Sampling and Analysis Plan
& Remedial Investigation Work Plan

Facility ID: 51-01073, Release ID: 3061, Work Plan 35100

Suta North Property

1st Street North

Sunburst, Montana 59482

Prepared For:
Sweetgrass Development Corporation
521 1st Ave NW #406
Great Falls, MT 59404

Prepared By:
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November 25, 2025
Version 1

GRANITE PEAK
ENVIRONMENTAL

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Suta North Property
Sunburst, Montana

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Version 1

Ms. Shawn Christiaens Landowner	Date
Sarah Converse Executive Director Sweetgrass Development Corporation	Date
Donnie McCurry Case Manager Montana DEQ	Date
Curtis Jeffries Brownfields Project Officer U.S. EPA Region 8	Date
Christin Hileman Project Manager Granite Peak Environmental	Date
David Sanborn Senior Technical Advisor Granite Peak Environmental	Date

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Distribution List

This Sampling and Analysis Plan (SAP) & Remedial Investigation Work Plan ("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 Sampling and Analysis Plan (SAP) and Remedial Investigation Work Plan ("work plan") on behalf of the landowner, Ms. Shawn Christiaens, and Sweetgrass Development Corporation (Sweetgrass) to assist with additional contamination evaluation and petroleum cleanup at the Suta North property (site), located on 1st Street North in Sunburst, Montana (**Figures 1** and **2**). This work plan was requested by the Montana Department of Environmental Quality (DEQ) to address known data gaps by further delineating petroleum contamination in soil and groundwater. The Montana Department of Environmental Quality (DEQ) lists the site as Facility ID: 51-01073 and Release ID: 3061. This work plan was requested by the DEQ (Request No. 35100) on October 31, 2025. This SAP and work plan will be reviewed and approved by the landowner, Sweetgrass, EPA, and Montana DEQ.

The objectives of this investigation are:

- Determine if surface and subsurface soils are contaminated with petroleum products under 1st Street North.
- Determine the eastern and downgradient extent of petroleum contamination in soil and groundwater.
- Determine if petroleum contamination is present in groundwater at the source area within 2021 excavation.
- Develop monitoring wells MW5, MW6, and MW7 to determine if groundwater contamination has been delineated to the west and south of the 2021 excavation.

2.0 Site Background

2.1 Site Description

The site is located on 1st Street North, just west of the US I-15 South off-ramp in Sunburst, Montana (**Figures 1** and **2**). The Site lies within Township 36 North, Range 02 West, Section 08 and has an approximate latitude and longitude of 48.885244 North and -111.906031 West, respectively.

2.2 Site Setting

The site is currently a vacant, bare lot but formerly operated as a bulk/retail fuel operation until 1996. The site is accessed off US I-15 on 1st Street North and is approximately 1.85 acres. The elevation of the site is approximately 3,344 feet above mean seal level. The site is generally flat and does not contain structures.

2.3 Geology, Hydrogeology, and Soils

Pleistocene continental glaciers covered the area where the town of Sunburst now resides (Lopez, 2002). Due to glaciation, glacial deposits cover much of the bedrock in lower elevations surrounding the Sweet Grass Hills. Bedrock geology knowledge is limited and approximate in this area. Underlying the town of Sunburst is the Upper Cretaceous Kevin Member depicted in the Geologic Map of the Sweet Grass Hills 30' x 60' Quadrangle (Lopez, 2002). The Kevin Member is a medium-dark-gray to brownish gray, calcareous, fissile shale. This geologic unit is also known as First White Specks due to its characteristic white specks of calcite. The Kevin Member is approximately 560 feet thick (Lopez, 2002). Just east of Sunburst lies Quaternary alluvial deposits, consisting of locally derived sand and gravel and reworked material from glacial till (Lopez, 2002). On site, Olympus (2022) encountered interbedded silt with sand, brown clay containing thin interbeds of sand with some gravel, and fine sand with gravel while drilling boreholes from 15 to 20 feet below ground surface (bgs).

In June 2022, groundwater was generally found 4 feet below top of casing (btoc) (Olympus, 2022). However, depth to groundwater was found from 10 feet to 13 feet btoc in monitoring wells MW5, MW6, and MW7. According to Olympus, MW5, MW6, and MW7 had poor yield after installation and their static water levels were not used in preparing a potentiometric map for the site. Olympus' best estimate of groundwater flow was to the south/southeast based on previous investigations.

Olympus encountered interbedded silt with sand, brown clay containing thin interbeds of sand with some gravel, and fine sand with gravel while drilling boreholes from 15 to 20 feet below ground surface (bgs). A thin (up to 6-inch) sand and gravel layer is present across much of the site at approximately 13-15 bgs (Olympus, 2022).

2.4 Current Ownership of the Site

The site is currently owned by Ms. Shawn Christiaens.

2.5 Previous Investigations

According to Olympus, the site previously operated as a bulk/retail fuel operation until 1996 (Olympus, 2022). In November 1996, a petroleum release was discovered at the site during upgrades and shortly after the fuel operation closed. In 2013 and 2014, a Remedial Investigation was conducted by Griffith Environmental Consulting. Five test pits were excavated at the locations shown on **Figure 2.** Both soil and groundwater samples were collected from the bottoms of each test pit. As shown in **Table 1**, VPH constituent concentrations exceeded Montana Risk-Based

Screening Levels (RBSLs). Granite Peak used updated 2024 Montana DEQ RBSLs when analyzing previous site data (DEQ, 2024). As such, only leaching to groundwater RBSLs were exceeded in soil samples collected from test pits B and E. As shown in **Table 2**, VPH constituent concentrations exceeded RBSLs in groundwater samples collected from test pits B and E.

In February 2021, Olympus excavated contaminated soil from the area depicted on **Figure 3**, removing a total of 1,032 tons of soil. As shown in **Table 1**, thirteen confirmation soil samples were collected from the excavation limits, eight of which contained VPH constituent concentrations exceeding leaching to groundwater RBSLs. These exceedances were identified in samples collected from the excavation pit bottom as well as the north, west, and south excavation walls. The final excavation boundaries and soil sample locations showing leaching to groundwater exceedances are shown on **Figure 3**. Additionally, Olympus advanced three boreholes (SB1, SB2, and SB3), which were subsequently completed as monitoring wells MW1, MW2, and MW3, respectively (**Figure 4)**. As shown in **Table 1**, soil samples from SB2 and SB3 exceeded VPH leaching to groundwater RBSLs. As shown in **Table 2**, groundwater samples from MW2 and MW3 (the wells completed within SB2 and SB3, respectively) showed VPH and lead scavengers concentrations above applicable RBSLs (**Figure 2**).

In May 2022, Olympus installed four additional boreholes (SB4, SB5, SB6, and SB7), each of which was subsequently completed as a monitoring well (MW4, MW5, MW6, and MW7, respectively)(**Figure 4**). As shown in **Table 1**, exceedances of VPH leaching to groundwater 2024 RBSLs were observed only in soil samples collected from SB4. Groundwater samples were collected from MW1, MW3, and MW4; however, MW2, MW5, MW6, and MW7 did not yield sufficient groundwater for sample collection (Olympus, 2022). As shown in **Table 2**, groundwater samples from MW3 and MW4 indicated VPH concentrations above 2024 RBSLs (**Figure 4**).

2.6 Known or Suspected Contamination

Based on the results and observations discussed in **Section 2.5**, and despite the 2021 excavation activities, soils exceeding leaching-to-groundwater screening levels—and contaminated groundwater—remain within, adjacent to, and east of the 2021 excavation area. The primary goals of this work plan and subsequent environmental investigations going forward includes:

- Determine if surface and subsurface soils are contaminated with petroleum products under 1st Street North.
- Determine the eastern and down gradient extent of petroleum contamination in soil and groundwater.
- Determine if petroleum contamination is present in groundwater at the source area within 2021 excavation.
- Develop monitoring wells MW5, MW6, and MW7 to determine if groundwater contamination has been delineated to the west and south of the 2021 excavation.

3.0 Proposed Scope of Work

3.1 Data Quality Objectives

Soil and groundwater Data Quality Objectives (DQOs) for this remedial investigation (RI) are presented in **Table 3**. The primary objectives of this RI is to determine if soils are contaminated with petroleum products under 1st Street North, determine the eastern and down gradient extent of petroleum contamination in soil and groundwater, and if groundwater is contaminated in the source area, and determine if groundwater contamination has been delineated to the west and south of the 2021 excavation.

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 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, 2025). All field staff will review this SAP and work plan 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, 2025). 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.

Granite Peak will be drilling in the shoulders of 1st Street North. Due to heavy traffic in 1st Street North, a traffic control plan and right-of-way encroachment permit are required prior to drilling work. Granite Peak will work with the Montana Department of Transportation and the Town of Sunburst prior to drilling to obtain necessary permits and safely implement traffic control during drilling work while in 1st Street North.

3.3 Data Collection

All field work will be performed in accordance with this EPA and DEQ-approved SAP and work plan, the EPA-approved QAPP (Granite Peak, 2025), as well as the access agreement executed

between the owner and Granite Peak. All public underground utilities will be located and marked at least 48 hours prior to any subsurface work commencing.

All field staff will review this SAP and work plan and associated Standard Operating Procedures (SOPs) (**Appendix B**) prior to beginning field work to fully understand the purpose and approach to this remedial investigation. The analytical laboratory will be notified prior to the work to ensure all sample equipment, container arrangements, and expected sample delivery times are confirmed. All extraction methods and hold times will be confirmed prior to start of work, as well. A Field Preparation Plan (FPP) showing the interested parties, appropriate communication lines, investigative approach, proposed sample numbers, analytical methods, containers, and hold times is attached to this SAP and work plan as **Appendix C**. This FPP will be edited and finalized according to EPA and DEQ's approval of this SAP and work plan.

All data and information gathered according to this SAP and work plan will be recorded on the appropriate boring logs, monitoring well installation forms, well development forms, groundwater sampling forms, daily field logs, and field notes in accordance with SOP-1 (**Appendix B**). The boreholes and monitoring wells will be located in the field using a global positioning system (GPS). Daily reviews with the Project Manager will occur 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.

All samples will be labelled, packaged, and shipped on ice immediately following sample collection in accordance with SOP-2 (**Appendix B**). All samples will be shipped to the laboratory under chain-of-custody with shipment tracking enabled 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 by the client.

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

3.4 Borehole Drilling and Soil Sampling

Granite Peak will oversee advancement of 10 boreholes at the site using a hollow stem auger drill rig in the locations depicted on **Figure 5**. Boreholes not converted to monitoring wells will be advanced to 10 feet bgs, or the observed water table, whichever is deepest. In boreholes where petroleum contamination is observed, advancement will continue to a depth where clean soil is observed. Boreholes to be converted to monitoring wells will be advanced to at least 15 feet bgs to remain consistent with existing monitoring wells. Borehole and monitoring well locations were chosen based on the following rationale:

- BH-1 through BH-6 are proposed in the shoulders of 1st Street North. The purpose of these boreholes is to determine if soil contamination is present under 1st Street North.
- BH-7 and BH-8 are proposed east of the 2021 excavation. The purpose of these boreholes is to further delineate the lateral extent of soils with leaching to groundwater exceedances to the east and downgradient of the 2021 excavation.
- MW-8 is proposed downgradient of MW3. The purpose of this monitoring well is to determine the downgradient extent of groundwater contamination observed at MW3.
- MW-9 is proposed within the 2021 excavation, approximately where the source area was located. The purpose of this borehole is to determine if leaching to groundwater exceedances in excavation floor soils have migrated to groundwater.

