the Guidance dropdown at the PTCS webpage.
- Prepare and submit a Groundwater Monitoring Report detailing the results of the investigation. The Report is expected to include all the content outlined in the Remedial Investigation Report format including, but not limited to the following:
 - Cumulative soil and groundwater data tables.
 - Site map(s) showing current and historical site features, including all borings.
 - A discussion and assessment of the effectiveness of remediation to date, the extent and magnitude of residual petroleum contamination, the extent of where additional remediation may be needed, evaluation of potential shifting of the contaminated plume and recommendations for additional remediation based on the results of the RCP.
 - A preliminary design of additional remediation.
 - Append groundwater monitoring field forms, laboratory analytical data, completed DVSFs, and the updated RCP.

2.2 Groundwater Monitoring and Sump Sampling

Groundwater samples will be collected from monitoring wells M1, M2, M6R, M7R, M8R, M9R, M11R and the sump in Moose's Saloon for analysis. Depth to water measurements will be recorded from all the site wells during the groundwater monitoring event to provide an accurate potentiometric surface plot, flow direction, and gradient.

Well sampling will be conducted according to WCEC Standard Operating Procedures (SOPs) [Appendix A] and MTDEQ Guidance for low-flow sampling using a peristaltic pump for purging and sample collection.

Groundwater quality parameter data (conductivity, pH, salinity, dissolved oxygen, temperature, turbidity, and ORP) will be acquired during well purging using a flow through cell attached to the peristaltic pump. Well drawdown will be minimized, ideally to 0.3 feet or less, and depth to water measurements will be taken frequently to achieve the ideal pumping speed. If drawdown is unavoidable the well will be purged at a rate of 50 ml/min, which changes over the water in the flow through cell every 5 minutes. Purge water will be handled according to the MTDEQ Purge Water Disposal Flowchart.

Groundwater sample collection will be completed following stabilization of groundwater quality parameters. Groundwater quality parameter, purge, and stabilization data for each well are recorded in the field using WCEC's Well Sampling Form. If present, any accumulations of free product (FP) in the monitoring wells will be noted and FP thicknesses will be recorded. Groundwater samples will not be collected from any wells that contain a measurable thickness of FP.

Prior to taking the sump sample WCEC personnel will take note of any sheen and/or petroleum odor in the sump. The sump sample will be collected by evacuating the sump of any standing water and collecting water that reinfilters the voided sump.

Groundwater samples will be preserved with hydrochloric acid, packed on ice, and delivered to Energy in Helena, Montana under chain of custody. All groundwater samples collected will be submitted for VPH, EPH, and intrinsic biodegradation indicators (IBIs) consisting of ferrous iron, manganese, nitrates/nitrites, sulfates, and methane. TEH fractions analysis will be conducted if the EPH screen exceeds 1,000 µg/L.

2.3 Report Preparation

At the conclusion of the remedial investigation, WCEC will prepare and submit a Groundwater Monitoring Report detailing the results of the groundwater monitoring. Laboratory analytical data will be validated using the MTDEQ Data Validation Summary Form (DVSF) with a completed DVSF appended to the laboratory analytical report. The report will include the content, figures, cumulative data tables, and appendices outlined in the Remedial Investigation Report format guidance, which includes preparing a Release Closure

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Plan (RCP). A thorough discussion regarding the remedial investigation with recommendations for further corrective actions will also be presented in the RCP and RI Report.

3.0 Estimated Costs & Project Timeline

The scope of work outlined in this work plan is tentatively scheduled to begin spring 2026, pending approval from the MTDEQ. The attached *Estimated Costs – Additional Corrective Action Work Plan 35121* spreadsheet details anticipated project costs to complete the MTDEQ required scope of work.

