FINAL
HEALTH AND SAFETY PLAN

BLACKTAIL CREEK RIPARIAN ACTION
REMEDIAL DESIGN WORK PLAN
AND PRE-DESIGN INVESTIGATION
BUTTE PRIORITY SOILS OPERABLE UNIT OF THE
SILVER BOW CREEK/BUTTE AREA SUPERFUND SITE
SILVER BOW COUNTY, MONTANA

Prepared for:

Montana Department of Environmental Quality
1520 E. 6th Avenue
Helena, MT 59601

Task Order under DEQ Contract No. 421042

Prepared by:

HydroGeologic, Inc.
1413 4th Avenue North
Billings, MT 59101

August 2022

HGL
HydroGeoLogic, Inc

Project Name: Butte Priority Soils Operable Unit of the Silver Bow Creek/Butte Area Superfund Site
Contract: 421042

Job Site Address: at and directly upstream of the confluence of Silver Bow Creek and Blacktail Creek, approximately bounded by Lexington Ave. and Montana St., and George St. and I-90/I-15 in Butte, MT	**Task:** Site Sampling, Site Inspections, Pump Testing **WBS Work Area:** Pre-Design Investigation
Site Contact: Drew Herrera	**MDEQ PM:** William George
Telephone: (307) 680-0026	**Telephone:** 406-422-8870/406-444-6420
Revision No.: 0	**Email:** william.george@mt.gov
Fieldwork Objectives, Tasks, and Equipment: Fieldwork for this Task Order will include site visit(s) for inspections and the collection of characterization samples, and to support DEQ during pre-design investigations. Samples to be collected may include surface soil sampling, hand augering, installation and logging of soil borings, test pits, collection of soil and sediment samples, pump testing, and associated field measurements. An XRF unit may be used to field screen soil samples (XRF without radioactive material, such as Vanta series XRF).	**Type: Check as many as applicable** ☐ Active ☐ Landfill ☐ Unknown ☒ Inactive ☐ Uncontrolled ☐ Military ☐ Secure ☒ Industrial ☐ Enclosed Space ☒ Unsecure ☐ Recovery ☐ Well Field ☒ Other Specify**: Former mining areas, mine wastes/byproducts**

Description and Features:

The Blacktail Creek (BTC) Riparian Actions Area will be investigated to address data gaps and satisfy design needs for the integration of restoration with remedy of mining and mineral processing wastes in the SBC and BTC Corridors. The BTC Riparian Actions Area is within the boundaries of the Butte Priority Soils Operable Unit (BPSOU), shown on Figure 1. DEQ's obligations for the BTC Riparian Actions are outlined within the amended record of decision for Butte Priority Soils Operable Unit and the finalized Consent Decree and include the removal of tailings, wastes, contaminated soils and sediment from BTC and SBC below the confluence with BTC wetlands; the reconstruction of BTC and SBC below the confluence with BTC. Additionally, settlings defendants are responsible for the control of discharge of contaminated groundwater to surface water in the project area. The study area covered by this investigation work is to be performed within the approximate boundaries shown in Figure 2.

The major objectives of the remedial activities for the BTC area, as outlined by the Consent Decree (CD), are to:

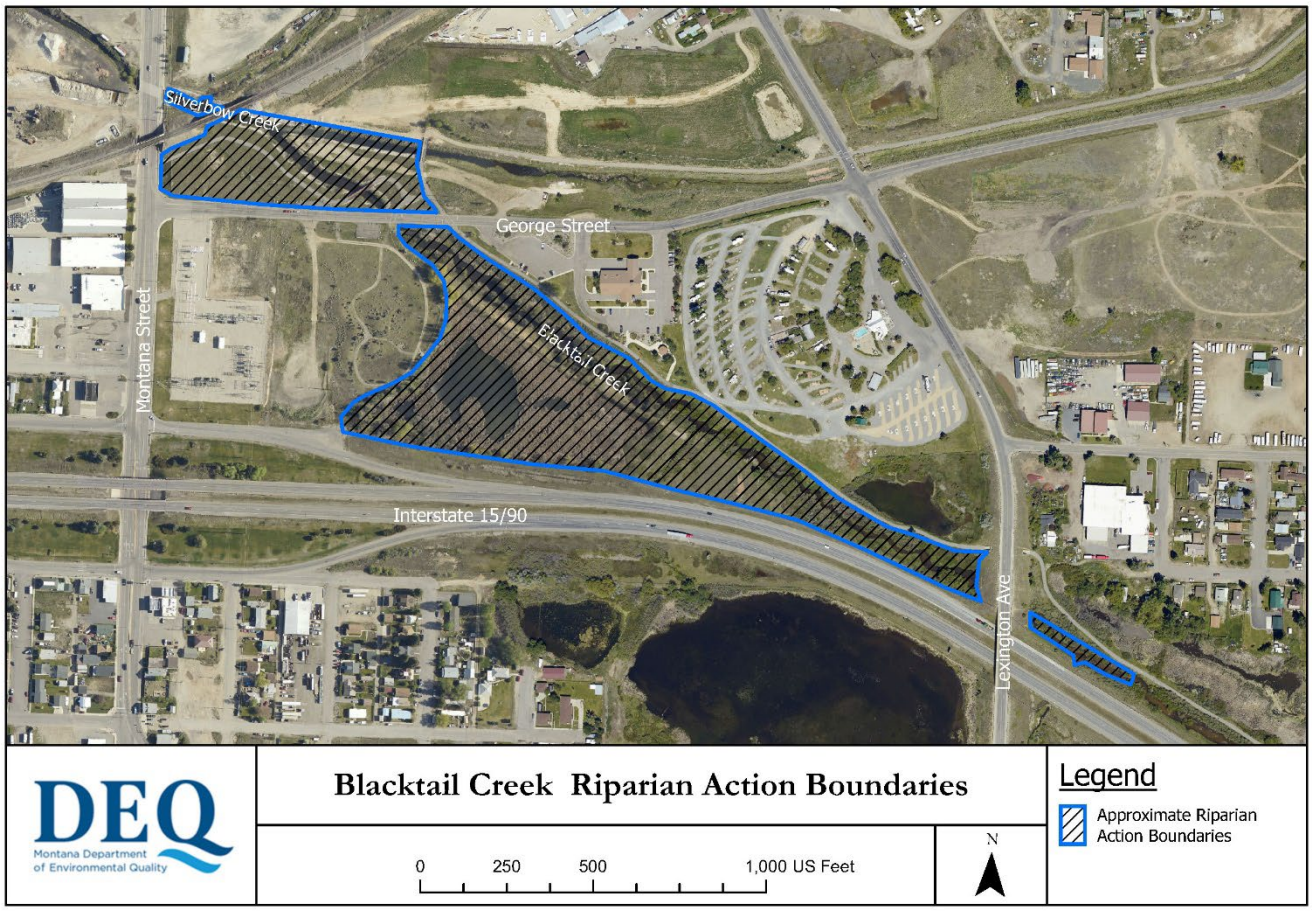
1) Remove tailings, wastes, contaminated soils and sediments from Blacktail Creek and Silver Bow Creek below the confluence with Blacktail Creek, including the BTC wetlands.
2) Control of discharge of contaminated groundwater to surface water in the project area; and
3) Reconstruct Blacktail Creek and Silver Bow Creek below the confluence with Blacktail Creek.

The purpose of this project is to address data gaps to delineate the vertical and lateral extent of tailings, waste, and contaminated soils associated within the project boundaries, and the estimated quantity and quality of water that will be associated with construction de-watering. Addressing data gaps will be accomplished by conducting additional field investigations.

Surrounding Population: ☒ Residential ☒ Industrial ☒ Rural ☐ Urban ☐ Other:

Figure 1 - Site Location Map

Figure 2 - Study Area



Site History:

BTC receives the majority of its base flow contributions from Summit Valley groundwater in Butte, Montana. The BTC Riparian Actions Area that is the focus of this data gap investigation extends from BTC 250-ft east of Lexington Ave just past the confluence with Grove Gulch Creek, including banks; the 100-year floodplain between George Street and Lexington Ave Culverts; and the 100-year floodplain below the confluence of BTC and SBC north of George Street and East of Montana Street.

In 1879, the first large-scale mineral processing smelter (Colorado Smelter) was built on SBC, at the west end of the valley. Between 1879 and 1888, at least three more smelters of consequence (BRW, Parrot Smelter and Montana Ore Purchasing Company (M.O.P)) were constructed upstream of the Colorado Smelter, which significantly altered the geomorphology and hydrology of both SBC and the lower portion of BTC. A fifth smelter of consequence, the Bell Smelter, located west of present-day Harrison Avenue on the north bank of BTC, was constructed in 1881; and reached a peak production of approximately 30 tons per day in 1883 (primarily silver ore). Production quickly tapered and the smelter was dismantled sometime in the early 1890s. Water demands during this period increased dramatically, and the stream channels were altered significantly to keep up with the demand. At least three dams were constructed on upper SBC and the confluence area for tailings

impoundment and water clarification. The dam at Montana Street was constructed for settlement of tailings from upstream smelters and resulted in significant ponding on both sides of the stream.

Over time, mining and smelting waste materials aggraded in the SBC and BTC channels and floodplain, causing frequent and substantial flooding (Meinzer, 1914). In an attempt to mitigate flooding issues, berms made mostly of readily available waste were constructed throughout the confluence area. The known waste area referred to as the BTC Berm, is an historic remnant of these flood control berms.

In 2020, the BPSOU Consent Decree was signed which set forth the framework for remediation on BPSOU and specifically BTC. The 2020 BPSOU Record of Decision Amendment addressed a fundamental change to the original 2006 BPSOU ROD and the 2011 BPSOU ESD.

Section 5 of Attachment C of Appendix D lists the objectives of the remedial activities described for the BTC Area. Appendix H to the Consent Decree sets forth the procedures and requirements for implementing the BTC Riparian Actions to be implemented by Montana DEQ.

Waste Types: ☒ Liquid ☒ Solid ☒ Sludge ☐ Gas ☐ Unknown ☐ Other **Specify:**

Waste Characteristics: Check as many as applicable.