BH-4, BH-5, and BH-6 will only be advanced if contamination is observed in BH-1, BH-2, or BH-3, respectively. If contamination is observed in one of these boreholes, it will require BH-4, BH-5, and BH-6 to be advanced. At a minimum, BH-1, BH-2, and BH-3 will be advanced.

Soils obtained via split spoons during drilling will be continuously logged, field screened using a PID in accordance with SOP-16 (**Appendix B**), and classified by Granite Peak staff following the Unified Soil Classification System (USCS) in accordance with SOP-8 (**Appendix B**). In addition, Granite Peak staff will document depths to groundwater and visual and/or olfactory evidence of contamination. Drilling observations, soil descriptions, and PID readings will be recorded on borehole logs in accordance with SOP-1 and SOP-7 (**Appendix B**).

If petroleum contamination is present in the 0-2 feet range, one discrete sample will be collected in accordance with SOP-6 (**Appendix B**). If no contamination is apparent, no samples will be collected. If contamination is present in the 2-10 feet range, two discrete samples will be collected. One discrete sample will be collected from the interval exhibiting the highest PID measurement and one discrete sample will be collected from directly above the groundwater interface. If no contamination is present within the 2-10 feet range, one discrete sample will be collected directly above the groundwater interface. Soil samples are not proposed below 10 feet bgs unless the groundwater interface has not been encountered. Subsurface soil samples will be collected in accordance with SOP-7 (**Appendix B**) and labeled, packaged, and shipped under chain-of custody to Pace National in Mount Juliet, Tennessee in accordance with SOP-2 and SOP-3 (**Appendix B**). Soil samples will be analyzed for the contaminants shown in **Table 3-1**.

Table 3-1: Contaminants and Laboratory Analytical Methods

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

Notes: EPH fractions will be requested if EPH Screen results exceed 200 mg/kg (soil) or 1,000 µg/L (groundwater)

3.5 Monitoring Well Installation

Groundwater monitoring wells will be installed in accordance with SOP-9 (**Appendix B**) at the locations depicted on **Figure 5**. Based on existing monitoring wells, monitoring wells will be installed to a depth of approximately 15 feet below ground surface. Depth to water measurements will be taken at existing monitoring wells prior to well installation and installation depths will be adjusted, if needed. The monitoring wells will be completed as 2-inch diameter Schedule 40 PVC wells, with 0.01-inch factory slotted well screen placed a minimum of 5 feet above and below the water table. Screen intervals may need to be adjusted depending on the depth of the observed water table. Silica sand filter packs will be placed from the bottom of the well to 2 feet above the top of the well screen. Hydrated bentonite chips will be placed above the filter pack to a depth of 1-foot bgs. Monitoring wells will be completed with a concrete surface seal equipped with a flush-grade metal protective well monument. Cement will be placed around the base of the monument and sloped slightly away from the well to minimize potential storm water runoff into the well.

3.6 Well Development and Surveying

Following monitoring well installation, newly installed monitoring wells will be developed in accordance with SOP-10 (**Appendix B**). In addition, monitoring wells MW5, MW6, and MW7 will be developed. If monitoring wells MW5, MW6, and MW7 are unable to be developed due to low yield, they will be replaced with deeper wells adjacent to them.

Prior, during, and after development, water levels will be measured in accordance with SOP-12 (**Appendix B**). In addition to water levels, purge rate, purge volume, and turbidity will be monitored and documented on a Well Development Form in accordance with SOP-1 (**Appendix B**). Each well will be developed by surging and pumping groundwater to remove fines. Granite Peak staff will remove at least 10 saturated casing volumes of groundwater from each well. If 10 saturated casing volumes are unable to be removed, the monitoring wells will be purged dry three times to complete development. Wells will be sampled 24 hours after well installation and development, which will be considered the first groundwater sampling event included in this SAP and work plan.

A professional licensed surveyor will survey all onsite monitoring wells to a USGS vertical and horizontal datum to help determine groundwater flow and gradient.

3.7 Groundwater Compliance Monitoring

Granite Peak will conduct a groundwater monitoring event during seasonally high groundwater in Spring 2026. Monitoring wells at this site have been unable to be developed and/or sampled during seasonally low groundwater. The Spring 2026 event will occur on the same mobilization as the borehole advancement and monitoring well installation work described above. Wells to be sampled include MW1 through MW7 and newly installed monitoring wells MW-8 and MW-9 (**Figure 5**). Prior to sampling, water levels will be measured to evaluate groundwater elevation and flow direction in accordance with SOP-12 (**Appendix B**). Wells will be purged using a low-flow bladder 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, water levels will be measured and recorded. Groundwater samples will be collected using a low-flow bladder pump after stabilization in accordance with SOP-7 (**Appendix B**). Samples will be labeled, packaged, and shipped under chain-of custody to Pace National in Mount Juliet, Tennessee in accordance with SOP-2 and SOP-3 (**Appendix B**). Groundwater samples will be analyzed for the contaminants shown in **Table 3-1**.

3.8 Equipment Decontamination During Investigation

Granite Peak will decontaminate all 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. Granite Peak staff will oversee the driller decontamination process of split spoons, drill stems, and augers to ensure that cross-contamination below grade and between borehole locations does not occur. All disposable field sampling or collection materials will be discarded in a garbage bag and disposed of properly.

3.9 Investigative Derived Waste Plan

Investigation derived waste will be handled in accordance with SOP-22 (**Appendix B**). Soil removed from boreholes will be monitored by field staff for obvious signs of staining, olfactory clues of petroleum presence, and field screened with a PID. If PID readings are greater than 100 ppm, the soil cuttings will be placed into driller-provided 55-gallon, steel, open-top drums. The containerized soil will be disposed of in accordance with state regulations based on the analytical results. Any drill cuttings that reach the surface and do not show signs of visual or olfactory clues of contamination and record less than 100 ppm with the PID may be spread on the ground near the borehole.

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).

3.10 Quality Assurance / Quality Control Sampling

Quality control samples collected during this investigation will include field duplicates, equipment rinse blanks (ERBs), and trip blanks. Quality control samples will be collected in accordance with SOP-5 (**Appendix B**) and the EPA-approved QAPP (Granite Peak, 2025). Duplicate samples will be collected at a frequency of one sample for every 20 natural samples collected. Equipment rinse blanks will be collected at a frequency of one per media sampled. In this case, one ERB will be collected to check the decontamination effectiveness of the soil boring sampling and groundwater sampling equipment. To collect the ERB, a sample will be collected by pouring DI water over the decontaminated split spoon and groundwater sampling equipment, respectively, and collecting the water into laboratory provided containers. 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 at a rate of 1 per every 20 natural samples during the advancement of boreholes, and another during subsequent groundwater sampling. The samples will be a duplicate of a subsurface soil and groundwater sample that is suspected of contamination and will be analyzed for contaminants presented in **Table 3-1**.
- One equipment rinse blank sample will be collected after the advancement of boreholes and groundwater sampling to evaluate the thoroughness of decontamination of sampling equipment. The sample will be analyzed for contaminants presented in **Table 3-1**.
- 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 SAP and work plan (**Appendix C**).

4.0 Reporting

4.1 Report of Findings

Upon receipt of laboratory results following the soil sampling and groundwater sampling, Granite Peak will prepare a Remedial Investigation (RI) Report. The report will be provided to all associated parties, including Ms. Shawn Christiaens, Sweetgrass, DEQ, and EPA. The RI Report will summarize the work completed, identify any deviations to the scope proposed within this SAP and work plan, and provide recommendations for additional investigation and/or cleanup, as warranted. Based on the Montana Remedial Investigation for Petroleum Releases (DEQ, 2017), the RI Report will include the following:

- Title Page
- Executive Summary
- Purpose and Objectives of Cleanup
- Figures illustrating facility location and site features
- Figures of new drilling locations
- Figures showing groundwater flow direction and elevation
- Receptor survey summarizing potential receptors and migration pathways
- Text summarizing the soil investigation
- Text summarizing the groundwater investigation
- Tables and field logs summarizing field parameters
- Tables summarizing laboratory results
- Summary of quality control samples and findings and data validation results
- Field notes, field photos, daily field logs, borehole logs, well development forms, groundwater sampling forms, analytical data, and any other pertinent information to this investigation will be included as appendices to the report
- Release Closure Plan
- Conclusions and Recommendations

Surface, subsurface soil, and groundwater results will be compared to Montana DEQ Tier 1 RBSLs based appropriately by their depth of sample, depth to groundwater, and site reuse plan (DEQ, 2024). Comparison of screening levels to laboratory report limits for soil and groundwater are provided in **Appendix D-1** and **D-2**, respectively. A summary of the comparisons are provided below:

- Surface Soil (0-2 feet bgs) – Compared to MT DEQ RBSLs, <10 feet to groundwater, direct contact RBSL based on commercial site use.
- Subsurface Soils (2-10 feet bgs) – Compared to MT DEQ RBSLs, <10 feet to groundwater, direct contact for construction workers and leaching to groundwater.
- Groundwater – Compared to Montana DEQ Tier 1 Groundwater RBSLs and Standards.

5.0 Schedule

Field activities are scheduled to be completed in Spring 2026. Field activities will not be initiated until review and approval of this SAP and work plan by Ms. Shawn Christiaens, Sweetgrass, DEQ, and EPA. The soil and groundwater investigation will take approximately one week. Laboratory results will be available approximately 4 weeks after sampling. The RI Report will be prepared within four weeks following receipt of laboratory analytical results.

Estimated costs for the proposed work are provided in **Appendix F.**

6.0 References

Granite Peak Environmental, LLC (Granite Peak), 2025. Programmatic Quality Assurance Plan, Sweetgrass Development Corporation, Brownfields Program. Version 1. April 2025.

Lopez, D.A., 2002. Geologic Map of the Sweet Grass Hills 30' x 60' Quadrangle, North-Central Montana. Montana Bureau of Mines and Geology Open File Report MBMG 443

Montana Department of Environmental Quality (DEQ), 2017. Montana Remedial Investigation Guidance for Petroleum Releases. October 2017.

Montana Department of Environmental Quality (DEQ), 2024. Montana Risk-Based Corrective Action Guidance for Petroleum Releases. February 2024.

Olympus Technical Services, Inc. (Olympus), 2022. Soil Sampling, Monitoring Well Installation and Groundwater Monitoring Report. Suta Supply North. Montana Department of Environmental Quality. November 2022.