4.0 References

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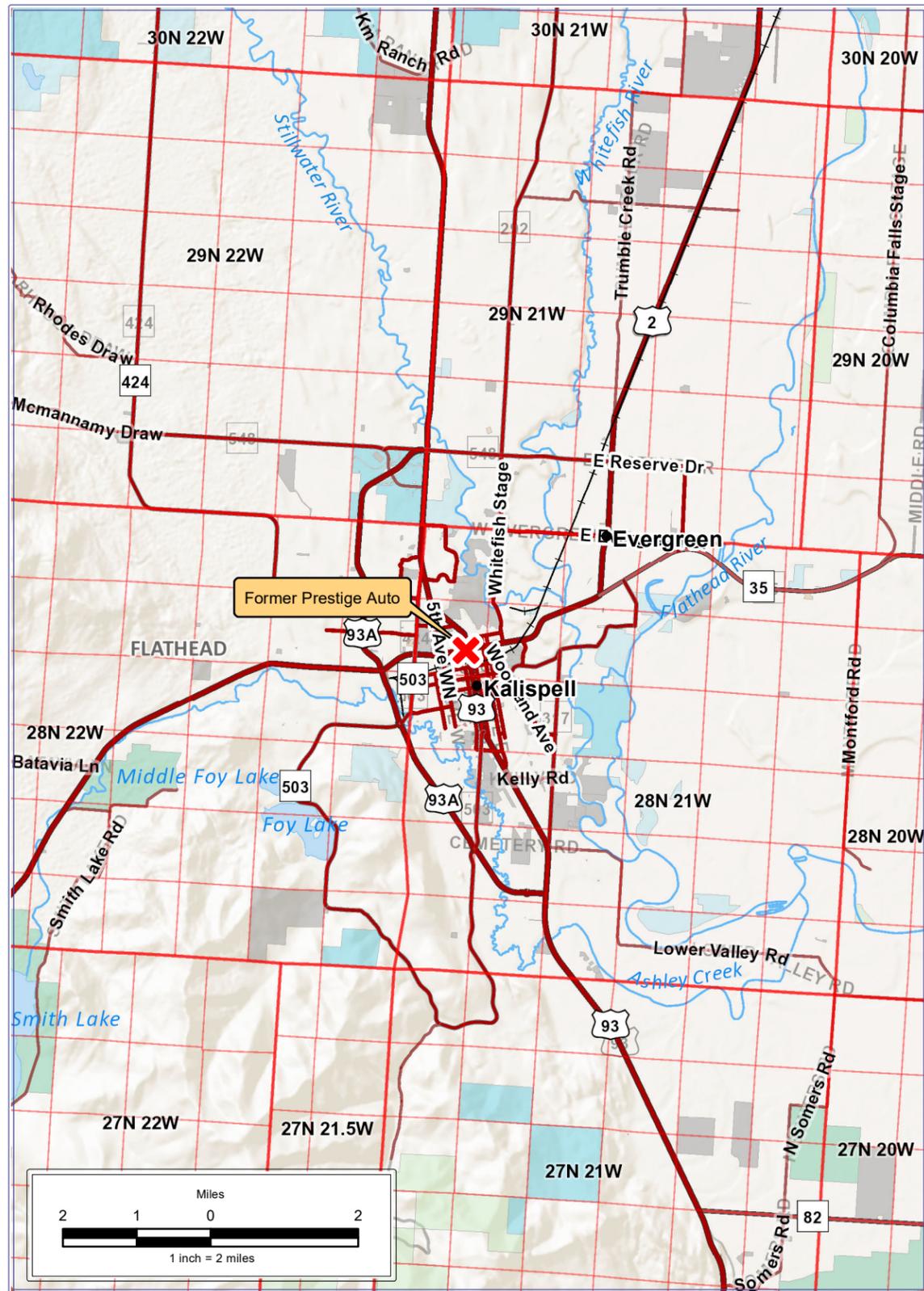
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Figures

Figure 1: Site Location Maps

Figure 2: Site Details Map



LEGEND

Site Location



Site Location Maps

Former Prestige Auto
 193 N Main Street
 Kalispell, MT 59901

DRAWN BY: TCP

DATE: 11/01/21

SCALE: 1:12,000

PROJECT NUMBER: 21-13636-70

IMAGE SOURCE: ESRI BASEMAPS



FIGURE 1

Source: Esri, DeLorme, USDA, USGS, AEX, GeoEye, Geotmapping, AeroGRID, IGN, ICB, and the GIS User Community



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Appendix A: Estimated Costs

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Appendix B: Field Investigation Standard Operating Procedures

Field Investigation Standard Operating Procedures

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1.0 Field Notes

Field books are bound and all information recorded in these books are written in indelible ink. All deletions are a single line cross out. The field books contain:

- Time and date fieldwork started.
- A purpose and description of the proposed field task.
- Location and description of the work area.
- Names of field personnel.
- Name, address, and phone number of any field contacts.
- Weather conditions.
- Details of the fieldwork performed, including sketches of locations, construction details, and field analytical results.
- All field measurements gathered.
- Record of any on-site communication with clients.