☐ Corrosive ☐ Flammable ☐ Radioactive*
☒ Toxic ☐ Volatile ☐ Reactive
☐ Inert Gas ☐ Unknown ☒ Carcinogenic
☐ Other **Specify:**

*Contact CHSD for further project planning.

Work Zones (exclusion, contamination reduction, and support): Work zones will be used during Site visits. The support zone will be considered the 10-foot perimeter around support vehicles and/or personnel sampling.

Hazards of Concern:

☐ Exhaust ☒ Slips, Trips, and Falls
☒ Inorganic Chemicals ☒ Noise
☐ Organic Chemicals ☒ Biological: stinging insects, venomous reptiles
☐ Explosive/Flammable ☐ Radiological
☐ Motorized Traffic ☒ Heat/Cold Stress
☒ Heavy Machinery
☐ High Traffic Area
☒ Other Specify: Coronavirus (wear mask or social distance)

Principle Disposal Methods and Practices for IDW.

Containment and Disposal Method
☒ **Not Needed**
☐ **Needed**

Summarize below:
Excess sample material generated will be left on site at the locations from which samples were taken.

Disposable materials (not classified as hazardous) such as latex gloves, used PPE, aluminum foil, paper towels, and similar items, will be placed and sealed in plastic garbage bags for disposal with sanitary waste from the site.

Project Specific Hazardous Material Summary: Indicate waste type and media in which the material is contained, estimate quantity if material exists in bulk quantities.

Chemicals Amounts/Units:	Solids Amounts/Units:	Sludges Amounts/Units:	Solvents Amounts/Units:	Oils Amounts/Units:	Other Amounts/Units:

☐ Acids ☐ Pickling Liquors ☐ Caustics ☐ Pesticides ☐ Dyes/Inks ☐ Cyanides ☐ Phenols ☐ Halogens ☐ Dioxins ☐ Other **Specify:**	☐ Flyash ☐ Asbestos ☒ Milling/Mine Tailings ☐ Ferrous Smelter ☐ Non-ferrous Smelter ☒ Metals ☐ Other **Specify:** Site is residual exposed and covered mine waste deposited by sedimentation from stream flow and settling.	☐ Paint ☐ Pigments ☐ Metal Sludges ☐ POTW Sludge ☐ Aluminum ☐ Distillation Bottoms ☐ Other **Specify:**	☐ Halogenated (chloro, bromo) ☐ Solvents ☐ Hydrocarbons ☐ Alcohols ☐ Ketones ☐ Esters ☐ Ethers ☐ Other **Specify:**	☐ Oily Wastes ☐ Gasoline ☐ Diesel Oil ☐ Lubricants ☐ PCBs ☐ Polycyclic Aromatics ☐ Other **Specify:**	☐ Laboratory ☐ Pharmaceutical ☐ Hospital ☐ Radiological ☐ Municipal ☐ Construction ☐ Munitions ☐ Other **Specify:**

Overall Hazard Evaluation: ☐ High ☐ Medium ☒ Low ☐ Unknown
Task hazard evaluation is included within the specific Activity Hazard Analysis

Fire/Explosion Potential: ☐ High ☐ Medium ☒ Low ☐ Unknown

Background Review: ☒ Complete ☐ Incomplete
Additional information to be collected in this and future investigations.

Contaminants of Interest (current TLV, STEL, IDLH and IP at this link)

Known Contaminants	Highest Observed Concentration (specify units and media)	ACGIH TLV TWA ppm or mg/m³ (specify)	STEL/ Ceiling Limit	IDLH ppm or mg/m³ (specify)	Symptoms/Effects of Acute Exposure	IP (eV)
Arsenic	4,410 mg/kg, sediment	0.01 mg/m³ A1 carcinogen	0.01 mg/m3	5 mg/m³ (as As)	Ulceration of nasal septum, dermatitis, gastrointestinal disturbances, peripheral neuropathy, resp irritation, hyperpigmentation of skin.	-NA
Cadmium	26 mg/kg, sediment	0.01 mg/m³total 0.002 mg/m³ (R)/ 0.005 mg/m³ A2 Carcinogen	NE	9 mg/kg (as Cd)	Pulmonary edema, breathing difficulty, cough, chest tightness, substernal pain, headache, chills, muscle aches, nausea, vomiting, diarrhea, anemia, kidney damage.	NA
Copper	10,500 mg/kg, sediment	1 mg/m³	0.1 mg/m3	100 mg/m3	Upper respiratory tract irritation, metallic taste, nausea, and metal fume fever. Irritation of eyes and nose; nasal septum perforation; metallic taste; dermatitis	NA

Lead	1,420 mg/kg, sediment	0.05 mg/m^3 A3 carcinogen	NE	1,000 mg/kg	Lassitude, insomnia, facial pallor, anorexia, weight loss, malnutrition, constipation, abdominal pain, colic, anemia, gingival lead line, tremor, paralysis, wrist, ankles, encephalopathy, kidney disease irritation eyes, hypertension	NA
Mercury	6.0 mg/kg, sediment	0.025mg/m3 Skin A4 Carcinogen	NE	10 mg/kg	Irritation of eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria	NA
Zinc	6,510 mg/kg, sediment	2 mg/m^3 respirable, as zinc oxide/5 mg/m^3 A4	10 mg/m^3 (respirable)	500 mg/m3	Metal Fume fever, irritation to the eyes, skin, upper respiratory system, cough	NA

Notes:

- = none
ACGIH = American Conference of Governmental Industrial Hygienists
Ca = human carcinogen
CAS = Chemical Abstracts Service
Ceiling = limit not to be exceeded
eV = electron volt
IDLH = Immediately Dangerous to Life and Health (NIOSH standard enforced by law)
IP = ionization potential
µg/kg = micrograms per kilogram
µg/L = micrograms per liter
mg/kg = milligrams per kilogram
mg/m^3 = milligrams per cubic meter
NA = Indicates that a chemical property is not applicable.
NE = not established
ND = not determined
NIOSH = National Institute for Occupational Safety and Health
OSHA = Occupational Safety and Health Administration
PID = photoionization detector
ppm = parts per million
(R) = respirable fraction
Skin = absorbed through the skin
STEL = Short Term Exposure Limit (15 minute)
TLV = Threshold Limit Value (Recommended by ACGIH)
TWA = Time-Weighted Average (Average concentration for a normal 8-hour working day or 40-hour working week)

General Site Rules

- **Conduct an initial briefing and address this HASP, site and task hazards, equipment hazards, chemicals brought to the site (hazards, hazard controls, location of SDSs), potential emergencies and responses, site control requirements, and PPE. Verify that utility locates are complete, if applicable.**
- **Confirm that site personnel have required training and qualifications.**
- **Conduct follow-up briefings, at least weekly, to address changes in scope or hazards.**
- **Conduct regular inspections to verify implementation and effectiveness of hazard controls.**
- **Do not consume food, beverages or tobacco products while working with hazardous chemicals or hazardous waste.**
- **Decontaminate personnel and equipment after contact with hazardous waste or hazardous chemicals.**
- **Use a buddy system (visual or by cell phone) to track personnel and render aid, if needed.**
- **Report incidents and significant near misses.**
- **Report or correct unsafe and potentially unsafe conditions or practices.**
- **Wear all required protective equipment.**
- **Remove jewelry that may become entangled in equipment.**
- **Biologicals: Eliminate contact with poisonous and thorny plants, allergens, insects, and animal hazards (e.g., spiders, hornets, reptiles, snakes, deer ticks (Lyme disease), mosquitoes, bird and rodent droppings, biting and stinging insects etc.). Field staff with severe allergic reactions to stinging insects shall alert the SSHO and other field staff during the daily Tailgate Safety Meeting and carry an Epi-pen (if prescribed by a physician) with them while on site.**
- **Prohibit running and horseplay.**
- **Personnel, while on duty, shall not operate motor vehicles after being in a duty status (regardless of their role or function) for more than 12 hours during any 24-hour period without at least 8 consecutive hours of rest. Personnel may work an additional 2 hours at the motel or their home (for a total 14-hour day), though still subject to reduction by the other requirements and factors described below. A minimum of 8 consecutive hours shall be provided for rest in each 24-hour period.**
- **No employee may drive continuously for more than 10 hours in any single on-duty period (continuous period of more than 10 hours in any 24-hour period without at least 8 consecutive hours of rest).**

Activity Hazard Analysis – Complete Corresponding Detailed PPE Section for each task

AHAs will be reviewed with the work crew before starting work and will be revised, as necessary, to incorporate additional task-specific considerations. AHAs are to be reviewed periodically to confirm that the work processes have not changed and that the hazards are addressed and controlled. Employees will be briefed on any changes made to AHAs. Additional AHAs will be prepared, as appropriate, for new tasks. The AHAs needed for this task are listed below and are included with this HASP:

- **Vehicle Operations**
- **General Site Work**
- **Surface Soil Sampling and Hand Augering**
- **Excavation and Trenching**
- **Heavy Equipment Operation**
- **Use of XRF Instrument for Lead in Soil Determination**
- **Direct Push Drilling-Soil Sampling**
- **Water Level Gauging**
- **Coronavirus Practices to Prevent Exposure**
- **Mobilization/Demobilization**
- **Decontamination of Equipment**
- **Creek Inspections**

PPE Level for this task = ☒D or ☒ D modified ☐ C
Definitions of PPE levels are available in the Corporate H&S Procedures Manual.

Level D= Safety glasses, hard hat, safety toe boots, nitrile gloves
Modified Level D= Option to include the above PPE with coverall to be worn in dusty conditions.

Does the project require air monitoring? Metal concentrations in soils do not warrant monitoring as long as dust levels are kept below nuisance visible dust levels.
☐ Yes ☒ No
Exposure Monitoring instrument(s) = ☐ PID ☐ PDR (dust monitor) ☐ CGI ☐ O_2 meter ☐ Other specify:

Does the project have any permit required confined spaces that will need to be entered to accomplish the identified project tasks?
☐ Yes ☒ No
If yes, attach the Permit Required Confined Space Entry Checklist (available via the Intranet) and contact the CHSD for additional project safety planning.