TABLES

Table 1. Cumulative Soil Results
Suta North Property, Sunburst, Montana 59482
Facility ID: 51-01073, Release ID: 3061

Sample	Date	Depth (ft bgs)	PID (PPM)	MTBE	Benzene	Toluene	Ethylbenzene	Total Xylenes	Napthalene	C9-C10 Aromatics	C5-C8 Aliphatics	C9-C12 Aliphatics	TPH	EPH Screen	C9-C18 Aliphatics	C19-C36 Aliphatics	C11-C12-Aromatics	TEH
RBSL Leaching 0-10 feet				**0.078**	**0.07**	**21**	**26**	**320**	**12**	**130**	**220**	**11,000**	**NA**	**NA**	**53,000**	**NA**	**370**	**NA**
RBSL Direct Contact Residential (0-2 feet)				**67**	**2**	**630**	**8**	**75**	**3**	**60**	**90**	**160**	**NA**	**NA**	**290**	**25,000**	**540**	**NA**
RBSL Direct Contact Commercial (0-2 ft)				**310**	**8**	**6,300**	**8**	**330**	**13**	**300**	**450**	**800**	**NA**	**NA**	**1,600**	**330,000**	**6,200**	**NA**
RBSL Direct Contact Construction (2-10 ft)				**9,100**	**190**	**14,000**	**38**	**1,900**	**120**	**4,000**	**2,000**	**3,000**	**NA**	**NA**	**6,000**	**1,600,000**	**33,000**	**NA**
2013 Test Pit Samples																		
RCS B-4'	8/19/1993	4	--	<0.10	<0.05	<0.05	<0.05	<0.15	<0.10	<2.0	**2.64**	**3.38**	**6.4**	ND	ND	ND	ND	
RCS B-8'	8/19/1993	8	--	**1.47**	**2.38**	**22.8**	**9.96**	**68**	**3.17**	**203**	**171**	**153**	**634**	ND	ND	ND	ND	
RCS C-4'	8/19/1993	4	--	<0.10	<0.05	<0.05	<0.05	<0.15	<0.10	<2.0	<2.0	<2.0	<2.0	ND	ND	ND	ND	
RCS C-8'	8/19/1993	8	--	<0.10	<0.05	0.21	**0.09**	**1.4**	<0.21	**25**	**171**	**34**	**232**	183	ND	ND	ND	
RCS DSS-01	8/19/1993	3	--	<0.10	<0.05	<0.05	<0.05	<0.15	<0.10	<2.0	<2.0	<2.0	<2.0	183	<20	<20	ND	
RCS E-5.5'	8/19/1993	5.5	--	**1.87**	**10.9**	**1.06**	**7.95**	**13**	**4.58**	**307**	**158**	**109**	**612**	ND	ND	ND	ND	
RCS E-7.0'	8/19/1993	7	--	<0.10	<0.05	<0.05	<0.05	<0.15	<0.10	**2.81**	**4.08**	**1.29**	**8.17**	ND	ND	ND	ND	
2021 Excavation Floor Samples																		
F1	3/22/2021	8	--	<0.12	<0.060	<0.060	**0.072**	<0.060	<0.12	**2.2 J**	**2.2 J**	**5.7**	<12	--	--	--	--	--
F2	3/22/2021	8	--	<0.12	**0.042 J**	<0.059	<0.059	<0.059	<0.12	**1.8 J**	**3.3**	**0.86 J**	**5.7**	<12	--	--	--	--
F3	3/22/2021	8	--	<5.4 D	**35**	**5.3**	**70**	**90**	**21**	**741**	**1,310**	**607**	**2,940**	**865**	**146**	--	--	--
F4A	3/23/2021	8	--	<1.7 D	**5.4**	**1.5**	**13**	**17**	**4.6**	**192**	**423**	**143**	**908**	<12	--	--	--	--
2021 Excavation Wall Samples																		
			--	<0.12	<0.061	<0.061	**0.044 J**	<0.061	<0.12	**2.3 J**	<2.4	**3.3**	**7.7**	<12	--	--	--	--
SW2A	3/23/2021	7	--	<0.12	**1.3**	<0.060	<0.060	<0.060	<0.12	<2.4	**2.3 J**	<2.4	**4.1**	**49**	--	--	--	--
SW9A (Dup SW2A)	3/23/2021	7	--	<0.12	**5.3**	<0.061	**0.057 J**	**.047 J**	<0.12	<2.4	**6.9**	**1.2 J**	**14**	<12	--	--	--	--
SW3	3/22/2021	5	--	<0.12	**0.054 J**	**0.11**	**3.1**	**1.3**	**0.28**	**83**	**25**	**67**	**153**	**44**	--	--	--	--
SW4A	3/23/2021	6	--	<0.12	**0.040 J**	<0.058	<0.058	<0.058	<0.12	<2.3	<2.3	<2.3	<2.3	**191**	--	--	--	--
SW5	3/22/2021	6	--	<0.12	**0.2**	<0.060	**0.31**	**0.042 J**	**0.075 J**	**11**	**2.1 J**	**5.8**	**20**	**9.0 J**	--	--	--	--
SW6	3/22/2021	6	--	<0.24 D	**0.62**	**0.30**	**4.4**	**0.63**	**0.31**	**51**	**122**	**48**	**213**	**20**	--	--	--	--
SW7	3/22/2021	6	--	<0.12	**0.13**	<0.060	<0.060	<0.060	<0.12	<2.4	**3.2**	<2.4	**4.1**	<12	--	--	--	--
SW8A	3/23/2021	6	--	<3.5 D	**15**	**4.7**	**37**	**59**	**12**	**443**	**957**	**344**	**1,910**	**145**	--	--	--	--
2021 and 2022 Borehole Samples																		
SB1-15-15.5	3/31/2021	15-15.5	ND	<0.12	<0.059	<0.059	<0.059	<0.059	<0.12	<2.3	<2.4	<2.4	<2.4	<12	--	--	--	--
SB1-19-19.5	3/31/2021	19-19.5	ND	<0.12	<0.058	<0.058	<0.058	<0.058	<0.12	<2.3	<2.3	<2.3	<2.3	<11	--	--	--	--
SB2-9.5-10	3/31/2021	9.5-10	409	<1.8 D	**4.4**	**0.88**	**11**	**12**	**4**	**136**	**320**	**145**	**599**	**18**	--	--	--	--
SB2-13-13.5	3/31/2021	13-13.5	9	<0.12	<0.058	<0.058	<0.058	<0.058	<0.12	<2.3	<2.3	<2.3	<2.3	<12	--	--	--	--
SB2-13-13.5	3/31/2021	13-13.5	9	<0.12	<0.058	<0.058	<0.058	<0.058	<0.12	<2.3	<2.3	<2.3	<2.3	<12	--	--	--	--
SB2-14-14.5	3/31/2021	14-14.5	ND	<0.12	<0.058	<0.058	<0.058	<0.058	<0.12	<2.3	<2.3	<2.3	<2.3	<11	--	--	--	--
SB3-7-7.5	3/31/2021	7-7.5	189	<0.70 D	**0.92**	**4.5**	**21**	**3.8**	**1.70**	**354**	**397**	**655**	**1,390**	**1,600**	**779**	**38**	**217**	**1,090**
SB3-8.5-9	3/31/2021	8.5-9	46	<1.0 D	**1.2**	**7.3**	**25**	**5.4**	**0.35**	**491**	**578**	**922**	**2,050**	**3,830**	**2,370**	**151**	**588**	**3,220**
SB3-14-14.5	3/31/2021	14-14.5	10	<0.12	<0.058	<0.058	<0.058	<0.058	<0.12	<2.3	<2.3	<2.3	0.95 J	<11	--	--	--	--
SB4-5-6	5/2/2022	5-6	829	<3.0	**9.60**	**2.50**	**1,200**	44.00	**19.00**	**414.00**	**896.00**	**392.00**	**1,660.00**	**124.00**	--	--	--	--
SB4-14-15	5/2/2022	14-15	ND	<0.11	0.10	<0.057	**0.03**	<0.057	<0.11	<2.3	<2.3	<2.3	**0.78**	<12	--	--	--	--
SB5-0-1	5/2/2022	0-1	1	<0.11	<0.055	<0.055	<0.055	<0.055	<0.11	<2.2	<2.2	<2.2	**0.77**	<17	--	--	--	--
SB5-14-15	5/2/2022	14-15	ND	<0.12	<0.058	<0.058	<0.058	<0.058	<0.12	<2.3	<2.3	<2.3	**1.10**	<11	--	--	--	--
SB6-6-7	5/3/2022	6-7	ND	<0.12	<0.60	<0.60	<0.60	<0.60	<0.12	<2.4	<2.4	<2.4	<2.4	<12	--	--	--	--
SB6-14-15	5/3/2022	14-15	ND	<0.12	<0.058	<0.058	<0.058	<0.058	<0.12	<2.3	<2.3	<2.3	<2.3	<20	--	--	--	--
SB8-14-15 (Dup)	5/3/2022	14-15	ND	<0.12	<0.058	<0.058	<0.058	<0.058	<0.12	<2.3	<2.3	<2.3	<2.3	<12	--	--	--	--
SB7-5-6	5/3/2022	5-6	ND	<0.12	<0.059	<0.059	<0.059	<0.059	<0.12	<2.4	<2.4	<2.4	<2.4	<12	--	--	--	--
SB7-14-15	5/3/2022	14-15	ND	<0.12	<0.058	<0.058	<0.058	<0.058	<0.12	<2.3	<2.3	<2.3	<2.3	<12	--	--	--	--

Results reported in mg/kg
J = Concentration estimated, analyte was detected at concentration less than reporting limit.
- = not sampled
< = less than reporting limit
ND = non-detect
Bold- = Detection
Result exceed leaching RBSLs
RBSLs - 2024 Montana DEQ RBSLs (DEQ, 2024)

Table 2. Cumulative Groundwater Results
Suta North Property, Sunburst, Montana 59482
Facility ID: 51-01073, Release ID: 3061

Well ID	Collection Date	MTBE	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Naphthalene	C9-C10 Aromatics	C5-C8 Aliphatics	C9-C12 Aliphatics	TPH	EPH Screen	C9-C18 Aliphatics	C19-C36 Aliphatics	C11-C22 Aromatics	THE	1,2-Dichloroethane	1,2-Dibro-moethane
RBSL		**30**	**5**	**1000**	**700**	**10,000**	**100**	**1100**	**650**	**1400**	**NA**	**NA**	**1400**	**1000**	**1100**	**NA**	**4**	**0.017**
2014 Grffith Environmental Consulting Investigation																		
RCWB	7/22/2014	<2.0	**2602**	**16**	104	97	<0.50	141	**1331**	105	4397	<300	--	--	--	--	--	--
RCWD	7/22/2014	<2.0	<0.50	<0.50	<0.50	<0.50	<1.0	<20	<20	<20	<2	<300	--	--	--	--	--	--
RCWE	7/22/2014	<2.0	**5478**	**83**	**848**	669	164	**1164**	**4632**	848	13885	389	--	--	--	--	--	--
Monitoring Wells																		
MW1	4/8/2021	<2.0 D	<1.0 D	<1.0 D	<1.0 D	<1.0	<2.0 D	<40	<40	<40	<4	<326	--	--	--	--	<0.050	<0.010
	6/6/2022	<1.0	<0.50	<0.50	<0.50	<0.50	<1.0	<20	<20	<20	<2	<322	--	--	--	--	<0.50	<0.010
MW2	4/9/2021	<127 D	**3280**	**1530**	**380**	**1520**	**19 J**	**1080**	**4780**	**1890**	**13300**	**2680 J**	--	--	--	--	**389**	**4.4**
MW3	4/8/2021	<2.0 D	**7.8**	**13**	**21**	**7.7**	**4.2**	**631**	**751**	**284**	**1670**	**937**	--	--	--	--	**16**	<0.010
	6/7/2022	<1.0	**8.3**	**12**	**33**	**7.8**	**4.2**	**592**	**760**	**581**	**1840**	**1570**	**666**	<306	**166 J**	**1100**	**15**	<0.010
MW4	6/6/2022	<270 D	**6040**	**105**	**1630**	**1910**	**391**	**4410**	**8350**	**4940**	**25300**	**17500**	**662 J**	<1290	**962 J**	**7220**	<1.2	<0.010

Results reported in ug/L
J - Estimated concentration
D - Reporting Limit (RL) increased due to sample matrix NA - Not available
- indicates not sampled, < indicates not detected at the indicated concentration
Bold - Detection

Table 3
Data Quality Objectives
Remedial Investigation
Suta North Property, Sunburst, 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
The site previously operated as a bulk/retail fuel operation until 1996. In November 1996, a petroleum release was discovered at the site during upgrades. An excavation and several investigations have been completed at the site, however contaminated soil and groundwater remains and the extent of soil and groundwater contamination has not been delineated.	Project decisions to be made include: Has petroleum contamination migrated offsite contaminating surface and subsurface soils under 1st Street North? To what extent has soil and groundwater contamination migrated east and down gradient at the site? Is groundwater contaminated at the source area within the excavation? Has groundwater contamination been delineated to the west and south of the excavation?	Subsurface soils and groundwater samples will be collected and analyzed for COPCs in areas where contamination is likely present and where contamination might be located based on previous investigations. Concentration of COPCs will be compared to MT DEQ RBSLs.	The site is located on 1st Street North, just west of the US I-15 South off-ramp in Sunburst, Montana. The Site lies within Township 36 North, Range 02 West, Section 08 and has an approximate latitude and longitude of 48.885244 North and -111.906031 West, respectively.	If soil and/or groundwater COPC concentrations exceed MT DEQ RBSLs during this remedial investigation and the extent of contamination has not been delineated, additional assessment may be required. If the extent of contamination has been delineated, cleanup will 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, 2025). 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 excavation and previous remedial investigations 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.