2.0 Boring Logs/ Well Logs

A boring log is constructed for each boring done at a specific location. Boring logs include the following:

- Project name, project number, Facility ID number, and boring identification number.
- Driller.
- Date and time that drilling begins and ends.
- ASTM symbol and depth for each lithologic unit.
- Material description and geologic origin for each lithologic unit.
- Photoionization detection readings of samples from a particular horizon.
- Depth that groundwater is encountered.
- Type, depth, and type of analysis of samples collected.
- Comments made during the drilling.

3.0 Photographs

Photographs of field activities are taken with a perspective similar to the naked eye. Photographs include a scale in the picture when practical. The following information is recorded in the field notebook:

- Photographer's name, date and time photo was taken, general direction of photo.
- Description of the subject and fieldwork portrayed in the picture.
- Sequential number of the photograph and the associated roll number.

4.0 Sample Identification and Sample Labels

A sample numbering system will be developed on a site specific basis to identify each soil or ground water sample obtained during a field investigation. This numbering system provides a tracking procedure to allow retrieval of information about a particular sample and assure that each sample is uniquely numbered.

Each unique sample number is entered onto the sample label using indelible ink. Additional information included on to the label includes the analytical parameter(s), preservative(s), sampling personnel, date of sample collection, time of sample collection, sample type (grab or composite) and the project number. The sample label is then directly affixed to the appropriate sample container and may be covered using clear tape.

5.0 Sample Custody

Samples are logged onto a chain-of-custody (COC) form while on-site. This record contains the following information: Project number, sample description, matrix, number of containers, type of preservative, analyses requested, sampling date, sampler(s), sampler(s') signature(s), West Central Environmental Consultants (WCEC) relinquishing signature(s), date, and time.

The last page of the COC form is retained by WCEC; the remainder of the form is shipped with the samples to the laboratory. At the laboratory, the COC form is signed by the appropriate laboratory personnel at the time the samples are received. A copy of this COC form is included in each laboratory report sent to WCEC. As few people as possible handle the samples and COC.

Samples will be properly packaged for shipment and dispatched to the appropriate laboratory for analysis, with a separate signed custody record enclosed in each sample cooler. All shipments will be accompanied by the COC form identifying the contents. The original copy and one copy will accompany the shipment, and one copy will be retained by the sampler.

If samples are sent by common carrier, a bill of lading should be used. If sent by mail, the package will be registered with the return receipt requested. Commercial carriers are not required to sign off on the custody forms as long as the custody forms are sealed inside the sample cooler and the custody seals remain intact.

6.0 Health & Safety Plan

A site specific Health and Safety Plan indicates the necessary site information (address, phone numbers, contact, etc.) and all pertinent data regarding potential health risks. A map indicating the site address and the closest hospital with an emergency route are included as a part of this Plan. General information and procedures pertaining to company wide health and safety are part of the WCEC Health and Safety Plan.

7.0 Sampling/Handling Procedures

Disposable latex gloves are used by field technicians at all times during sampling. Gloves are replaced when soiled and between each sampling point to minimize cross or background contamination. Sampling equipment and sampling jars are kept segregated from potential sources of cross or background contamination and are replaced if deemed necessary.

8.0 Equipment Decontamination

All non-disposable sampling equipment used is scrubbed in a solution of biodegradable Alconox detergent and warm de-ionized water, then rinsed with de-ionized water, followed by a methyl alcohol rinse (when applicable), and finally triple-rinsed with warm de-ionized water. Water disposal is in accordance with state guidelines.

9.0 Quality Assurance / Quality Control

In order to detect background contamination (for VOCs, BTEX, MTBE, and/or GRO), laboratory supplied trip blanks are kept with the sample jars and exposed to the same conditions as the actual samples. Trip blanks are not opened until analyzed by the laboratory.

Duplicate water samples are collected to evaluate the variability in laboratory analytical methods. When possible, an additional set of samples is collected from a well with petroleum contamination. This duplicate is

labeled as an additional monitoring well and is kept with the other samples to be analyzed for all project parameters.

When re-usable sampling equipment is used for water sampling, field blanks may be collected to detect possible cross-contamination. The field blank samples are collected by running distilled water through the same equipment used to collect the actual samples; the field blank samples are then analyzed by the laboratory for the same project parameters.