Does the project have any work that will require a Hot Work Permit (e.g., welding, metal cutting)?
☐ Yes ☒ No
If yes, attach Hot Work Permit

Does the project require specialized training or competent persons for excavations, fall protection, equipment operators, etc.?
☐ Yes ☒ No
If yes, state specialized training and competent person(s)

Additional Protective Equipment Requirements:

Protective Clothing: ☐ **Not Needed**
☐ Splash Suit
☐ Apron
☒ High Visibility Vests
☐ Tyvek® coverall
☐ Coverall – Specify:
☐ Encapsulated suit

Gloves: ☐ **Not Needed**
☐ Undergloves
☐ Overgloves
☒ Gloves – Specify: Nitrile (6 mil) when handling potentially contaminated soils and/or surface water

Head & Eye: ☐ **Not Needed**
☒ Safety Glasses
☐ Face Shield
☐ Goggles
☐ Hearing Protection
☐ Other – Specify:

Respiratory: ☒ **Not Needed**
☐ APR Full face:
☐ Cartridge/Filter type:
☐ Escape Mask:
☐ SCUBA, Airline ☐ Other:

Note: Use of respirators requires a respiratory protection plan and assessment to verify that planned respirator use will be effective.

Boots: ☐ **Not Needed**
☒ Boots: Leather steel-toe or composite toe
☐ Overboots:
☐ Rubber

☒ **Other PPE – specify below:** Outerwear appropriate for weather conditions. Life vests will be worn if any work is done in the pond area. This only includes times when a boat is used or if deemed necessary by the site safety officer.

Personnel and Responsibilities *(Include subcontractors)*

Name	Firm/Region	Medical Monitoring Clearance* (yes/no)	First Aid (yes/no)	Responsibilities	On-site Involvement
Drew Herrera	HGL	Yes	Yes	Project Manager	Site Visit
TBD	HGL	Yes	Yes	Field Team Leader/SSHO	Sampling, Data Collection
TBD	HGL	Yes	Yes	Field Sampling Technician	Sampling, Data Collection

*Health clearance meets all the medical surveillance requirements of 29 CFR 1910.120. Medical surveillance certification for on-site personnel is presented in HGL H&S Procedure Manual, Procedure 8.0. Subcontractors are required to meet the medical requirements of 29 CFR 1910.120, if applicable.

Subcontractors shall be solely responsible for the health and safety of their employees and shall comply with all applicable laws and regulations. In accordance with 1910.120(b)(1)(iv) and (v), HGL will inform subcontractors of the Site emergency response procedures, and any potential fire, explosion, health, safety or other hazards by conducting a Site kick-off meeting/training, conducting regular tailgate safety meetings, and making this HASP and Site information obtained by others available during regular business hours. All contractors and subcontractors are responsible for: (1) developing their specific AHAs, having a written Hazard Communication Program and any other written hazard specific programs required by federal, state and local laws and regulations; (2) providing their own personal protective equipment; (3) providing documentation that their employees have been health and safety trained in accordance with applicable federal, state and local laws and regulations; (4) providing evidence of medical surveillance and medical approvals for their employees; and (5) designating their own competent persons such as: Site safety officer, equipment operators, excavation competent persons, etc. and for ensuring that their employees comply with their own H&S requirements and taking any other additional measures required by their Site activities.

Health and Safety Monitoring Equipment and Action Levels

Instrument	Task	Action Level Guidelines	Response
Photoionization Detector ☒ **Not Needed** Type: Multi-Rae Lamp: ☐ 10.6 ☐ 11.7 ☐ other	Active HAZWOPER work areas.	Total organic vapor*(BETX) >10 parts per million (ppm) above background in breathing zone	Suspend the task, withdraw from the area of elevated readings, and evaluate the situation to determine cause(s) of elevated readings. Correct cause(s) if possible. Options include, natural ventilation, powered ventilation, changing work schedules, working upwind, altering the task/method, changing schedule, and if none of the preceding options are effective, notify the SSHO. Re-test the area and if concentration is below action level, resume work. If elevated concentrations continue to occur, notify the project manager and corporate H&S personnel before upgrading to respiratory protection. Collect sufficient breathing zone readings to characterize exposure.
Combustible Gas Indicator LEL/O_2 Meter ☒ **Not Needed**	Any Confined Space entry	>5% of LEL <19.5% >23.5 %	Do not enter the confined space in an enriched or oxygen deficient atmosphere. STOP WORK and consult with CIH or SSHO for further recommendations.
Sound level meter or smart phone app ☒ **Not Needed**	Active Work areas	>85 dBA (Whenever it is difficult to carry on a conversation with a person when they are standing at an arm's length away).	Require use of hearing protective devices at >85 dBA.
Dust Monitor (Digital) Type: ☒ **Not Needed**	Active HAZWOPER work areas.	2 – 2.5 mg/m^3 for visible dust	Visible dust will be controlled at all times in active HAZWOPER work areas Sources of PM-2.5 would not typically be found at construction and remediation sites, as excavation and soil moving activities tend to stir up larger sized dust particles. It should be noted that airborne dust is visible at approximately 2 – 2.5 mg/m^3.
OSHA heat stress app for temperature extremes-heat and cold stress	Active work areas	Variable depending on the individual and work activity. OSHA heat stress app to be used or ACGIH TLVs	Take breaks in the shade, drink chilled fluids. Provide for ample shelter and breaks for hot/cold weather exposure. All personnel to be trained in the recognition of symptoms and treatment of heat and cold stress.

Notes:
LEL = lower explosive limit

Decontamination Procedures

Personalized Decontamination

Wash well with soap and water before hand to mouth contact is made. A shower will be taken as soon as possible after leaving the field.

Wet or dry decontamination procedures will be selected per project.

Dry Decon Procedure
☐ **Not Needed**
Place all disposable PPE in a garbage bag as removed in the following order:
(1) Brush off work boots, remove disposable over boots, or booties
(2) Remove gloves
(3) Remove safety glasses
(4) Remove Tyvek or cloth coverall, if used
(5) Remove respirator, if used
(6) Remove inner gloves
(7) Wash hands/face before eating/drinking

Wet Decon Procedure
☒ **Not Needed**
(1) Wash overboots in soapy water and rinse
(2) Remove overboots or booties
(3) Remove gloves
(4) Remove safety glasses
(5) Remove Tyvek or cloth coverall, if used
(6) Remove respirator, if used
(7) Remove inner gloves
(8) Wash hands/face before eating/drinking

Sampling Equipment Decontamination
☐ **Not Needed**
All sampling equipment to be re-used such as hand augers and trowels will be thoroughly decontaminated as follows:

(1) Wash and scrub with low phosphate detergent
(2) Potable tap water rinse 1
(3) Potable tap water rinse 2
(4) Thoroughly rinse with deionized water, if specified by the FSP
(5) Air dry
(6) Wrap in aluminum foil for transport, if specified by the FSP

Heavy Equipment Decontamination
☐ **Not Needed**
All heavy equipment and tool parts that contact subsurface soil are constructed of heavy gauge steel and have no natural or synthetic components that could absorb and retain most soil-borne organic contaminants.

Prior to removal from the work site, potential contaminated soil/groundwater will be scraped or brushed from the exterior surfaces.

The drill rig, augers and any other large equipment in the exclusion zone will be taken to a decon pad and steam cleaned. Rain suits to protect from water spray and runoff will be used if necessary.

Hazardous Materials Inventory (Safety Data Sheets) for Investigation-Associated Substances.

Preservatives
☐ Hydrochloric Acid (HCl)
☐ Ascorbic Acid
☐ Nitric Acid (HNO_3)
☐ Sulfuric Acid (H_2SO_4) ☐ Other:
☐ Sodium Hydroxide (NaOH)
☐ Zinc Acetate (ZnOAc)

Decontamination
☒ Alconox ™ ☐ Hexane
☐ Liquinox ™ ☐ Isopropanol
☐ Acetone ☐ Nitric Acid
☐ Methanol ☐ Other:
☐ Mineral Spirits

Calibration Gases and Fluids
☐ Isobutylene ☐ pH Standard
☐ Methane ☐ Propane
☐ Pentane ☐ Zobell Solution
☐ Hydrogen ☐ Other:
☐Conductivity Standard

Spill Response: The following materials will be kept on site for spill response (check all appropriate materials)

☐ Absorbent Pads ☐ Granular absorbent material (nonflammable) ☐ Polyethylene Sheeting ☐ Waste Container
☒ Shovels or assorted hand tools

If a hazardous waste spill or material release to the air, soil, or water at the site is observed, the EPA site representative and the local Fire Department will be immediately notified. An assessment will be made of the magnitude and potential impact of the release. If it is safe to do so, site personnel will attempt to locate the source of the release, prevent further release, and contain the spilled and/or affected materials.

Emergency Contacts	Phone	Emergency Contacts	Name	Phone
Emergency	911	MDEQ PM	William George	406-444-6420
Dig/Utility Clearance	811 800-DIG-SAFE (800-344-7233)	HGL PM	Drew Herrera	307-680-0026
Silver Bow Health Department	406-497-5020	Site SSHO	To be determined	N/A
Butte Sheriff's Department	406-497-1120	Health and Safety Manager (HSM)	Edie Scala-Hampson, CIH, CHMM	847-409-6384
Butte Fire Department	911 406-497-6481	CHSD	Steve Davis, CSP, CIH	865-659-0499
		Occupational Physician	WorkCare	888-449-7787
Highway Patrol/State Police Silver Bowe, MT	406-494-3233	**HGL 24 Hour Emergency Number**		**800-341-3647**
State Spill Line	406-444-5300			

Medical Emergency	Contingency Plans Summarize below:
Hospital Name, Address, and Phone: **St. James Healthcare** 400 S Clark St, Butte, MT 59701 (406) 723-2500	**If staff observes hazards for which they have not been prepared, they will withdraw from the area and call HGL CHSD Steve Davis or the HSM Edie Scala-Hampson.** **In the event of medical emergency, contact Hospital, Police, or Sheriff's Department.** **The weather will be monitored routinely. If lightning is seen or thunder heard, the "30-30 Rule" shall be used where visibility is good and there is nothing obstructing the view of the thunderstorm: when lightning is seen, the time until thunder is heard is counted. If that time is 30 seconds or less, then the thunderstorm is within six miles and is dangerous. Activities with exposure shall cease at that**
Name of Contact at Hospital: **N/A**	
Name of 24-Hour Ambulance: **N/A**	
Distance to Hospital: 1.4 miles	

From Blacktail Creek mine area, head west on George St toward Blacktail Creek trail (0.2 mi). Turn right onto Montana St (0.6 mi). Continue straight to stay on Montana St (0.2 mi). Turn left onto W Platinum St (0.3 mi). Turn right onto S Crystal St (0.1 mi) you will arrive at St. James Healthcare. (Approximately 5 minutes).	**time and shall not resume until at least 30 minutes after the last clap of thunder. In the case that immediate shelter is required all personnel will go to the nearest available shelter and wait until hazardous conditions pass.** **Additional rally points and evacuation methods for severe weather will be identified on site as needed. If no shelter is available move into field vehicles and travel to hotel if necessary.** When a medical facility or physician is not accessible within 5 minutes of the work site, a minimum of two personnel on each shift will be qualified to administer first aid and CPR. **Emergency Equipment** • A minimum of one ANSI Z308.1, Type III first aid kit for portable outdoor settings. • A minimum of one approved fire extinguisher (10-B:C).