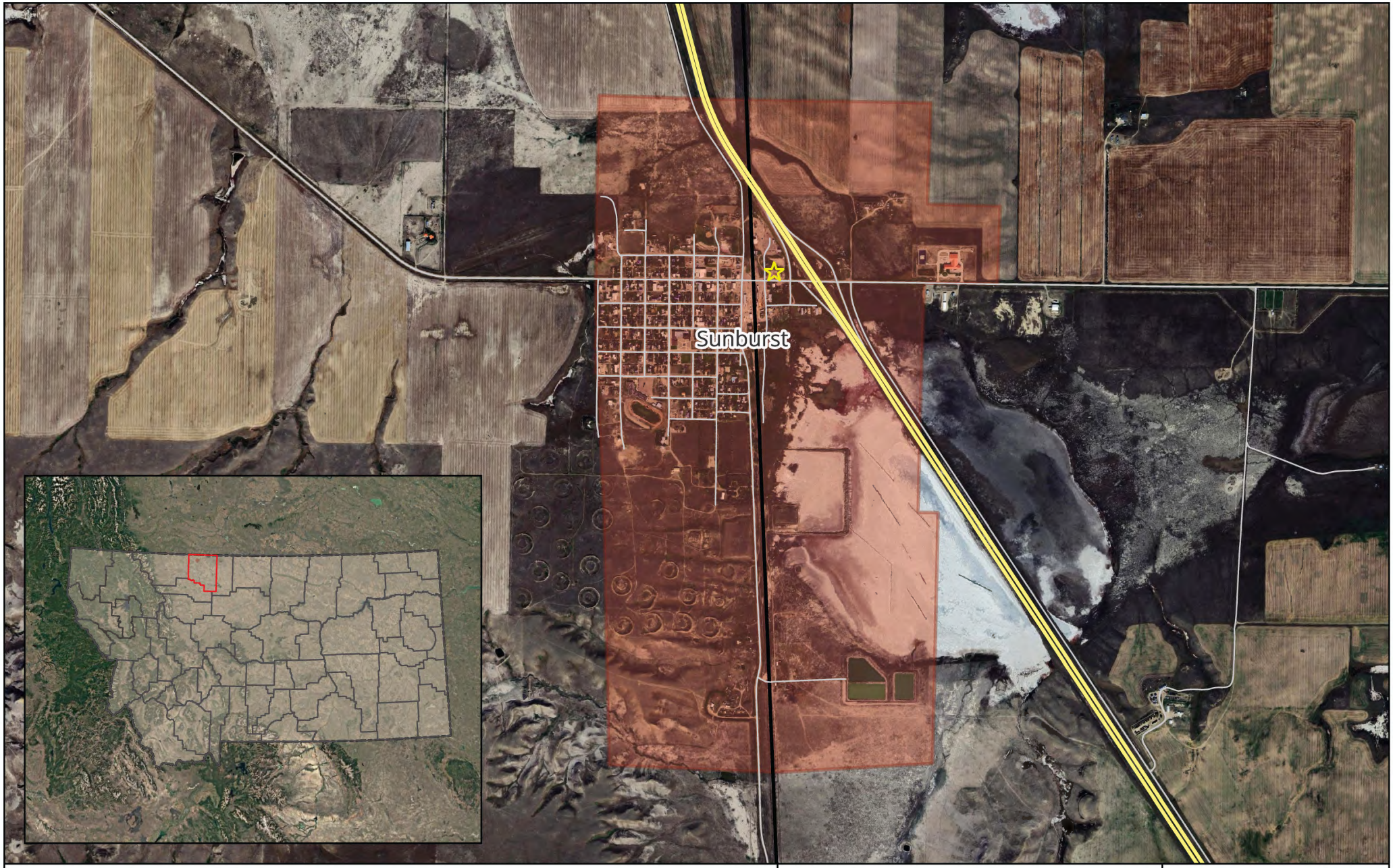
MT DEQ RBSLs- Montana Department of Environmental Quality Risk-based Screening Levels

COPCs - Contaminants of Potential Concern

CSM - Contaminated Site Model

QAPP - Quality Assurance Project Plan

FIGURES



Suta North Property
1st Street North
Sunburst, Montana 59482

FIGURE 1
Area Map

GRANITE PEAK ENVIRONMENTAL

DATE: 10/07/2025	DRAWN BY: SJ	Imagery ©2025 Google

N

0 50 100 ft

2013 and 2014 Test Pits

2021 Excavation Area

Suta North Property
1st Street North
Sunburst, Montana 59482

FIGURE 2
2013 and 2014 Test Pits

GRANITE PEAK ENVIRONMENTAL

DATE: 11/04/2025 | DRAWN BY: SJ | Imagery ©2025 Google

N

0 25 50 ft

- Soil RBSLs Not Exceeded
- Soil Leaching RBSLs Exceeded
- 2021 Excavation Area

Suta North Property
1st Street North
Sunburst, Montana 59482

FIGURE 3
2021 Excavation

GRANITE PEAK ENVIRONMENTAL

DATE: 11/04/2025 | DRAWN BY: SJ | Imagery ©2025 Google

N

0 25 50 ft

Monitoring Wells

Water Line

2021 Excavation Area

Suta North Property
1st Street North
Sunburst, Montana 59482

DATE: 11/04/2025 | DRAWN BY: SJ | Imagery ©2025 Google

FIGURE 4
Monitoring Well Locations

GRANITE PEAK ENVIRONMENTAL

Suta North Property
1st Street North
Sunburst, Montana 59482

DATE: 11/11/2025 | DRAWN BY: SJ | Imagery ©2025 Google

FIGURE 5
Proposed Investigation

GRANITE PEAK ENVIRONMENTAL

APPENDIX A
HEALTH AND SAFTEY PLAN

GRANITE PEAK ENVIRONMENTAL

Health and Safety Plan

Site Information

Site Details	
Site Name	Suta North Property
Site Address	1st Street North, Sunburst, Montana
Proposed Date of Activities	Spring 2026
Type of Project	Remedial Investigation

Work Plan

The purpose of this work is to further delineate petroleum soil contamination that has impacted groundwater at the site. Activities at the site will be as follows:

- Determine if surface and subsurface soils are contaminated with petroleum products under 1st Street North.
- Determine the eastern and down gradient extent of petroleum contamination in soil and groundwater.
- Determine if petroleum contamination is present in groundwater at the source area within 2021 excavation.
- If subsurface soil contamination is found below 1st Street North, evaluate the most effective technology to remediate subsurface soils.
- Develop monitoring wells MW5, MW6, and MW7 to determine if groundwater contamination has been delineated to the west and south of the 2021 excavation.
- Determine the most effective technology to remediate onsite groundwater.

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

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

The Granite Peak staff that completes this investigation will have completed their initial 40-hour Hazardous Waste Operations and Energy Response (HAZWOPER) training and their current 8 - hour annual HAZWOPER refresher training.

Site Description

The site is located on 1st Street North, just west of the US I-15 South off-ramp in Sunburst, Montana (**Figures 1** and **2**). The Site lies within Township 36 North, Range 02 West, Section 08

and has an approximate latitude and longitude of 48.885244 North and -111.906031 West, respectively.

The site is currently vacant but formerly operated as a bulk/retail fuel operation until 1996. The site is accessed off US I-15 on 1 St Street North and is approximately 1.85 acres. The elevation of the site is approximately 3,344 feet above mean sea level. The site is generally flat and does not contain structures.

Site History

According to Olympus (2022), the site operated as a bulk/retail fuel operation. In November 1996, a petroleum release was discovered at the site during upgrades and shortly after the fuel operation closed. Three cleanups/investigations have taken place at the site since 2013. An initial remedial investigation in 2013 and 2014, a contaminated soil excavation and remedial investigation in 2021, and an additional remedial investigation in 2022.

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 being operated;
- 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
X	Exploratory Borehole Drilling	X	Groundwater Depth Measurement
X	Surveying		Free Product Measurement
	Test Pitting		Free Product Removal
X	Monitoring Well Installation		Soil Stockpile Testing
X	Monitoring Well Development		Remedial Excavation
X	Soil Sample Collection		Underground Storage Tank (UST) Removal
	Vapor Intrusion Sampling		Remediation System Monitoring
X	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	X	Loud Noises/Vibration
	Remote Site	X	Slip, Trips, Falls
	Poor Cell Service	X	Pinch Points/Sharp Tools
	Vehicular Traffic On Site*		Excavation
X	Physical		Confined Spaces
X	Chemical	X	Overhead Hazards
X	Biological	X	Below Grade Hazards
	Radiological		Working From Heights
X	Heat Stress	X	Unstable/Uneven Terrain
X	Cold Stress		Frequent Heavy Lifting
	Electrical		Awkward Postures
X	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) – Soil and Groundwater
- Volatile Petroleum Hydrocarbons (VPH) – Soil and Groundwater
- Lead Scavengers EDB & DCA – Soil and Groundwater

Site Monitoring Procedures

	Instrument Type	Contaminant	Frequency
X	PID	Organic Vapors and Gases	Periodic during Subsurface Soil Sampling or Excavating
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 had, 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: Logan Health, 640 Park Avenue, Shelby, Montana
Phone Numbers (Hospital ER): 406-434-3200
Distance: 27 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: Christin Hileman	Cell Phone: 406-253-0756
Health and Safety Officer: TBD	Cell Phone: TBD

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)

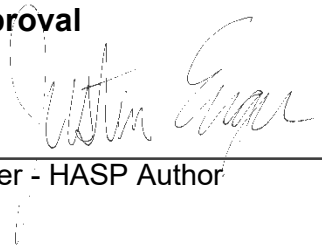
- By ambulance (if necessary) or Granite Peak vehicle
- Stay with person at medical facility
- Keep Granite Peak's Project Manager updated on the situation.