10.0 Investigation Procedures

10.1 Surface Soil Sampling

The following procedure is used to collect surface soil samples:

- Carefully remove the top layer of soil or debris to the desired sample depth with a pre-cleaned spade.
- If volatile organic analysis is to be performed, transfer the sample directly into an appropriate, labeled sample container with a stainless steel lab spoon or equivalent, and secure the cap tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval.
- Place the sample into appropriate, labeled containers and secure the caps tightly; or, if composite samples are to be collected, place a sample from another sampling interval or location into the homogenization container and mix thoroughly. When compositing is complete, place the sample into appropriate, labeled containers and secure the caps tightly.

10.2 Solid Investigation Derived Waste (IDW)

General trash and personal protective equipment will be cleansed of any gross soil accumulation and placed in plastic garbage bags, double bagged, and transferred or transported to a licensed solid waste disposal facility as municipal waste.

Soil cuttings which exhibit obvious signs of contamination will be segregated and stockpiled on plastic or containerized pending profiling for disposal. Methods for soil cutting profiling and disposal will be determined on a case-by-case basis by the WCEC project manager in conjunction with the appropriate regulatory agency.

11.0 Headspace Analysis

Soil samples for on-site screening are placed in plastic zip lock baggies or glass “Mason” style jars. Each baggie is one third filled with soil and sealed trapping headspace air. Each jar is half-filled with soil and covered with aluminum foil. To seal the sample, a ring lid is carefully screwed onto the jar.

Headspace development proceeds for a minimum of 5 minutes; each baggie or jar is shaken for 15 seconds before and after this period. Analysis is completed with a MiniRAE 3000 photoionization detector (PID) with 10.2 eV lamp. The PID is calibrated on-site prior to commencement of field activities, and as necessary with compressed isobutylene gas to read parts-per-million volume/volume of volatile organic compound vapors. Additionally, the PID is recalibrated in the factory every year. To perform the analysis, the PID probe is inserted into the container or baggie to a depth of approximately one half of the total headspace, and maximum meter response over a period of 5 seconds is recorded.

12.0 Receptor Survey

A county water well receptor search is conducted using the Ground Water Information Center (GWIC) developed by the Montana Department of Natural Resources (DNRC). The GWIC is searched for wells within ½ mile of the release site. If greater than 25 wells exist within ½ mile, information is included for the nearest 25 wells. If no wells exist within ½ mile of the release site, the search is extended to 1 mile. The County sanitarian is also contacted; information is requested on wells within either ½ mile or 1 mile of the release, depending on the range of the GWIC search. If additional information is still required, the DNRC will be contacted directly.

13.0 Well Monitoring Procedures

13.1 Monitoring Well Water Level Measurement

The static water level in each well is measured to the nearest 0.01 foot from a referenced point on the well casing using a factory-calibrated electric water level probe. Water level measurements are collected from all monitoring wells on site within the shortest time interval achievable and recorded in the Monitoring Well Sampling Field Sheet. Water levels are measured from the least contaminated wells (known or suspected) first followed by increasingly contaminated wells. Water level measurements are converted to water level elevations using surveyed elevations of the reference points on the innermost well casings. Water level probes are decontaminated after each use according to WCEC’s Decontamination procedures.

13.2 Monitoring Well Free Product Measurement

If free product is present in a monitoring well, the thickness in feet or inches is measured and recorded in the Monitoring Well Sampling Field Sheet. Free product measurements are obtained using an oil/water interface probe.

13.3 Monitoring Well Purging and Sample Collection

In order to ensure that representative groundwater samples are collected WCEC will purge each monitoring well until all groundwater quality parameters stabilize. Groundwater parameters of temperature, dissolved oxygen, temperature, conductivity, salinity, pH and ORP are recorded after stabilization in a site specific field log. Monitoring wells will be purged using a peristaltic pump which discharges into a YSI-556 multi-parameter meter flow through cell. All purge water will be collected in a volumetrically scaled container for accurate measurement of total volume of purged water. New tubing is used for each well to ensure that cross contamination between wells is impossible. Prior to sample collection personnel raise the sample tubing to an elevation immediately

below the water interface, and then cut the tubing between the YSI flow through cell and the peristaltic pump to allow for sample collection.