Health and Safety Plan Approvals	
Prepared by:	Date:
SSHO Signature:	Date:
HGL HSM Signature: Edie Scala-Hampson CIH, CSP	Date:

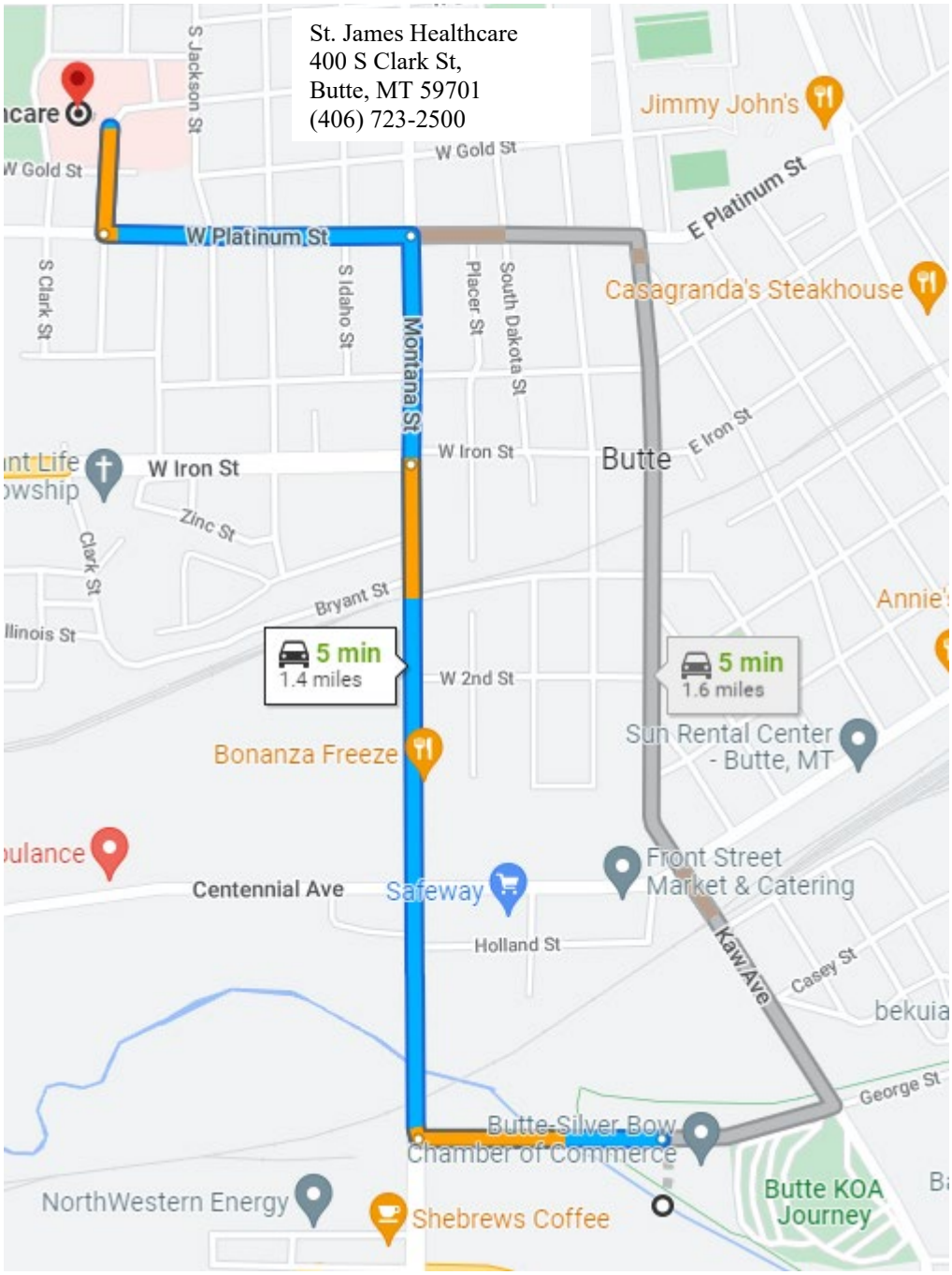


Figure 3 - Hospital Route Map with Approximate Time and Distance from Site

From Blacktail Creek mine area, head west on George St toward Blacktail Creek trail (0.2 mi). Turn right onto Montana St (0.6 mi). Continue straight to stay on Montana St (0.2 mi). Turn left onto W Platinum St (0.3 mi). Turn right onto S Crystal St (0.1 mi) you will arrive at St. James Healthcare. (Approximately 5 minutes).

The following personnel have read and fully understand the contents of this HASP and further agree to all requirements contained herein.

Name and Responsibility	Affiliation	Date	Signature

LIST OF ACTIVITY HAZARD ANALYSIS FORMS

- **Vehicle Operations**
- **General Site Work**
- **Surface Soil Sampling and Hand Augering**
- **Excavation and Trenching**
- **Use of XRF Instrument for Lead in Soil Determination**
- **Direct Push Drilling-Soil Sampling**
- **Water Level Gauging**
- **Coronavirus Practices to Prevent Exposure**
- **Mobilization/Demobilization**
- **Decontamination of Equipment**
- **Creek Inspections**

HGL HydroGeoLogic, Inc

ACTIVITY HAZARD ANALYSIS

Activity/Work Task: Vehicle Operations

Project Location: Blacktail Creek, Butte, MT

Contract Number: 421042

Date Prepared: 7/2/2022

Prepared By: Chris Robb

Corporate H&S Reviewer: Edie Scala-Hampson

Notes: (Field Notes, review comments, etc.)

Overall Risk Assessment Code (RAC) (Use highest code)	L

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
Project vehicle use on and off project site. Inspecting vehicles. Vehicle operations. Parking vehicles. Backing vehicles.	Accidents due to faulty equipment on vehicles	All company owned, leased, or rented vehicle operations shall comply with the requirements of HGL Procedure No. 16 "Driving Safety." Subcontractors operating motor vehicles shall comply with all federal, state, and local traffic regulations. Subcontractors shall only use vehicles that are in good condition and safe to operate. All personnel shall drive defensively and wear seat belts while vehicles are in motion. Inspect vehicles before use – document inspection. Keep alert for pedestrians. Always yield to and give pedestrians the right of way.	L
	Failure to properly plan daily activities	The crew must review this AHA and complete a pre-task safety and health analysis before beginning daily activities. This is a component of the morning Tailgate Safety Meeting which will discuss conditions that may be encountered in the field and at any time throughout the workday, when new tasks are initiated, unforeseen circumstances arise, or if working conditions change.	L

Job Steps	Hazards	Controls	RAC
Project vehicle use on and off project site. Inspecting vehicles. Vehicle operations. Parking vehicles. Backing vehicles.	Accidents	In the event of an accident: stop; call for medical assistance; notify police; complete Vehicle Accident Report and submit to the SSHO. If an HGL employee is injured, contact Workcare 24-7 emergency number 888-4497-787, Workcare will provide information on the nearest health clinic or emergency room. Follow HGL Procedure No. 9 “Incident Reporting Procedures.” If a subcontractor employee is injured, the Supervisor's Employee Injury/Illness Report Form must be completed and submitted to the SSHO.	L
	Equipment failure	Perform daily inspections of your vehicle. Any vehicle with mechanical problems that may endanger the safety of the driver, passengers, or the public shall not be used.	L
	Not prepared for emergency	Ensure safety equipment is in the vehicle. Safety equipment should include a spare tire, jack, first-aid kit, fire extinguisher, and flashlight. Flares and/or reflective triangles shall be available in larger trucks. Verify that the proper documentation is in the vehicle - documentation includes an operations manual for the vehicle, insurance card, vehicle registration, and HGL accident forms.	L
	Unfamiliar with the vehicle	Familiarize yourself with the vehicle before moving. Properly adjust mirrors and seat. Review the dashboard controls, steering radius, overhead, and side clearances. Locate controls for windshield wipers and lights.	L
	Shifting loads-Vehicle loading	Do not overload the vehicle. Secure all equipment within the body of the vehicle. Do not block side view mirrors with load. Do not transport Department of Transportation manifested hazardous materials without a commercial driver’s license. Dispatch all equipment and personnel with proper forms and identification.	L
	Distractions-Cellular phones	Do not use handheld cellular phones while driving. Pull over to the side of the road when making or receiving a call.	L