Additional Information

- A utility locate will be completed before work is started to prevent drilling or digging into utilities. A ticket should be created on Montana 811, public utilities should be notified, and all utilities should be marked and documented before drilling or digging operations.
- The Field Lead will conduct a Tailgate Safety Meeting at the beginning of each day before conducting field work. The Field Lead will discuss each task that will be conducted that day and go over the associated hazards with each task. Personnel and Subcontractors will sign the Tailgate Safety Meeting Form provided in **Attachment D**.

- 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.
- Field personnel will be aware at all times of the location and motion of heavy equipment in the work area to ensure a safe distance between personnel and the equipment. Personnel will be visible to the operator at all times and will remain out of the swing and/or direction of the equipment apparatus. Personnel will approach operating heavy equipment only when they are certain the operator has indicated that it is safe to do so through hand signal or other acceptable means.
- Heavy equipment and/or vehicles used on this site will work within 20 feet of overhead utility lines without first ensure that the lines are not energized. The distance may be reduced to 10 feet depending on the client and use of a safety watch.
- Traffic Control will be implemented when drilling in the shoulder of 1st Street North. Granite Peak Staff will work with the Montana Department of Transportation and the Town of Chester prior to drilling to obtain a right-of-way encroachment permit and safely implement traffic control during drilling work in in the shoulders of 1st Street North.

HASP Approval



11/24/2025

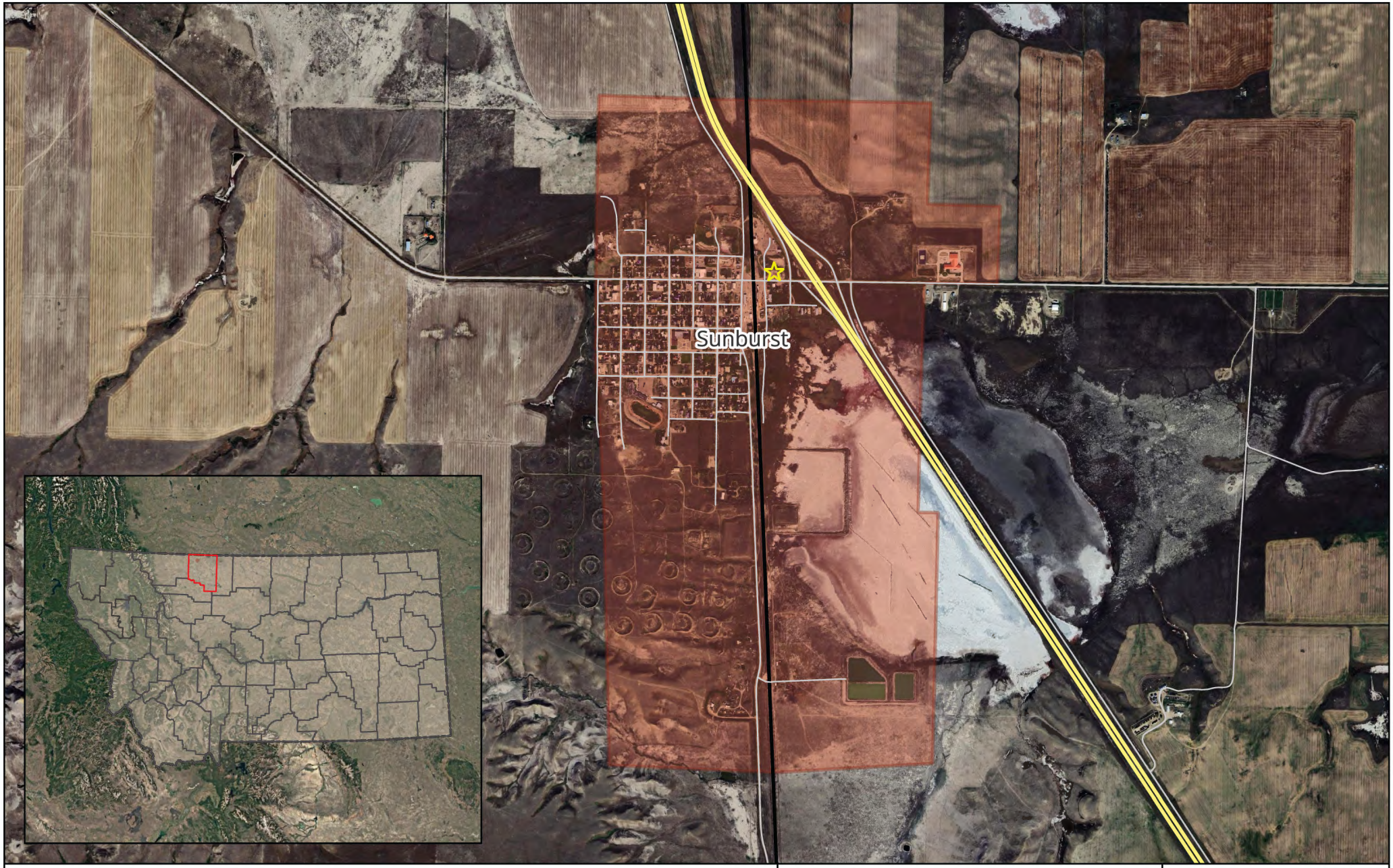
Justin Enger - HASP Author — Date

11/24/25

Christin Hileman - Project Manager — Date

TBD - Health & Safety Officer — Date

Figures



Suta North Property
1st Street North
Sunburst, Montana 59482

FIGURE 1
Area Map

GRANITE PEAK ENVIRONMENTAL

DATE: 10/07/2025	DRAWN BY: SJ	Imagery ©2025 Google

N

0 50 100 ft

2013 and 2014 Test Pits

2021 Excavation Area

Suta North Property
1st Street North
Sunburst, Montana 59482

FIGURE 2
2013 and 2014 Test Pits

GRANITE PEAK ENVIRONMENTAL

DATE: 11/04/2025 | DRAWN BY: SJ | Imagery ©2025 Google

Attachment A

Job Safety Analysis (JSAs)

Job Safety Analysis (JSA)

Job Title: Driving	**JHA Number: 01**	**Revision Date: October 24, 2022**
Project Name:	**Project Number:**	
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 roadside safety kit and fire extinguisher are inside vehicle. 9. Drive defensively: Be alert, 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 available.

Name	Date	Signature

Job Safety Analysis (JSA)

GRANITE PEAK ENVIRONMENTAL

Job Title: General Field Activities	**JHA Number: 02**	**Revision Date: October 24, 2022**
Project Name:	**Project Number:**	
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/Fence 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 electrical 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

Job Safety Analysis (JSA)

GRANITE PEAK ENVIRONMENTAL

Job Title: Drilling	JHA Number: 03	Revision Date: October 25, 2022
Project Name:	Project Number:	

Required Personal Protective Equipment: Hard Hat, Steel Toed Boots, Safety Glasses, Hi-Viz Vest, and Hearing Protection. Nitrile Gloves while sampling.

Tools and Equipment:

Sequence of Job Steps	Potential Hazards/Injury Sources	Safe Action or Procedure
Preplan	N/A	Go over each location with the driller. Ensure drilling sites are in a safe location. Have a Tailgate Safety Meeting with drillers. If a traffic control plan is being implemented, discuss the plan with the drillers.
Underground and Overhead Utilities	1. Buried power, gas & water lines, fiber optics, overhead lines.	1. Call 811 should have been notified with a ticket. Call public utilities (gas & water) to have them send out a locator. Use a private utility locator if needed.
Drill Rig Set Up	1. Visitors mishaps and resulting bodily injury 2. Drilling into underground utilities 3. Striking overhead lines or objects	1. Pay attention to visitors approaching the area. If necessary, set up barriers, signage and/or caution tape to keep vehicles and visitors out of the work area. 2. Underground utilities should be marked before drilling. 3. Make sure the driller is aware of overhead obstructions. Observe overhead lines, tree limbs, or other objects before drilling.
Drilling	1, Eye or ear injury. 2. Slip/Trip/Fall	1. Wear proper safety glasses and hearing protection. Consult driller to set up work area in a safe location. 2. Keep work area clear of tripping and slipping hazards.

Name	Date	Signature

Attachment B

Safety Data Sheets

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

Effective date: 11 May 2020 **Revision**: 11 May 2020
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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

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

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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Trade Name: Alconox®

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.

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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.

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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.

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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/m³ (Vacated) STEL: 250 ppm (Vacated) STEL: 325 mg/m³ Skin TWA: 200 ppm TWA: 260 mg/m³	IDLH: 6000 ppm TWA: 200 ppm TWA: 260 mg/m³ STEL: 250 ppm STEL: 325 mg/m³	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 Email: EMSDS.RA@thermofisher.com
Creation Date	06-Aug-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

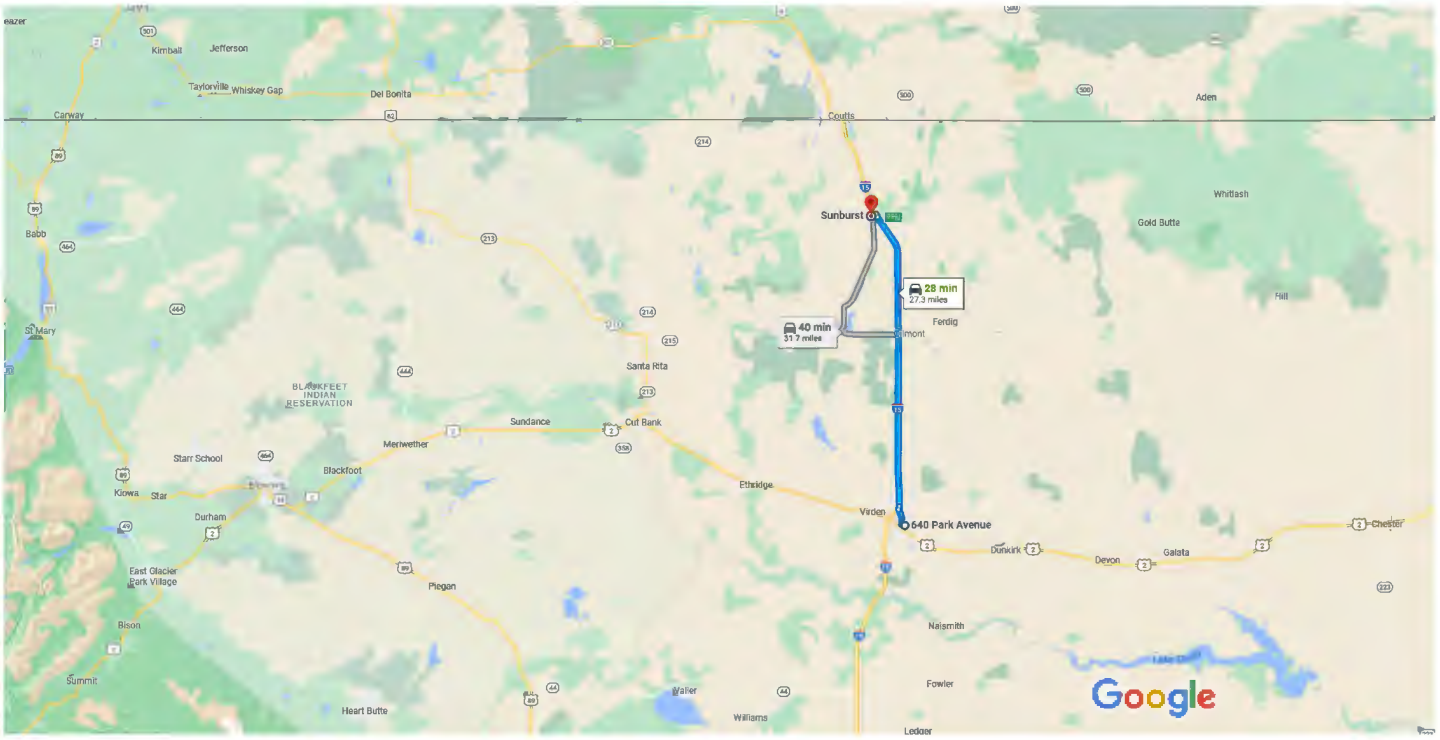
End of SDS

Attachment C

Route To Hospital

Google Maps 640 Park Ave, Shelby, MT 59474 to Sunburst, Montana

Drive 27.3 miles, 28 min



Map data ©2022 Google 5 mi

via I-15 N	Fastest route now due to traffic conditions	28 min 27.3 miles
via I-15 N and Sunburst Rd		40 min 31.7 miles

Explore Sunburst

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

STANDARD OPERATING PROCEDURES
TABLE OF CONTENTS

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

- 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

SOP-6 Surface Soil Sampling

This Standard Operating Procedure (SOP) describes the guidelines for obtaining surface 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 surface conditions.