In the event that the depth to water is greater than the capabilities of the peristaltic pump, a bladder pump or disposable bailers will be used for well purging and sample collection. Three well volumes will be purged from each well prior to sample collection. All purge water will be collected in a volumetrically scaled container for accurate measurement of total volume of purged water. Samples will be collected from the uppermost groundwater interface with the bailer after the well has been purged. Water quality parameters will be recorded after laboratory sample collection is completed with a sensor probe lowered down the well to a depth slightly below the water interface attached to a YSI-556 multi-parameter meter. The YSI sensor probe is decontaminated after each use according to WCEC's Decontamination procedures.

Samples are transferred to the appropriate laboratory-supplied sample jars with as little disturbance as possible and with minimal exposure to the atmosphere. Homogenous water samples are collected by grouping sample vials and adding water to each vial in a cyclical order attempting to reach the required sample volume in each vial at approximately the same time. All water samples are labeled with the date, time, facility, well designation, and name of sample collector. Sample times, dates, and samplers are recorded in the site specific log book and recorded onto a chain-of-custody following sample collection. Samples are preserved as necessary for analytical method, placed in a cooler on ice to decrease the sample temperature to below 4 degrees Celsius, and shipped/delivered for analysis at an analytical laboratory on the MT DEQ Approval list.

All water sample collection, handling, and storage procedures are conducted to minimize the potential for contamination of the water sample. Monitoring well sampling details are recorded in the *Site Specific Field Log Book* or *Groundwater Sampling Field Data Sheet*, and included the date the site was sampled on, facility name, location, facility ID and release number, description of weather conditions, current barometric pressure, samplers names, laboratory analysis samples will be analyzed for, number and volume of sampling containers, methods of sample preservation, time of sample collection, depth to static water level in wells, field chemistry parameters of salinity, pH, conductivity, dissolved oxygen in mg/L and percent, temperature, and oxygen-reduction potential (ORP). Turbidity will also be recorded if requested on a site specific basis. Field personnel will record visual and olfactory properties of the purge water from each well.

13.4 Disposal of Contaminated Groundwater Monitoring Purge Water

Purge water removed from monitoring well for the purpose of collecting representative groundwater samples will be discharged in accordance with the Montana Water Quality Act (75-5-101) as defined in the MT DEQ Technical Guidance Document #10 and according to the MT DEQ Disposal of Untreated Purge Water From Monitoring Wells Flow Chart. In the circumstance that the purge water contains a listed or characteristics waste covered by the Resource Conservation and Recovery Act (RCRA), free product or visible pollutants, could enter a shallower aquifer that is less contaminated, or if discharge could enter surface water or storm drains, purge water will be containerized and stored at the site. An assessment of the most economical disposal options that comply with federal, state, and local regulations will be conducted by WCEC's project manager for the facility in conjunction with the MT DEQ project manager. In the event that purge water meets the criteria established in the MT DEQ Flow Chart, purge water will be discharged onto the ground next to the well, allowing the purge water to return to the same groundwater where it originated.

13.5 Sample Handling

Disposable nitrile gloves are used by field technicians at all times during sampling. Gloves are replaced when soiled and between each sampling point to minimize cross and/or background contamination. All sampling equipment and sampling jars are kept away from potential sources of cross and/or background contamination and are replaced if deemed necessary.

13.6 Equipment and Work Area Decontamination

All non-disposable or non-dedicated equipment introduced to the well is scrubbed in a solution of biodegradable Alconox detergent and warm distilled water, and then rinsed with distilled water. All sampling work and equipment storage space is maintained free of possible sources of cross contamination. Work space is cleaned using Alconox and/or distilled water.

13.7 Chain-of-Custody

Samples are logged onto a lab-specific chain-of-custody form. This record contains the following information: project number, sample description, environmental matrix, number and type of containers, type of preservative, analytical method to be conducted, date and time of sample collection, sampler(s), sampler's signature(s), WCEC relinquishing signature(s), date, and time. Samples that are shipped to the laboratory will be custody sealed prior to shipment by relinquishing signatory.

The last page of the chain-of-custody form is retained by WCEC; the remainder of the form is shipped with the samples to the appropriate laboratory. At the laboratory, the chain-of-custody form is signed by the appropriate laboratory personnel at the time the samples are received. A copy of this chain-of-custody form is included in each laboratory report sent to WCEC. As few people as possible handle the samples and chain-of-custody forms.

13.8 Quality Assurance / Quality Control

In order to detect background petroleum hydrocarbon contamination, laboratory supplied trip blanks are kept with the sample jars and exposed to the same conditions as the actual samples. Trip blanks are not opened until analyzed by the laboratory. Temperature blanks accompany samples in each cooler to ensure that samples are kept at or below 4 degrees Celsius.