Job Steps	Hazards	Controls	RAC
Project vehicle use on and off project site. Inspecting vehicles. Vehicle operations. Parking vehicles. Backing vehicles.	Influenced by drug and alcohol	Never drive under the influence of drugs or alcohol. Disciplinary action, including termination, will be taken against anyone who is convicted of or who pleads no-contest to the charges of driving under the influence in accordance with the HGL Substance Abuse Policy. Project-assigned hourly employees are not permitted to operate company owned, leased, or rented vehicles after 10:00 p.m. without written authorization from their supervisor.	L
	Driver attitude/fatigue	Do not operate any vehicle when abnormally tired or fatigued. Do not let the actions of others affect your attitude. Take breaks to avoid “highway-hypnosis” and “falling asleep at the wheel”. Take plenty of breaks when driving long distances or rotate driving responsibility with a passenger. Personnel, while on duty, shall not operate motor vehicles after being in a duty status (regardless of their role or function) for more than 12 hours during any 24-hour period without at least eight consecutive hours of rest. No employee may drive continuously for more than 10 hours in any single on- duty period (continuous period of more than 10 hours in any 24-hour period without at least eight consecutive hours of rest).	L
	Backing-Struck by or against	Back into parking spaces upon arrival, whenever possible. When preparing to move or back vehicles, walk around the vehicle 360° before entering vehicle to identify any new conditions or obstructions. Use a spotter when backing whenever possible. Determine and agree upon hand signals (between spotter and driver) before attempting to back vehicle. Check the rear-view and side mirrors prior to backing (Note: All vehicles, other than automobiles, must have small convex mirrors attached to the side mirrors). Back slowly in areas of obstructed vision.	L
	Blind Spots-Struck by or against	Become familiar with any blind spots associated with your vehicle. Adjust mirrors properly. Make sure you use your directional signals. Always look over your shoulder to assure the lane is clear when changing lanes. Exercise caution when approaching other driver’s blind spots.	L

Job Steps	Hazards	Controls	RAC
Project vehicle use on and off project site. Inspecting vehicles. Vehicle operations. Parking vehicles. Backing vehicles.	Collisions-Spacing/distance	Do not tailgate. Follow the 3-second rule. Increase the 3-second rule as necessary during hazardous travel conditions. Always leave yourself an “out” during travel – this applies to stoplights as well. When stopping, make sure that you leave enough distance between you and the car in front of you (you should be able to see the rear tires of the vehicle in front, when stopped). When at a red light, and it turns green, use the “delayed start” technique, by counting to three before you take your foot off the brake. Allow extra spacing and braking time for trucks and vehicles towing trailers. Trailers shall be equipped with brakes.	L
	Skids-Loss of vehicle control. Struck by or against.	If the vehicle has begun to skid out of control, turn the steering wheel in the direction of the skid and re-adjust the wheel, as necessary. Slow down during hazardous travel conditions. Use 4-wheel drive, if available, when driving vehicles off road, on steep inclines, muddy conditions, etc. Do not take vehicles “off road” if they cannot be operated safely.	L
	Speed. Loss of vehicle control.	Obey all posted speed limits. Radar detectors are prohibited in all company owned, leased, or rented vehicles. Reduce travel speed during hazardous conditions (i.e., rain, fog, snow).	L
	Caught under or between- High profile vehicle/low clearances.	Determine actual height of vehicle during initial inspection - prior to moving vehicle. Maintain awareness of vehicle height while driving. Identify low clearance structures, such as motel overhangs, gas station canopies, bridges, tunnels, parking garages, fast-food drive-throughs, banks, etc. Determine the height of the low clearance structure prior to driving under it and verify that there is enough clearance to safely pass – use a spotter as necessary.	L
	Crossing railroad tracks-Struck by.	Stop, look, and listen before crossing railroad tracks. Be aware that multiple tracks may have more than one train using them, and the trains may be traveling in opposite directions. Never drive around crossing gates.	L
	Flooding/high water/drowning.	Never drive vehicles across flowing water on the road.	L

Job Steps	Hazards	Controls	RAC
Add Steps, Hazards, and Actions to Eliminate or Minimize Hazards based on conditions encountered in the field.			

Equipment	Training	Inspection
<u>Equipment</u>: Emergency phone list. Can be available on cell phone contacts. Map to medical care facilities Operator's manual Insurance card Vehicle registration Shaw accident forms Fire Extinguishers First Aid Kit Spare tire tnd jack Flashlight Flares and/or reflective triangles shall be available in larger trucks	Competent Person (CP) / Qualified Person (QP) CP/SSHO: TBD Training Requirements (as determined by the SSHO): Site safety orientation Qualified vehicle operators Defensive driving	Daily vehicle inspections Vehicle inspections (prior to trips greater than 50 miles for HGL provided vehicles) Walk around the vehicle 360° before entering vehicle (each time)

ACTIVITY HAZARD ANALYSIS (AHA)

Activity/Work Task: General Site Work

Project Location: Blacktail Creek, Butte, MT

Contract number: 421042

Date Prepared: 7/2/2022

Prepared by: Chris Robb

Corporate H&S Reviewer: Edie Scala-Hampson

Notes: (Field Notes, Review Comments, etc.)

Overall Risk Assessment Code (RAC) (Use highest code)	**L**

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	***M***	***L***
Marginal	**H**	**M**	**M**	***L***	***L***
Negligible	**M**	**L**	**L**	***L***	***L***

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

Probability the likelihood the activity will cause a Mishap (near miss, incident or accident). Identify as: Frequent, Likely, Occasional, Seldom, or Unlikely.

Severity the outcome/degree if a mishap occurred. Identify as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

E = Extremely High Risk

H = High Risk

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L = Low Risk

Job Steps	Hazards	Controls	RAC
Review–Health and Safety (H&S) needs, communication and preparatory instructions	Behavioral: Human error- Failure to plan/warn/train. Inadequate preparation can lead to personal injuries, property damage and project delays. Employees not trained in the safe execution of their assigned task may harm themselves or others.	Readiness Review. SSHO to identify applicable portions of SSHP and include those and AHAs in site specific job training for workers. SSHO to perform onsite verification that SSHP and AHAs capture all important site hazards and controls. SSHO to verify that access to the necessary equipment, to evaluate and control site hazards, is available and complete. and in good condition (i.e. equipment, tools, PPE, materials, etc. required to perform the tasks. For example: PID with correct lamp for evaluating chemical hazards in breathing zone.	**L**

Job Steps	Hazards	Controls	RAC
	Unfamiliarity with site, general site hazards, project safety rules, chain of command, emergency procedures. Adding new personnel to work team, visitors.	Conduct training and coordination with team. New employees will be trained and proficient before they are assigned to their jobs. Visitors will receive a site safety briefing and PPE.	
	Emergency response unfamiliarity-Delay in response and treatment	SSHO to verify that emergency safety supplies and first aid supplies are available and complete. SSHO to review emergency procedures, contact numbers and evacuation plans, severe weather shelters and rally points. The SSHO will monitor weather conditions each day to plan and prepare for hazardous conditions. Work activities will be suspended prior to weather conditions becoming hazardous so that workers have ample time to seek shelter. Upon seeing lightning or hearing thunder, outdoor activities shall be suspended and personnel shall be evacuated to safe areas. SSHO to confirm that all personnel know what to do in the event of an accident (personal or property damage).	
Transportation to site and site vehicle maneuvering	Struck by: Vehicle accidents/Traffic	Prohibit cell phone use by driver while vehicle is in motion. Practice defensive driving and wear safety restraints when vehicle is in motion. Adjust vehicle per personal specifications and confirm that it is in good working order and all cargo is secured and distractions are minimized. Familiarize yourself with the route and directions. Keep vehicle speed appropriate to road conditions. Be aware of the onset of driving fatigue and take breaks as needed. Perform a walk-around vehicle inspection at least daily.	**L**
	Weather: Poor road conditions, ruts, snow, ice mud puddles, poor traction	Monitor weather conditions and consider postponing travel or decreasing speed in poor travel conditions. Match driving speed to the conditions.	
	Struck by or against: Maneuvering in tight areas/potential vehicle or personnel damage	Use a spotter to help maneuver in tight areas. Avoid backing if possible. Check all blind spots before you attempt to move vehicle. Sound horn before backing and move slowly.	

Job Steps	Hazards	Controls	RAC
Secure site	Unwanted entry: Security/Site access control	Establish positive site access control prior to on-site operations using barricades, signs, or fencing.	L
Material handling and set up	Strains, sprains, awkward bending/lifting/ positions and ergonomic hazards	Know your own limitations and ask for help if you need it. Size up the load before the lift. Use mechanical assistance or 2-person lift for loads greater than 50 pounds and for large awkward loads. Lift with the legs and keep back straight. DO NOT lift and twist torso at the same time. Confirm that the walking pathway is clear of depressions or debris. Limit repetitive awkward motions and unbalanced lifting as much as possible.	L
Working around vehicles and or earth moving Equipment	Struck-by hazards, crushing hazards, caught-between, noise-hearing loss	Select work location away from traffic. Discuss active work areas in daily briefings. Place barricades or stationary vehicles for work site protection, if necessary. Wear high visibility vest. STAY CLEAR of traffic and earth moving equipment. Make eye contact with operators of equipment to make sure they know your intentions. Prohibit machinery or equipment, requiring an operator, to run unattended. Confirm all heavy equipment has functional backup alarms. Minimize the number of ground personnel working around heavy equipment. Never position yourself between moving and fixed objects Wear hearing protection if noise levels are > 85 dBA.	L

Job Steps	Hazards	Controls	RAC
Working around/ near other trades or contractors	Hazards caused by other trades-Failure to communicate hazards (various hazards: toxic dusts, chemicals, physical hazards, biological hazards)	Coordinate with subcontractors and other personnel on a daily basis. Notify others of potential hazards posed by HGL work and ask them to do the same for us. Stop work or implement controls if the work of others poses a hazard for HGL or subcontractor personnel. Inform subcontractors of locations of warning signs, hazards and precautions that they should be taking. Provide specific hazard communication training tailored to the particular workplace. Inspect the work of subcontractors to verify safe operation and compliance with applicable requirements and require correction of deficiencies. Ask the “creating” employers (subcontractors) to correct hazards. NEVER tell the “creating” employer how to do their job, but tell subcontractors to get the hazard corrected and hold them accountable. If HGL detects a safety violation we have an obligation to see that it gets corrected by the subcontractor that created the hazard. Ensure that all site workers have the required OSHA training. Require that each subcontractor be responsible for conducting inspections of their specific operations and equipment, conducting exposure monitoring for their workers and providing SDSs, PPE, medical surveillance and specialized worker training (e.g., fork lift, excavation and trenching, fall protection, etc.). Acquire documentation.	L
	Fire	Maintain at least one dry chemical fire extinguisher having a minimum UL rating of 1A5BC on site. 10B:C should be in cab of bulldozer, crane, front-end-loader, etc. 4A:60B:C in immediate area of hot work 40-B:C in immediate re-fueling area 3A:40B:C (within 30 ft.) near generator Limit smoking to designated areas	
Working in remote areas.	Criminal activity, wild animals, falls leading to inability to self-evacuate Getting lost	Use the buddy system if possible, however if it cannot be used, follow the Lone Worker Procedure: Contact PM or alternate point of contact at work start, mid-day, and when leaving work site at end of day. Let others on site (non-HGL staff) know where you are working and establish a check in procedure. Bring a smart phone, topographic and/or site map, compass, GPS.	L