Equipment and Materials Needed

- Sample bottles/containers and labels
- Sample cutting/extracting equipment (scoops, trowels, shovels, hand augers, split spoon if drilling)
- Stainless Steel Mixing Bowl
- Hand-Lens
- Daily Field Record
- Borehole Log (if drilling)
- 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
- Photo-ionization 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 two different methods of surface soil sampling that are commonly used: discrete samples (aka: grab samples) and composite samples. Discrete samples are collected to identify and quantify compounds at a specific location or interval and are limited in a real and vertical extent. A discrete sample shall be comprised of no more than the minimum amount of soil necessary to obtain the volume of sample dictated by the required sample container. Composite samples are a mixture of a given number of sub-samples and are collected to characterize the average composition of a given surface area, vertical interval, etc. The number of sub-samples forming a composite sample shall remain consistent with the context of the investigation. The number and pattern for collection of sub-samples within a grid, interval, etc. shall be selected based on project goals, noted in the Sampling and Analysis Plan (SAP) or work plan, and shall not change.

Sampling Procedures.

Field personnel shall classify all surface soils, regardless of sampling method, using procedures provided by the Unified Soil Classification System (USCS, ASTM D2487-17). Soil samples to be analyzed for volatile organics will be collected and sealed as soon as possible after sample retrieval. After collecting surface 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, PID reading, sample depth, and location should be recorded in the Daily Field Record and/or in the appropriate field form. The procedures for collecting discrete samples and composite samples are described below.

SOP-6 Surface Soil Sampling

Discrete Samples

- Locate sample location.
- Remove all surface materials (e.g., excess gravel, vegetation, etc.) from the sample location
- Use a stainless-steel scoop trowel, hand auger, or other equipment to collect a surface soil sample from 0 to 24 inches as required by the SAP or otherwise specified.
- Place the soil in a stainless-steel bowl.
- Remove gravel from the bowl. If volatile organics analysis is not required, mix the remaining sample in the bowl. If volatile organics analysis is required, place the soil sample in the sample container immediately.
- Samples for chemical analyses and/or geotechnical testing shall be collected using the laboratory-approved and analytical-method required sample containers.
- Immediately store samples in a cooler with ice.

Composite Samples

Composite soil samples are not the preferred sampling procedure when analyzing for volatile organics due to the volatilization of the compounds when exposed to air. If composite soil samples are requested for volatile organics, a more involved sampling procedure will be provided in the SAP to minimize volatilization. The composite sampling procedure for field compositing non-volatile organic compounds is described below. If lab compositing, follow discrete sample procedures and request lab compositing on COC.

- Locate and mark off the sampling area grids as described on the SAP or otherwise specified.
- Remove all surface materials (e.g., excess gravel, vegetation, etc.) from the sample locations.
- Use a stainless-steel scoop trowel, hand auger, or other equipment to collect 5 surface soil samples of equal volume from 0 to 6 inches as required by the SAP or otherwise specified.
- Place the soil in a stainless-steel bowl.
- Remove gravel from the bowl. Mix the remaining sample in the bowl.
- Samples for chemical analyses and/or geotechnical testing shall be collected using the laboratory-approved and analytical-method required sample containers.
- Immediately store samples in a cooler with ice.

Commonly Used Sample Containers

Analyte	Sample Container and Preservative
VPH/GRO	1 – 40 ml amber vial with 10 ml methanol
VOC's/ Lead Scavengers and BTEX/MTBE & Naphthalene (All One Test)	1 – 40 ml amber vial with 10 ml methanol
EPH/DRO	4 oz amber glass jar
Metals	4 oz glass jar
SVOC's	4 oz glass jar
PAH's	4 oz glass jar

References

ASTM International, D2487-17 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System). April 2020

Montana DEQ, Soil Sampling Guidance. June 2016

Pace Analytical, Analytical Guide. December 2021.

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-8 Soil Classification

This Standard Operating Procedure (SOP) describes the guidelines for logging and classifying soil samples during subsurface explorations for the purposes of characterizing subsurface conditions at a Site.

Equipment and Materials Needed

- Daily Field Record
- Borehole Log
- Tape measure
- Pens
- Camera
- Whiteboard and dry erase marker
- Photoionization Detector (PID)
- Soil classification cheat sheet
- Hand lens
- Personal Protective Equipment (PPE) – Level D unless otherwise specified in the Site-Specific Health & Safety Plan

General Procedures

Field personnel conducting soil classification shall be a trained technician and shall classify all surface and subsurface soils, regardless of sampling method, using procedures provided by the Unified Soil Classification System (USCS, ASTM D2487-17). Field data and observations associated with soil classification shall be documented during logging and for all drilling and sampling activities.

Soil Classification and Descriptions

The following soil classification and descriptions will be logged by field personnel on a Borehole Log form or similar sampling form in the order below:

- Depth measured in tenths of a foot
- Soil color
- Major soil type (e.g., Clay). This descriptor can include a secondary soil constituent as a modifier (e.g., silty Clay)
- Unified Soils Classification System (USCS) Group Symbol in parentheses (e.g., ML)
- Evidence of petroleum impacts, if encountered (e.g., staining, odor, etc.)
- Other soil components with appropriate percent descriptor (e.g., “with” or “trace”)
- Moisture (e.g., dry, moist, or wet) and plasticity
- Miscellaneous descriptors (organics, oxidation, angularity of particles, cementation (if present), etc.)
- PID reading

Color

Field Personnel will follow the Munsell Soil Color Chart. Field Personnel will write the Munsell color name with the Munsell color identification number in parentheses following the color name (e.g., Brown (5YR 5/2). If soil components are present (e.g., gravel), a color description will follow each component.

Soil Types

Soil descriptions and classification shall be conducted in accordance with Unified Soils Classification System (USCS). The order and presentation of the primary classification terms is as follows:

- Major Soil Type (e.g., Clay). This descriptor can include the secondary soil constituent as a modifier (e.g., clayey, silty, sandy or gravelly). "Topsoil" is an adequate term to describe naturally organic soil found at the ground surface. "Fill" can be used to describe previously disturbed soil. In addition, USCS can be used to describe the "Fill".
- Other soil components of the sample are listed in descending order of percentage using adjectives "with", "some" and "trace".
- Granular material can be described as well. Size, sorting or angularity modifiers can be used to provide further description.

Moisture Content

Moisture content can be described visually and by touch. "Dry" is used to describe soil that is absent of moisture, dusty, and/or dry to the touch. "Moist" is used to describe soil that is damp but there is no visible water. "Wet" is used to describe soil that has visible free water. Wet soil is usually below the water table.

Evidence of Environmental Impacts

If visual, olfactory, or a PID indicate the potential presence of petroleum impacts, it will be noted in detail. Staining will be documented as its own descriptor, separate from the natural color of the soil. Odor will be described as either "Weak", "Moderate", or "Strong". PID readings will be documented along the entire depth.

References

ASTM International, D2487-17 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System). April 2020

SOP-9 Monitoring Well Installation

This Standard Operating Procedure (SOP) describes the guidelines for installing monitoring wells as stated in the Sampling and Analysis Plan (SAP) or as otherwise specified. Monitoring wells are installed to determine depth to groundwater, monitor fluctuations in groundwater elevation, determine and monitor depth and thickness of free-phase products (if present), obtain groundwater and/or free-phase product samples for laboratory analysis, and facilitate aquifer characterization.

Equipment and Materials Needed (GPE)

- Daily Field Report
- Monitoring Well Construction Form
- Measuring Tape
- Camera
- Well Lock

Equipment and Materials Needed (Driller)

- Drill Rig
- Screen materials
- Casing Materials
- Annular Seal (if applicable)
- Bentonite Seal
- Fine Sand Material (if applicable)
- Filter Pack
- Surface Seal
- Monitoring manhole cover
- J-plug
- Decontamination Materials

Before Arriving Onsite

- Obtain permits from appropriate local, state, and/or federal agencies. If there is a fee for permits, drilling subcontractors usually include this fee in their estimate.
- Notify (verbally or in writing) the client, landowner, and appropriate local, state, and/or federal authorities, as appropriate, in advance of the date that drilling and installation is scheduled to begin.
- Conduct a public utility locate at all planned drilling locations. If drilling in an area with a suspected high density of either public or private utilities, consider using a private locate.
- Make provisions for containment, storage, and disposal of all cuttings, drilling fluids, discharge water, and other refuse generated during well installation. Waste characterization may be necessary prior to disposal.
- Review the lithology of the site to determine drilling materials needed.
- Work with the drillers to ensure that the appropriate drilling materials are available on site at the time of installation. If drilling into concrete or asphalt, notify the driller to ensure that a saw is available.

Monitoring Well Installation Procedures (Driller)

- Connect the screen and well casing. Well casing should be blank PVC. The well screen should be factory slotted, and the size will be dependent on lithology. Insert and lower the screen and well casing into the borehole in 10-foot increments. Hand-tighten connections to prevent them from leaking or becoming loose. The final section of well casing should be measured and field

cut, if necessary, before connecting to allow for above ground or flush with ground finish. Sand smooth or rasp the cut end of casing.

- Pour in sand or gravel to seal and support the casing and screen. Based on boring and casing diameters, determine volume of filter pack material required to place the filter approximately 2 feet above and below screened sections, if multiple.
- Slowly pour filter material down annulus, being careful to evenly distribute the material around the casing and to avoid the material becoming packed between the sidewall and casing. Use a small-diameter pipe to dislodge packed material and to ensure adequate height and settlement of filter pack.
- Pour bentonite pellets or chips down the annulus on top of the filter pack. The bentonite should be placed rapidly to prevent swelling and bridging around the casing when it hydrates. The bentonite should be allowed to hydrate for at least 15 minutes before backfilling remaining annulus to ground surface.
- Install the monitoring manhole cover so that at least 2 feet of its length is embedded in the below the ground surface, if possible. Place sand over bentonite and in between the well cover and casing.
- Pour a concrete pad approximately 3 feet in diameter around the base of the monitoring manhole cover. The concrete pad should be sloped away from the manhole cover to allow flow away from the well.
- Mark the inside of the manhole cover with the monitoring well ID. Mark the north top of casing to provide a reference point for all future measurements. Install the J-plug to the top of casing and install a locking device to prevent unauthorized entry or vandalism to the well.