Field blanks may be collected to detect contamination from ambient sources. A field blank is collected by pouring distilled water directly into the sample jars in the same location that samples are collected. Equipment sample blank collection may be conducted to detect contamination from sampling equipment and/or sampling method. An Equipment sample blank is collected by running distilled water through the same equipment used to collect the actual sample. Field and equipment blanks are kept with the other samples and analyzed by the laboratory for the same project parameters.

Duplicate water samples are collected to evaluate the variability in laboratory analytical methods. The duplicate consists of an additional set of homogenous samples collected by grouping sample vials and adding water to each vial in a cyclical order attempting to reach the required laboratory sample volume in each vial at approximately the same time. Duplicate samples are collected from wells with known petroleum contamination and are assigned a mock sample ID's to maintain the principals of a scientific single blind to prevent laboratory personnel from consciously or unconsciously biasing the analytical results. The duplicate samples are kept with the other samples and analyzed by the laboratory for the same project parameters.

When applicable, WCEC will complete the MT DEQ Data Validation process.

13.9 Survey of Monitoring Wells

Survey elevation measurements are collected from the northern rim at the top of the PVC monitoring well casing. The survey location is marked for use when collecting depth to water measurements from the monitoring well. The location of this measuring point is accurately located in both the latitude and longitude plan as well as the vertical dimension. Vertical survey measurements are accurate to the Fourth Order (0.10 feet x square root of total distance of level loop in miles) with a measurement precision of 0.01 feet (US Army Corps of Engineers Manual "Geodetic and Control Surveying). Latitude and longitude measurements are typically accurate to a precision of 1.0 feet, but may deviate on a case-by-case basis if necessary. GPS devices may be used to collect latitude and longitude coordinates.

The vertical control datum used to determine the elevation of the well is the North American Vertical Datum of 1988 (NAVD 88), which is referenced to a nearby United States Geological Survey (USGS), or equivalent, benchmark. Deviations from this technical standard may be made on a case -by-case basis where another datum can be justified. The North American Datum of 1983 (NAD 83) is used for determining latitude and longitude coordinates and are also referenced to a nearby USGS, or equivalent, benchmark. Deviations from this technical standard may be made on a case-by-case basis where another datum can be justified. GPS devices may be used to collect latitude and longitude coordinates.

14.0 Procedures For Low-Flow Sampling With Pumps

The general steps are outlined below. Begin with least contaminated well and progress to the most contaminated well. Where applicable, WCEC will conduct low-flow groundwater sampling in accordance with MT DEQ Groundwater Sampling Guidance (March 2018).

- To avoid disturbing particulates, complete a round of water levels before sampling; record water levels and measuring point in logbook.
- Calibrate field water quality instruments at the beginning of each sampling day.
- Wearing gloves, install tubing and/or pump equipment and slowly lower until intake is positioned at selected depth.
- Purge well; if using an adjustable rate pump, adjust pump rate to achieve minimal drawdown.
- Every 5 minutes measure water levels (using an electric water level probe) and pumping rate (using a bucket graduated for volume measurement).

- Monitor indicator parameters every three to five minutes by placing probes in a clean container of the purge water. Stabilization is considered complete when three consecutive readings are within the following limits:
DO: 10%; temperature: 3%; pH: +/- 0.1 unit; Specific Conductance: +/- 3%; turbidity: +/- 10%; ORP: +/- 10 millivolts.

15.0 Water Supply Well Sampling Procedures

When water samples are required to be drawn from wells used as drinking or industrial water supplies, the following procedures are followed:

- Samples are collected from the point in the waterline closest to the well; that is before water is softened, filtered, or heated.
- All aerators, filters, or other devices are removed from the tap before sampling. If possible, samples are taken before the water enters the pressure tank. If that is not possible, the water is run to waste long enough to empty the tank and the water in storage in the pipes. One well volume (and the pressure tank) is evacuated to obtain a sample of fresh aquifer water.
- The water being collected should be withdrawn from the source at a slow rate.
- Water samples are collected according to protocol for laboratory analysis in laboratory-supplied, test-specific sample containers.
- Samples are labeled and logged onto a chain-of-custody form in the field, then stored and shipped at 4° C in an ice-filled cooler along with the completed chain-of-custody. Any pertinent details regarding the samples or sampling procedure are noted in the Site Specific project notebook.