Job Steps	Hazards	Controls	RAC
	Injuries and accidents from driving/walking over soft ground and uneven and rough terrain	Choose location with level and firm soils, when possible. Have gravel added to site roads to improve traction. Maintain vehicle speed corresponding to road conditions. Watch footing when walking in mud or wet soils	
	Unhygienic conditions	Confirm that restroom facilities, if installed on site, are adequately provided and maintained. Maintain hand disinfectant, wipes, and wash stations.	
	Slip, trip, and fall hazards	Wear slip-resistant footwear. Inspect the work area for slip, trip and fall hazards Use sand or salt or slip-on traction aids to control ice slip hazards, as needed during winter months. Keep work area picked up and as clean as feasible Keep egress routes are as clear and unobstructed as possible.	
General Site Work- Working outdoors. Walking on site.	Biologicals–contact with poisonous and thorny plants, allergens, insects and	Note: All personnel have the option to complete the Voluntary	**L**

Job Steps	Hazards	Controls	RAC
	animal hazards (for example: spiders, hornets, reptiles, snakes, deer ticks (Lyme disease), mosquitoes, bird and rodent droppings, biting and stinging insects, thorny plants, etc.). Specify below any site specific details and or review APP for specific biological hazards.	Allergy/Sensitivity/Medical Questionnaire. Conduct visual inspection before work begins and note (mark) areas of poisonous vegetation, insect (hornet wasp) nests and snake habitats. Use mosquito repellent with DEET and tick repellant with permethrin, as required. Treat clothing with permethrin-based products if ticks are prevalent. Know the local fauna and review emergency preparedness measures. Review potential animal dangers specific to the site and precautions (actions to take if run-in with wild animal occurs) and treatments. Inspect your body and clothing for ticks during outdoor activity and at the end of the day. Wear light colored clothing so ticks can be more easily seen. Remove ticks right away to prevent infections. When in areas with tick potential tuck pants into socks. Wear long-sleeved shirts that should be tucked in Review information for poison ivy/oak recognition and treatment, if plants are present. Use existing footpaths when possible. Avoid walking in un-cleared areas with poison ivy or biological hazard potential. Use barrier cream and cleaning products such as Zanfel, Ivy Block, Tecnu, IvyX if poison ivy or poison oak is prevalent. • Wash hands using Ivy cleanser, prior to eating, using restroom, operating motor vehicle and after leaving the field • Do not touch face with hands or clothing while in the field • Remove contaminated work clothing with gloves. Store, bag and wash separately. Use poison ivy cleansers (not lotion soap) to clean affected skin. Lotion soaps will spread the irritant oil on larger areas of the skin. Shower immediately upon leaving work. Wear snake chaps if poisonous snakes are present.	
General Site Work in heat and sun	UV exposure–sunburn Temperature stress: heat exhaustion, stroke	Wear UVA/UVB SPF sunscreen (minimum 30 SPF) and reapply frequently. Wear hats and clothing that shield skin from direct sun. Implement heat stress controls when the heat index is greater than 75	L

Job Steps	Hazards	Controls	RAC
		degrees Fahrenheit (°F), when the temperature is 75 °F or more with relative humidity of 55% or more: Acclimatize by gradually working in heat, systematically building up tolerance. Conduct field activities in the early morning, if possible, to avoid heat. Have enough water onsite so that each worker can consume at a minimum, one quart per hour per shift. Have frequent reminders to personnel, to take water breaks so that each person can consume enough water. Provide access to shade that is reasonably close to the work area. Take breaks as necessary in shady or cool areas and hydrate. Conduct training on risk factors, signs and symptoms of heat illness, importance of hydration and acclimatization, and importance of reporting symptoms and what to do in case of heat illness emergency, and contacting emergency medical services (see APP, Heat Stress Monitoring Program). Follow the requirements for physiological monitoring as stated in the APP. (e.g., During work in temperatures above 90 adjusted temperature, perform physiological monitoring—see safety plan if wearing Tyvek for when to start monitoring.) Be conscious of individual tolerances to work in hot weather and medication contraindication for heat exposure. Monitor yourself and co-workers for signs and symptoms of heat stress.	L

Job Steps	Hazards	Controls	RAC
General site work in cold temperatures	Temperature stress: cold, hypothermia.	Institute cold stress controls when air temperature or wind chill is, or may drop below 40° Fahrenheit (F), when parts of the body are or may become immersed in cold water, and when working in snow or ice. Train employees on the dangers and symptoms of cold-related illnesses and the applicable hazard controls. Train workers on the personal factors that may increase risk such as advanced age and circulatory problems and medications. Establish a buddy system and ensure that personnel watch each other for signs of cold related illnesses. Provide a warm break area and establish a schedule for warm-up breaks and increase the frequency of warm-up breaks with decreasing temperatures. Take warm-up breaks if personnel exhibit shivering or report pain in the extremities that might be due to incipient frostbite. Prevent or minimize exposure of bare skin if temperature or wind chill is less than minus (-) 25°F. Schedule tasks to avoid long periods during which workers must sit or stand still. Adjust work schedules or tasks for new employees to permit acclimatization to the cold conditions. Encourage personnel to drink adequate quantities of water, soup, or other fluids to ensure adequate hydration. Establish emergency plans to include: immediately available dry clothing if there is a potential for personnel to be splashed or immersed in liquid.	L

Job Steps	Hazards	Controls	RAC
Repetition of work tasks for periods longer than 8 hours	Behavioral: Human error- Fatigue associated with extended work shifts including general drowsiness and also associated driving fatigue.	Operators of heavy equipment must not exceed 12 hours of duty time in any 24-hour period. Motor vehicle operators must not exceed 10 hours of driving in any 24-hour period. Do not operate motor vehicles after working for more than 12 hours during any 24-hour period. Know personal physical and psychological limitations. Stop work/driving when necessary to take breaks and hydrate. Stop work all together if fatigue endangers your safety or the safety of others. If appropriate, find a replacement for your job tasks. Schedule more demanding tasks for when endurance and alertness is best. Postpone more demanding and hazardous jobs if you are fatigued. Follow guidelines of APP for work-rest regimens under adverse conditions of heat or cold stress.	L
Completion of work shift and clean-up	Clothing contact with potentially irritant materials/insects. Take home toxics.	Decontaminate yourself and gear, as appropriate for contaminants and dust. If appropriate wear Tyvek as necessary and washable or disposable over-boots to keep personal clothing and boots, clean and free of any contaminated soils. Use liners to prevent contamination of truck. Shower immediately at end of workday. Check body for ticks, bites and signs of irritation or cuts.	L

Job Steps	Hazards	Controls	RAC
Add Steps, Hazards, and Actions to Eliminate or Minimize Hazards based on conditions encountered in the field.			

Equipment	Training	Inspection
PPE Level D: Hard hat (if there are overhead hazards) Safety glasses Safety-toed boots Work gloves/chemical resistant gloves ANSI Class 2 reflective warning vests Hearing protection, as necessary Other Equipment: Generator if needed Fire extinguishers Emergency eyewash bottle First aid kit Insect repellent–DEET and permethrin Hand tools Spill containment supplies, if needed Containers as needed Tarps GFCI Heavy duty extension cords Drinking water Weather radio/or Smart phone apps (temperature stress, noise, weather) Face coverings (if social distance cannot be maintained) Hand sanitizer Disinfectant wipes	Competent Person (CP) / Qualified Person (QP):NA CP/SSHO: TBD QP/First Aid and CPR: TBD QP/First Aid and CPR: TBD Training Requirements (as determined by the SSHO): HAZWOPER 40 hour and current refresher Supervisor training (SSHO) OSHA 30 hour (SSHO) Site safety orientation Tailgate meetings Emergency procedures Hazard communication Hearing conservation Bloodborne pathogen Applicable AHAs Fire extinguisher use Biological hazard identification and control Severe weather shelter location Lightning safety procedures Temperature stress prevention, controls, treatment	Daily inspection (SSHO): TBD Housekeeping (daily) Fire extinguisher (monthly) Vehicle inspection (daily) Equipment and tools inspection (daily and before use) Portable flexible cords or cables (daily) Eyewashes (monthly) Survey areas for poisonous plants, insects, and animals (each work area) Identify closest usable severe weather shelter (ex. tornado shelter) that is available in each work area) First Aid kit inspection every 3 months, if unopened they do not have to be opened for inspection. Requirements for Basic First Aid Unit Package Unit first aid item / Minimum Size or Volume (metric) / Minimum Size or Volume (US) / Item quantity per unit package / Unit package size Absorbent Compress: 206 cm^2 / 32 in^2 / 1 / 1 Adhesive Bandage: 2.5 x 7.5 cm / 1 x 3 in / 16 / 1 Adhesive Tape: 2.3 m / 2.5 yd (total) / 1 or 2 / 1 or 2 Antiseptic Wipe: 2.5 x 2.5 cm / 1 x 1 in. / 10 / 1 Aspirin, Individually Wrapped: 325 mg / / 2 / 2 Bandage Compress (2 in-4 in): 5 x 91 cm / 2 x 36 in. / 4 / 1 Burn Dressing: 10 x 10 cm / 4 x 4 in / 1 / 1-2 Burn Treatment: 0.9 / 1/32 fl. Oz. / 6 / 1 Cold Pack: 10 x 12.5 cm / 4 x 5 in / 1 / 1 *Combat style Tourniquet with Windlass: 95.3 x 3.8 / 37.5 x 1.5 in. width / 1 / 1 CPR Breathing Barrier: / / 1 / 1 Eye Covering, with means of attachment: 19 cm^2 / 2.9 in^2 / 2 / 1 Eye/Skin Wash: 118 ml (total) / 4 fl. oz total / 1 / 2 First Aid Guide: / / 1 / 1 Gloves, latex free: XL / XL / 2 pair / 1 Hand Sanitizer: 0.9 g / 1/32 oz. / 6 / Occlusive Dressing: 10.2 x 10.2 / 4 x 4 / 1 / 2 Roller Bandage (2 in.): 5 x 366 cm / 2 in. x 4 yd. / 2 / 1 Roller Bandage (4 in.): 10 x 366 cm / 4 in. x 4 yd. / 1 / 1 Sterile pad: 7.5 x 7.5 cm / 3 x 3 in. / 4 / 1 Triangular Bandage: 101 x 101 x 14cm / 40 x 40 x 56 in. / 1 / 1 * Required when power tools in use.