Documentation

Field Personnel overseeing drilling and installation activities are responsive for the documentation of well installation. Field personnel will document well installation activities on a Monitoring Well Construction Form. The following information should be recorded during well installation activities:

- Project name and number
- Borehole and monitoring well ID
- City and state
- Township/Range/Section
- Northing and easting
- Date and time well installed
- Drilling company, rig and method
- Surface seal type
- Locked? Yes or no
- Depth to bottom of concrete
- Depth to top of screen and bottom of screen
- Total length of casing and screens
- Depth to top of filter pack (if applicable)
- Depth to top of bentonite seal
- Depth to top of fine sand material (if applicable)
- Depth to top and bottom of screen
- Total depth drilled

References

ASTM International, D5092-04 Standard Practice for Design and Installation of Groundwater Monitoring Wells. October 2017

Montana DEQ, Instructions, Monitoring Well Construction Form

SOP-10 Monitoring Well Development

This Standard Operating Procedure (SOP) describes the guidelines for developing wells. Well development is conducted to remove any loose, fine-grain, sediment from the filter pack and well screen. Well development will eliminate, to the extent possible, impact to the integrity of groundwater samples and aquifer characterization test results and restore the natural permeability of the formation adjacent to the borehole.

Equipment and Materials Needed

- Daily Field Report
- Well Development Form
- Water Meter Tape or Electronic Water Level Indicator
- Turbidity Meter
- Water Quality Meter (if applicable)
- Pump and hoses
- Bailers and string
- Buckets or Drums
- Decontamination Supplies
- Personnel Protective Equipment (PPE)

Well Development Procedures

- Measure the depth to groundwater from the top of casing using the water meter tape or the electronic water level indicator.
- Using the depth to groundwater, total depth of casing, and well casing volume per foot, the saturated casing volume shall be calculated using the formula below:
  V = A(B-C)
  Where, V = 1 saturated casing volume
  A = well casing volume in gallons per foot (see table below)
  B = total depth of casing (in feet)
  C = depth to water measurement (in feet)

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

- Now multiply the saturated casing volume by 10. 10 casing volumes (in gallons)
- Measure water quality parameters immediately prior to and during well development at a minimum frequency of once per well volume removed. At a minimum, water quality parameters should include turbidity to measure the clarity of groundwater. Other water quality parameters can include pH, conductivity, and temperature. Water quality parameters to be measured will be specified in the Site-Specific Sampling and Analysis Plan (SAP).
- Remove a minimum of 10 standing water volumes using a bailer or pump.
- A well that does not yield sufficient volume must be bailed or pumped dry and allowed to recover to within 90% of the pre-development saturated casing height. This must be performed three times if acting as an alternative to standard development procedures.

- Each well will be sampled at least 24 hours after well development completion unless otherwise specified by the regulatory authority within the site-specific SAP.

Documentation

Field personnel are responsible for the documentation of monitoring well development. Field personnel will document well development activities on a Well Development Form. The following information should be recorded during well development activities:

- Project name and number
- Site Address (if applicable)
- Site City, State, and Zip
- Monitoring well ID
- Measuring Point
- Initial Static Water Level
- Casing Diameter and Type
- Total Depth of Well
- Screen Type and Slot Size
- Screen Interval
- Well Development Methods
- Purging Method
- Length of Saturated Casing
- 1 and 10 Casing Volumes
- Depth to water measurements including the time taken, purge rate, purge volume, turbidity reading and other water quality parameters (if applicable)
- Observations
- Total volume purged

References

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

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 top 1/3 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 0.1 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 remove the tubing from the flow through cell and 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

SOP-16 Field Screening VOCs in Soil

This Standard Operating Procedure (SOP) describes procedures for field screening of volatile organic compounds (VOCs) in soils. The objective of this SOP is to create a standard for measuring the VOC concentration in soils during field work.

Equipment and Materials Needed

- Photoionization Detector (PID)
- Flame Ionization Detector (FID)
- Combustible Gas Indicator (CGI)
- Ziplock Bags
- Field Forms
- Nitrile Gloves
- Waterproof pens with non-erasable ink

Methods

Depending on the contaminants on site and site conditions, an appropriate instrument (PID, FID, or CGI) will be selected to field screen VOCs in soils. The Sampling and Analysis Plan will provide information on which instrument has been selected. If using a PID, follow the instructions below.

- Ensure the equipment is outfitted with the appropriate lamp for the standard compounds detected.
- Utilize a filter to prevent moisture and particles from contacting the PID lamp.
- Prior to each field day, the PID must be calibrated using the manufacturer's instructions.
- Document the calibration notes on a calibration form or within the field notes.
- Collect a soil sample and place it in a Ziploc bag. Shake the bag to properly mix the sample with the air within the Ziploc.
- Allow the sample to come to room temperature, approximately 60-80 degrees Fahrenheit by placing it in a warm location, but not direct sunlight. If sampling is occurring in winter, the Ziploc may need to be placed near a heater to warm sample.
- Insert the PID probe into the Ziploc bag and record the maximum reading on the PID display.

PID Lamp Selection

9.8 eV – Most Selective lamp: Typical compounds detected include benzene, aromatics, amines.

10.6 eV – Standard PID lamp: Typical compounds detected include all those covered under the 9.8 eV as well as chlorinated compounds, vinyl chloride, DCE, TCE, PCE, and chlorobenzene.

11.7 eV – Widest range PID lamp: Typical compounds detected include all those covered under the 10.6 eV as well as methylene chloride, carbon tetrachloride, chloroform, and 1,1,1-trichloroethane.

References

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

SOP-22 Management of Investigative Derived Waste

This Standard Operating Procedure (SOP) describes the procedures for handling wastes generated during a site investigation. The objective of this SOP is to limit contamination to the surrounding environment by properly handling investigative-derived wastes during field work. All procedures for the handling of wastes generated during an investigation should be pre-approved through a site-specific Sampling and Analysis Plan (SAP). This SOP is not applicable to hazardous wastes. All wastes described within are non-hazardous wastes. If hazardous wastes are encountered, please consult with your Project Manager and the appropriate regulatory agency.

Equipment and Materials Needed

- Field Forms
- PID
- Department of Transportation (DOT) Approved 55-gallon drums (open top for soils, open-top or closed-top for groundwater)
- Drum Wrench

Soils

- Whenever possible, any soil removed during borehole drilling, test pitting, or excavation, should be backfilled in the reverse order it was removed.
- To determine if soil removed from the ground is contaminated, visual reconnaissance and field screening for volatiles using a PID should occur.
- Any soil with a PID reading over 100 parts per million (ppm) should be containerized in a 55-gallon open-top drum or larger container as necessary.
- Soil that does not appear contaminated or show greater than 100ppm PID readings may be spread on the ground near the point of origin.
- Collect a representative sample of any containerized soils. Soil samples should be analyzed for site-specific contaminants of concern for disposal classification.
- Any containerized soil should be disposed of in accordance with state and federal regulations based on the soil analytical results.
- Disposal of soils should occur in a timely manner.
- All containers left on site should be labeled with a the following identifiers; site name, date, contents, contact company.

Groundwater

- Any water purged from a well during development or sampling that has a sheen or contains free product is considered contaminated groundwater.
- All known contaminated water must be containerized in a 55-gallon drum or tank, be properly labeled, and analyzed for site-specific contaminants of concern.
- Use one drum per well sampled so the analytical for the well can be used to characterize the water in the drum.
- If one drum is used for more than one well, the water within the drum should be sampled separately to characterize the water for disposal. Groundwater that does not have a sheen or contain free product may be discharged to the ground surface near the point of origin, depending on state guidance. Applicable state guidance should be confirmed prior to sampling.
- Any containerized water deemed contaminated through analytical results should be disposed of in accordance with state and federal regulations.

References

Montana DEQ (2015), Disposal Of Untreated Purge Water From Monitoring Wells

APPENDIX C
FIELD PREPARATION PLAN

Field Preparation Plan

GRANITE PEAK ENVIRONMENTAL

Project:	Suta North Property	Project Number:		Project Manager:	Christin Hileman
Location:	1st Street North, Sunburst, Montana	Investigation Dates:	Spring 2026	Field Staff:	TBD
Client:	Sweetgrass Development Corporation	Site Contact:	Ms. Shawn Christiaens	Date:	11/25/2025
Client Contact:	Sarah Converse	DEQ/EPA Contact:	Donnie McCurry	Completing Personnel:	Justin Enger

Investigation Objectives:
•Determine if surface and subsurface soils are contaminated with petroleum products under 1st Street North.
•Determine the eastern and down gradient extent of petroleum contamination in soil and groundwater.
•Determine if petroleum contamination is present in groundwater at the source area within 2021 excavation.
•Develop monitoring wells MW5, MW6, and MW7 to determine if groundwater contamination has been delineated to the west and south of the 2021 excavation.

Sampling Approach

Borehole Subsurface Soil Sampling

Number of Samples	Analytical Analysis	Media	Sample Type	Analytical Method	Sample Containers	Preservative	Hold Times	Sample Notes
30	VPH	Soil	Natural	MTDEQ VPH	1 x 40ml vials	Methanol	14 days	3 per borehole
30	VOCs including lead scavengers	Soil	Natural	EPA 8260	1 x 40ml vials	Methanol	14 days	3 per borehole
30	EPH	Soil	Natural	MTDEQ EPH	4 oz amber glass jar	NA	14 days	3 per borehole
1	VPH	Duplicate	QC	MTDEQ VPH	1 x 40ml vials	Methanol	14 days	Soils duplicate sample
1	VOCs including lead scavengers	Duplicate	QC	EPA 8260	1 x 40ml vials	Methanol	14 days	Soils duplicate sample
1	EPH	Duplicate	QC	MTDEQ EPH	4 oz amber glass jar	NA	14 days	Soils duplicate sample
1	VPH	ERB	QC	MTDEQ VPH	3 x 40ml vials	HCl	14 days	Soils equipment rinsate blank sample, zero headspace
1	VOCs (including DCA)	ERB	QC	EPA 8260	3 x 40ml vials	HCl	14 days	Soils equipment rinsate blank sample, zero headspace
1	EPH	ERB	QC	MTDEQ EPH	2 x 1L amber glass jar	HCl	14 days	Soils equipment rinsate blank sample
1	Lead Scavenger EDB	ERB	QC	EPA 8011	3 x 40ml vials	$Na^2S^2O^3$	14 days	Soils equipment rinsate blank sample, zero headspace
1	VPH	Trip Blank	QC	MTDEQ VPH	1 x 40ml vials	HCl	14 days	laboratory provided, zero headspace
Groundwater								
9	VPH	Groundwater	Natural	MTDEQ VPH	3 x 40ml vials	HCl	14 days	1 per well, zero headspace
9	VOCs (including DCA)	Groundwater	Natural	EPA 8260	3 x 40ml vials	HCl	14 days	1 per well, zero headspace
9	EPH	Groundwater	Natural	MTDEQ EPH	2 x 1L amber glass jar	HCl	14 days	1 per well
9	Lead Scavenger EDB	Groundwater	Natural	EPA 8011 & 8260	3 x 40ml vials	$Na^2S^2O^3$	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	VOCs (including DCA)	Duplicate	QC	EPA 8260	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 Scavenger EDB	Duplicate	QC	EPA 8011 & 8260	3 x 40ml vials	$Na^2S^2O^3$	14 days	groundwater duplicate sample, zero headspace
1	VPH	ERB	QC	MTDEQ VPH	3 x 40ml vials	HCl	14 days	Groundwater equipment rinsate blank sample, zero headspace
1	VOCs (including DCA)	ERB	QC	EPA 8260	3 x 40ml vials	HCl	14 days	Groundwater equipment rinsate blank sample, zero headspace
1	EPH	ERB	QC	MTDEQ EPH	2 x 1L amber glass jar	HCl	14 days	Groundwater equipment rinsate blank sample
1	Lead Scavenger EDB	ERB	QC	EPA 8011 & 8260	3 x 40ml vials	$Na^2S^2O^3$	14 days	Groundwater equipment rinsate blank sample, zero headspace
1	VPH	Trip Blank	QC	MTDEQ VPH	1 x 40ml vials	HCl	14 days	laboratory provided, zero headspace

Laboratory: Pace National, Mount Juliet, TN

Shipping: Fedex 2 Day

Notes:
10 boreholes: 3 samples per borehole if surface (0-2) and subsurface (2-10) are contaminated. One duplicate, ERB, and Trip Blank. Send to Pace with standard turnaround time
Groundwater: Existing monitoring wells MW1, MW2, MW3, MW4, MW5, MW6, MW7, and proposed monitoriing wells MW-8 and MW-9.