HydroGeoLogic, Inc

ACTIVITY HAZARD ANALYSIS

Activity/Work Task: Surface Soil Sampling and Hand Augering

Project Location: Blacktail Creek, Butte, MT

Contract number: 421042

Date Prepared: 7/2/2022

Prepared By: Chris Robb

Corporate Health and Safety Reviewer: Edie Scala-Hampson

Notes: (Field notes, review comments, etc.)

Overall Risk Assessment Code (RAC) (Use highest code)	**L**

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
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Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

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Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

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H = High Risk
M = Moderate Risk
L = Low Risk

Job Steps	Hazards	Controls	RAC
Determine location for set-up/load and unload/stage equipment	Traffic-Struck by hazards	Determine best access route before transporting equipment. Select location away from traffic. Place barricades for work site protection, if necessary. Wear high visibility vest.	L
	Driving over soft ground Uneven terrain	Choose location with level and firm soils.	L
Collect soil sample	Ergonomic	Use good body mechanics. Do not twist at waist when pulling. Avoid awkward hand and body positions. Maintain good fitness routine.	L
	Slip, trip and fall hazards	Wear slip resistant footwear. Look before you step to ensure secure footing. Watch for rocks and animal burrows. Keep work area picked up and as clean as feasible and free of tripping and fall hazards.	L
	Flying debris, dirt, dust, rocks	Wear safety glasses when there is a potential for flying debris. Ensure eyewash bottle is available and first aid supplies are adequate.	L

Job Steps	Hazards	Controls	RAC
Collect soil sample (continued)	Strains, sprains, awkward bending/lifts and ergonomic hazards	Size up the lift. Use proper lifting techniques. Ensure walking pathway is clear. Do not lift greater than 50 lbs. Use mechanical assistance or 2 person lift for loads heavier than 50 pounds. Limit repetitive awkward motions. Never twist or turn when lifting. Use your legs to lift and keep a straight back.	L
	Noise	Wear hearing protection if noise levels from neighboring equipment exceeds 85 dBA (if you cannot be heard speaking in a normal voice at arms distances).	L
	Struck by hazards/ Pinch points	Maintain eye contact with machine operators before. Honor exclusion zone. Conduct real-time monitoring (PID), if needed, when all operators are aware of your presence. Keep hands fingers and feet clear of moving equipment.	L
Collect Soil Samples	Inhalation and skin contact hazards	Wear chemical resistant gloves based on the identified chemicals. Boot covers and splash suit protection if necessary. Follow respirator action level dictates of SSHP.	L
	Take home toxics	Decon with soap and water. Remove all contaminated clothing and materials and leave on-site. Use plastic as a barrier for soil, truck bed or foot well contact. Practice good hygiene. Not eating or smoking until deconned. Shower as soon as possible.	L
	Unattended worker	Use “Buddy system.”	L
Put sample in preserved jar	Inhalation and skin contact with preservatives: NaOH, HNO_3, HCl	Use in well ventilated area. Wear appropriate PPE (cuffed gloves, safety glasses). Review SDS.	L
	Spills	Use absorbents and containers for spills.	L
Label and put sample in cooler	Cut hazards	Set-up stable work area for labeling samples. Wear adequate hand protection. Use care when handling glassware.	L

Job Steps	Hazards	Controls	RAC
General Site work (if not covered specifically in this AHA, refer to the General site hazards AHA)	General site hazards: Insect bites and stings. Contact dermatitis from poisonous and irritating plants (poison ivy, poison oak, and poison sumac). Vehicle traffic Severe weather Heat stress Cold stress Noise Lifting Slips, trips, falls UV hazards, etc.	See General site work AHA.	L

Job Steps	Hazards	Controls	RAC
Add Steps, Hazards, and Actions to Eliminate or Minimize Hazards based on conditions encountered in the field.			

Equipment	Training	Inspection
Personal Protective Equipment: Level D: Hard Hat Safety Glasses Safety-Toed Boots Work Gloves/ Chemical resistant gloves ANSI Class 2 reflective warning vests Hearing protection as needed Other Equipment: Generator Fire Extinguishers Emergency Eyewash First Aid Kit Insect repellant with DEET Repel Permanone™ Drinking water Smart phone apps for temperature, weather, noise, as needed	Competent Person (CP) / Qualified Person (QP): NA CP/SSHO: TBD QP/First Aid and CPR: TBD QP/First Aid and CPR: TBD Training Requirements (as determined by the SSHO): Site safety orientation Tailgate meetings Emergency procedures Hazard communication Hearing conservation MEC awareness	Daily site safety inspection (SSHO): TBD Housekeeping (daily) Eye wash equipment (weekly) Fire extinguisher (monthly) Vehicle inspection daily Equipment and tools inspection daily and before use Survey areas for poisonous plants, insects, and animals (each work area) Check body for ticks (each evening during tick season) Identify closest usable tornado shelter that is available (each work area).

HGL HydroGeoLogic, Inc

ACTIVITY HAZARD ANALYSIS

Activity/Work Task: Excavation and Trenching

Project Location: Blacktail Creek, Butte, MT

Contract Number: 421042

Date Prepared: 7/2/2022

Prepared By: Chris Robb

Corporate H&S Reviewer: Edie Scala-Hampson

Notes: (Field notes, review comments, etc.)

Overall Risk Assessment Code (RAC) (Use highest code)	L

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
Identify overhead and underground utilities. Excavation and Trenching.	Overhead utilities: arc flash and electrocution Underground utilities: electrocution, arc flash, fire, property damage Excavation/Trenching hazards.	Complete a Site Layout Plan prior to mobilizing the equipment. The plan must identify all overhead and underground hazards in the active work areas and travel routes. Observe the minimum distances from electrical lines (see APP). Assume power lines are energized unless verified to be de-energized and visibly grounded. Maintain clearance distances as stated in APP when operating beneath a power line that has not been verified as de-energized and grounded. Erect a high-visibility elevated warning line or barricade at the minimum approach distance. Train each work crew member in the electrocution hazards and emergency procedures associated with energized power lines. Remain aware of overhead power lines – use spotters when necessary	L

Job Steps	Hazards	Controls	RAC
Identify underground utilities. Complete utility avoidance checklist.	Underground utilities: electrocution, arc flash, fire, property damage.	Follow the procedure for intrusive activities in the APP and SOP 411.03 Subsurface utility avoidance. Complete a dig permit prior to mobilizing equipment. Use subcontractor utility locator and/or private utility locator if there is uncertainty regarding the presence or location of high-hazard (gas, high voltage) or high-value utilities. Have high-hazard utilities turned off and locked out if possible. Walk the excavation area to visually verify that the identified utility locations are consistent with visible clues like power poles, depressions over old trenches, etc. Continuously expose (daylight) high-hazard or high-value utilities that are within the footprint or within 5 feet of the edge of planned excavation or if working in a residential or high population area. Use low impact techniques such as shovel or hand auger or hydrovacing, or air knifing. Do not use drilling equipment within 6 inches of high-hazard utilities. Expose other utilities, using low-impact techniques, at least every 10 feet to confirm location and depth and route do not change. Verify if there any subsurface obstructions that will prevent reaching a depth of 5 feet using low-impact techniques, if obstructions exist, verify that the obstruction itself is not a utility (for example, a concrete sewer pipe versus concrete rubble). Conversely, if there is a credible probability that utilities are present at depths greater than 5 feet, the low-impact excavation should be continued to greater depths. It is not permissible to omit low-impact excavation due to a lack of suitable equipment. Maintain and protect markings for utility locations during the work. CAUTION: If utility markings are removed or if the location or boundaries of the activity change, repeat locating processes and replace markings. Many utility incidents occur when the boundaries of excavations are changed. Follow the procedures below if a utility is damaged during the work (refer to the project Health and Safety Plan or Accident Prevention Plan for project contact information): • If a gas line has been breached, shut down all nearby equipment that might provide an ignition source. • Evacuate the immediate area of the breach unless the breached item clearly poses no hazard to personnel as determined by the SSHO. • Notify the owner/manager of the utility and emergency services (as appropriate) immediately. Note that in many cases contacting the public utility locating service (using One Call 811, or going online to https://call811.com/) will notify the member utility. In some states it is required by law to notify One Call. • If a buried electrical line is cut or damaged, call the power company emergency number for instructions. • Notify the HGL Project Manager and H&S Director. • Do not proceed with activities until the situation has been assessed by qualified H&S or utility owner personnel and permission to resume work has been granted by the Project Manager and H&S Director.	L
AHA Excavation and Trenching		Review SOP Subsurface Utility Avoidance SOP 411.03 and complete the utility avoidance checklist.	