Project Requirements

DEQ Approved	Client 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

Appendix D-1: Montana Tier 1 Soil Screening Levels (<10 feet to Groundwater)

Analysis	Method	Target Analyte	Montana Risk-Based Screening Levels[1]				Laboratory Reporting Limit[2]	RL < RBSL
			Residential Direct Contact	Commercial Direct Contact	Construction Direct Contact	Leaching		
			(0-2 feet)	(0-2 feet)	(2-10 feet)	(0-10 feet)		
Extractable Petroleum Hydrocarbons (EPH)	MT EPH (MADEP)	EPH Screen	--	--	--	--	200	Yes
		C9-C18 Aliphatics	290	1600	6000	53000	20	Yes
		C19-C36 Aliphatics	25000	330000	1600000	Considered Immobile	20	Yes
		C11-C22 Aromatics	540	6200	33000	370	20	Yes
Volatile Petroleum Hydrocarbons (VPH)	MT VPH (MADEP)	C5-C8 Aliphatics	90	450	2000	220	5	Yes
		C9-C12 Aliphatics	160	800	3000	11000	5	Yes
		C9-C10 Aromatics	60	300	4000	130	5	Yes
	EPA 8260	MTBE	67	310	9100	0.078	0.001	Yes
		Benzene	1.7	7.6	190	21	0.001	Yes
		Toluene	630	6300	14000	21	0.005	Yes
		Ethylbenzene	8.4	38	1200	26	0.0025	Yes
		Xylenes	75	330	1900	320	0.0065	Yes
		Naphthalene[4]	2.9	13	120	12	0.0125	Yes
Lead Scavengers	EPA 8260	1,2-Dibromoethane (EDB)	0.05	0.24	7.3	0.000086	0.0025	No[3]
		1,2-Dichloroethane (DCA)	0.67	3	100	0.019	0.0025	Yes

Notes:

1 = Montana Tier 1 Risk-Based Screening Levels (RBSLs, February 2024) are shown for petroleum analytes. <10 to GW for surface, subsurface soils, and leaching

2 = Pace National Reporting Limits

3 = Lowest Reporting Limit achievable by Pace National

4 = Montana DEQ RBSL Memorandum, July 2020

-- = EPH fractions will be requested if EPH Screen results exceed 200 mg/kg

All units in 'mg/kg (miligram per kilogram)

RL = Reporting Limit

RBSL = Risk-Based Screening Level

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

Appendix D-2: Montana Tier 1 Groundwater Screening Levels

Analysis	Method	Target Analyte	Montana Risk-Based Screening Levels Groundwater[1]	Laboratory Reporting Limit[2]	RL < RBSL
Extractable Petroleum Hydrocarbons (EPH)	MT EPH (MADEP)	EPH Screen	--	300	Yes
		C9-C18 Aliphatics	3,000	600	Yes
		C19-C36 Aliphatics	100,000/bu	600	Yes
		C11-C22 Aromatics	1,100	600	Yes
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
Lead Scavengers	EPA 8260	1,2-Dichloroethane (DCA)	4	2.5	Yes
	EPA 8011	Ethylene dibromide (EDB)	0.017	0.02	No[4]

Notes:

1 = Montana Tier 1 Risk-Based Screening Levels (RBSLs, May 2018) are shown for petroleum analytes. <10 to GW for surface, subsurface soils,

2 = Pace National Reporting Limits

3 = Must request that sample is reported down to MDL

4 = Lowest Reporting Limit achievable by Pace National

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

APPENDIX F
COST ESTIMATE

Cost Estimate

Project: Suta North Property
Location: 1st Street North, Sunburst, Montana 59482
Client: Ms. Shawn Christianes
Date: November 11, 2025

GRANITE PEAK ENVIRONMENTAL

Costs	Description	Quantity	Units	Hourly Rate	Total
Task 1 - Work Plan*					
Labor	Principal	4	hour	$170	$680
	Project Scientist	6	hour	$140	$840
	Staff Scientist	32	hour	$110	$3,520
	GIS Specialist	4	hour	$100	$400
				Total Task 1	**$5,440**
Task 2 - Project Management					
Labor	Project Scientist	45	hour	$140	$6,300
				Total Task 2	**$6,300**
Task 3 - Mobilization/Demobilization					
	Borehole Drilling, Well Installation, and Groundwater Monitoring				
Labor	Staff Scientist (prep)	8	hours	$110	$880
	Staff Scientist (mobilization)[1]	12	hours	$110	$1,320
				Total Task 3	**$2,200**
Task 4 - Vehicle and Fuel					
	Borehole Drilling, Well Installation, and Groundwater Monitoring				
Direct	Field Truck	5	days	$150	$750
	Fuel	1	ls	$300	$300
				Total Task 4	**$1,050**
Task 5 - Lodging and Per Diem					
	Borehole Drilling, Well Installation, and Groundwater Monitoring				
Direct	Lodging	4	days	$160	$640
	Per Diem	5	days	$55	$275
				Total Task 5	**$915**
Task 6 - Laboratory Analysis & Sampling Fees					
	Subsurface Soil Samples (10 boreholes, 3 boreholes per borehole) +3 QC Samples (TB, ERB, FD)				
Direct	VPH	34	each	$150	$5,100
	EPH Screen	33	each	$60	$1,980
	EPH Fractions	15	each	$110	$1,650
	Lead Scavengers	33	each	$100	$3,300
	Terracore Kit	33	each	$15	$495
	Total Solids	33	each	$10	$330
	Laboratory Sample Disposal Fee	34	each	$10	$340
	GPE Sampling Fees	34	each	$10	$340
				Direct Costs Subtotal	$13,535
	Groundwater Sampling (9 Monitoring Wells) + 3 QC samples (TB, ERB, FD)				
Direct	VPH	12	each	$150	$1,800
	EPH Screen	11	each	$60	$660
	EPH Fractions	5	each	$110	$550
	Lead Scavengers	11	each	$100	$1,100
	Laboratory Sample Disposal Fee	12	each	$10	$120
	GPE Sampling Fees	12	each	$10	$120
				Direct Costs Subtotal	$4,350
				Total Task 6	**$17,885**
Task 7 - Field Work Oversight					
	Staff Scientist - Traffic Control (Prep, Setup, and Takedown)[2]	10	hours	$110	$1,100
	Staff Scientist - Remedial Investigation	50	hours	$110	$5,500
				Total Task 7	**$6,600**
Task 8 - Field Work (Equipment)					
	Borehole Drilling, Well Installation, and Groundwater Monitoring				

Direct	GPS	1	days	$100	$100
	PID	4	days	$100	$400
	Oil Water Interface Probe	5	days	$100	$500
	Gecontroller	3	days	$90	$270
	Bladder Pump	3	days	$60	$180
	Bladders	9	unit	$6.60	$59
	Tubing (Silicone)	1	foot	$3.00	$3
	Tubing - (Polyethalene .170x1/4)	180	foot	$0.25	$45
	Tubing (Polyethalene 1/4x3/8)	180	foot	$0.25	$45
	Turbidity Meter	3	days	$100	$300
	YSI	3	days	$150	$450
	Ice	12	each	$3.00	$36
				Total Task 8	**$2,388**
Task 9 - Drilling Contractor					
Direct	Hollow Stem Contractor	1	ls	$15,000	$15,000
				Direct Costs Subtotal	$15,000
				10% Markup	$1,500
				Total Task 9	**$16,500**
Task 10 - Traffic Control					
Labor	Traffic Control Plan	10	Hours	$110	$1,100
				Labor Costs Subtotal	$1,100
Direct	Equipment (Barricades, Cones, Signage)[2]	1	ls	$2,000	$2,000
				Direct Costs Subtotal	$2,000
				10% Markup	$200
				Total Task 10	**$3,300**
Task 11 - Drum Transportation and Disposal					
Direct	Subcontractor - Estimate	1	ls	$1,500	$1,500
				Direct Costs Subtotal	$1,500
				10% Markup	$150
				Total Task 11	**$1,650**
Task 12 - Monitoring					
Labor	Staff Scientist - 9 wells	9	wells	$220	$1,980
				Total Task 12	**$1,980**
Task 13 - Report					
Remedial Investigation Report					
Labor	Principal	4	hour	$170	$680
	Project Scientist	4	hour	$140	$560
	Staff Scientist	32	hour	$110	$3,520
	GIS Specialist	6	hour	$100	$600
				Total Task 13	**$5,360**
Task 14 - Release Closure Plan Update					
Labor	RCP Update[3]	1	ls	$575	$575
				Total Task 14	**$575**
Task 15 - Data Validation Summary					
Labor	Staff Scientist	3	hours	$110	$330
				Total Task 15	**$330**
				Total - All Tasks	**$72,473**

Notes/Assumptions:

*This estimate makes assumptions regarding what will be requested and approved by DEQ in the Remedial Investigation Work Plan. Final costs will be determined once DEQ and PTCRB has approved the Remedial Investigation Work Plan.

**Final drilling and monitoring well installation costs will be requested from contractors following the approval of this work plan. Costs shown in this estimate are for budgetary purposes.

1) Mobilization cost was calculated by adding drive time to Sunburst from Missoula and back to Missoula (8 hours) and adding additional hours (1 hour) to mobilize to Sunburst from Shelby and back. Granite Peak employees plan to stay in Shelby, the closest town to Sunburst with a hotel, Monday through Thursday.

2) Due to heavy traffic in 1st Street North, a traffic control plan and right-of-way encroachment permit are required prior to drilling work in the shoulder of 1st Street North. There will be time spent working with Montana DOT and the Town of Sunburst to acquire an encroachment permit and create a traffic control plan. There will also be costs associated with renting cones, barricades and signage as well as costs associated with the pick up, set up, take down, and drop off of cones, barricades, and signage.

3) Based on DEQ Guidelines, an RCP update will be included in the Remedial Investigation Report