Job Steps	Hazards	Controls	RAC
	Dump truck operations.	Inspect trucks daily, paying attention to tire condition, tire pressure, and leaking hydraulic fluid. Re-evaluate overhead hazards prior to allowing dump trucks onto the project site. Barricade areas with overhead hazards with caution tape to prevent dump bed from contacting. Observe minimum distances from electrical lines (see APP). In areas where it is not feasible to use barricades, then spotters and overhead hazard warning signs must be provided. Confirm that trucks have working backup alarms. Wear seat belts while trucks are in motion at the project site. Assist trucks when backing is necessary with flag persons.	L
Identify overhead and underground utilities.	Dump truck operations (continued).	Obey traffic control signage and flag persons. Do not allow trucks to raise beds on uneven surfaces or in soft areas where the tires will sink. Prohibit ground personnel near trucks when beds are raised. Stay away from pinch hazards. Lower dump beds before moving trucks. Perform decontamination of dump trucks if contaminated materials are contacted.	L
Excavation and Trenching	Excavation collapse, engulfment or entrapment	Follow the Excavation/Trenching Plan Use a competent person to inspect and monitor the excavation competent person (at least daily and more frequently when conditions change, such as rain). Document inspection on the Excavation Inspection form. Document soils testing for soil classification on the Soils Classification Worksheet. No competent person required, no entry into any excavation. Slope or bench all excavations greater than 5 feet deep, that personnel will enter. Slope or bench to 34 degrees from the horizontal (a horizontal to vertical ratio of 1.5:1). Keep soils, equipment, and materials at least 2 feet from the face of excavations. Provide walkways and guard rails when personnel must cross over trenches. Provide ladders in excavations >4 feet deep, so that personnel do not have greater than 25 feet of lateral travel to exit excavations.	

Job Steps	Hazards	Controls	RAC
Trencher use	Contact with Rotating Parts Struck by Flying Objects Slips and Falls.	Check machine before operating. Machine must be in good operating condition and all safety equipment installed and functioning properly. Wear proper PPE. Confine long hair and avoid jewelry such as rings, wristwatches, necklaces, or bracelets. Keep spectators away. Keep steps clear of objects and debris which may cause difficulties stepping on or off the machine. Improper use of steps, ladders, and platforms can cause falls. Face the machine when mounting and dismounting. Maintain a 3-point hand/foot contact with the access system. Keep all handrails in place. Use shutdown procedure before servicing, cleaning, repairing or transporting machine. Keep hands, feet, and clothing away from power-driven parts. Use proper lockout/tagout procedures when working on machine. Moving parts can crush. Keep all safety signs and decals in place and in good condition.	L
Excavation and Trenching.	Hand injuries.	Inspect Items to be handled shall be for sharp edges, splinters, burrs, rough surfaces, etc. prior to being handled. Wear leather gloves when handling materials with sharp edges, splinters, burrs, rough surfaces, etc. Instruct personnel to avoid pinch point hazards.	L
Excavation and Trenching.	Use of mechanical equipment.	Ensure that only qualified personnel are permitted to operate equipment Inspect mechanical equipment daily. Note deficiencies in equipment on the inspection form. Equipment found to be unsafe shall be taken out of service. Instruct equipment operators to wear safety belts and hearing protection (>85 dBA). Operate all equipment at safe speeds and in a safe manner. Instruct ground personnel to NOT position themselves between equipment and stationary objects and to stay out of swing radius. Approach equipment only after receiving a signal from the operator.	L
	Dust.	Control dust by maintaining equipment operation rates. Apply water. Stay out of dust and work from upwind when possible.	L
	Struck by and against (vehicles and	Wear PPE with high visibility vests when walking or working near moving equipment or vehicles.	L

Job Steps	Hazards	Controls	RAC
	equipment).	Maintain a safe distance from operations. Stay clear of swing radius of the equipment. Do not assume equipment and vehicle operators have seen you unless operator has made eye contact with you and signaled to you. Use warning signs and signalpersons as necessary.	
Excavation and Trenching.	Use of ladders.	Train personnel in the safe use of ladders. Use only Type I ladders. Inspect ladders before each use to confirm they in good condition, Erect ladders on level surfaces. Instruct personnel to not overextend their reach while working off ladders. Instruct personnel to not stand on the top two rungs of ladders. Tie off extension ladders when used. When tying-off is impractical, then other personnel shall be used to steady the ladder.	**L**
Excavation and Trenching.	Use of pumps and hoses.	Review operator's manual for recommended operating procedures. Utilize appropriate PPE and always wear safety glasses and face shield when disconnecting hoses. Keep away from hot exhaust and hot surfaces. Use proper lifting procedures for pumps and hoses. Get help as necessary. Maintain control of hose ends when moving hoses to prevent striking self or other workers. Secure hoses with lashing to prevent whipping - do not allow hoses to whip. Identify and avoid pinch points.	**L**
	General site hazards: Insect bites and stings. Contact dermatitis from poisonous and irritating plants (poison ivy, poison oak, and poison sumac). Vehicle traffic Severe weather Heat stress Cold stress Noise. Lifting Slips, trips, falls UV hazards, etc.	See AHA General Site Work	**L**

Job Steps	Hazards	Controls	RAC
Excavation and Trenching.	Use of portable generators.	Review operator manual before use. Check operator's manual for generator grounding requirements, if any. Keep the generator dry and do not use in rain or wet conditions. Dry your hands (if wet) before touching the generator. Use a heavy duty, outdoor-rated extension cord that is rated (in watts or amps) at least equal to the sum of the connected appliance loads (S, ST, SO, STO, SJ, SJO, SJT, SJOT).Check that the entire cord is free of cuts or tears and that the plug has all three prongs, especially a grounding pin. A GFCI Circuit protector will always be used between the generator and the power cord. Turn off generator before refueling. Let it cool down. Gasoline spilled on hot engine parts could ignite. Do not use portable generators in areas with dry grass unless area has been adequately cleared of the grass. Position an A 4-A:80-B:C fire extinguisher, so that it is readily available, in locations where a generator is being used. Use hearing protection when working near a generator. Lift with legs and straight back when moving portable generators. Do not use indoors or in areas with poor ventilation without performing air monitoring for carbon monoxide.	**L**

Job Steps	Hazards	Controls	RAC
Add Steps, Hazards, and Actions to Eliminate or Minimize Hazards based on conditions encountered in the field.			

Equipment	Training	Inspection
Personal Protective Equipment: Hard Hat Safety Glasses with side shields Safety-Toed Boots Work Gloves Class 2 high visibility vests Hearing protection, as necessary Other Equipment: Air monitoring instruments Fire Extinguishers First Aid Kit GFCI Heavy duty extension cords (S, ST, SO, STO, SJ, SJO, SJT, SJOT) Drinking water Smart phone apps for weather, temperature, noise Ladders Caution tape Excavation perimeter protection Tag lines Insect repellant with DEET (Deep Woods Off™ or equivalent) Repel Permanone™	Competent Person (CP) / Qualified Person (QP):NA CP/SSHO: TBD QP/First Aid and CPR: TBD QP/First Aid and CPR : TBD CP/Excavation: NA QP/Signal Person: TBD Training Requirements (as determined by the SSHO): Site safety orientation Emergency procedures Hazard communication Hearing conservation MEC awareness Applicable AHAs Qualified equipment operators Lifting/back safety Ladder use Fall protection Fire extinguisher use Biological hazard identification and control Tornado shelter location Lightning safety procedures Heat stress prevention and heat stroke treatment Cold stress prevention	Daily site safety inspection (SSHO): TBD Daily site safety inspection (QCO):TBD Mechanized equipment (U.S. Army Corps of Engineers form prior to use) Mechanized equipment (daily) Overhead utilities (prior to operating equipment in area) Locate underground utilities (prior to intrusive activities) Excavation inspection (daily) Housekeeping (daily) Ladder (before each use) Fire extinguisher (monthly) Vehicle inspection (daily) Equipment and tools inspection (daily and before use) Survey areas for poisonous plants, insects, and animals (each work area) Check body for ticks (each evening during tick season) Identify closest usable tornado shelter that is available (each work area)

HGL
HydroGeoLogic, Inc

ACTIVITY HAZARD ANALYSIS

Activity/Work Task: Use of XRF Instrument for Lead in Soil Determination

Project Location: Blacktail Creek, Butte, MT

Contract Number: 421042

Date Prepared: 7/2/2022

Prepared By: Chris Robb

Corporate H&S Reviewer: Edie Scala-Hampson

Notes: (Field Notes, review comments, etc.)

Overall Risk Assessment Code (RAC) (Use highest code)	**L**

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Job Steps	Hazards	Controls	RAC
Determine location for set up/staging equipment	Traffic-Struck by hazards	Select location away from traffic. Place barricades for work site protection, if necessary. Wear high visibility vest. Stay clear of traffic and equipment.	L
	Driving over soft ground Uneven terrain	Choose location with level and firm soils.	L
	Site access control-unwanted entry	Maintain a constant watch for intrusion of unauthorized personnel.	L
Use of XRF Instrument for Lead in Soil Determination	Employee exposure to radiation	Require that only trained XRF technicians be allowed to operate the instrument. Improper usage may circumvent safety protections and could potentially cause harm to the user. Pay attention to all warning labels and operate according to instructions. Heed warnings. The x-rays emitted from the XRF are capable of passing straight through many different materials (such as wood) without losing strength. Therefore it is very important to be mindful of where the device is aiming whenever performing an analysis. The beam is capable of passing through the sample material and tables upon which the samples are placed. A small amount of the X-rays are scattered back towards the unit. Therefore, it is important to keep hands away from the sample window and the metal frontal portion of the unit.	L*

Job Steps	Hazards	Controls	RAC
Use of XRF Instrument for Lead in Soil Determination	Employee exposure to radiation (continued)	Hold the unit by the handle and analyze materials only when they are lying on the floor or a table. The devices should never be used to analyze material that is being held in a person's hand. Always be certain that the beam is not pointed at anyone and assume that the beam may pass through testing material and any table the testing material upon which it is placed.	L
	Public exposure to radiation	Establish controlled areas for storage of the instrument. Access should be restricted to limit potential exposure to ionizing radiation. Institute controls for when the instrument is in use. The instrument should remain in direct control of the operator. Provide proper transportation, maintenance, and calibration of the instrument to prevent inadvertent radiation leakage.(Review rental company instructions). Enforce time, distance and shielding policies.	L
	Awkward postures: Bending, lifting, stooping	Maintain personal fitness. Avoid repetitive motions and unbalanced lifting as much as practical. Know your own limitations.	L
	Electric shock	Allow only trained XRF technicians to operate the instrument. Allow only authorized manufacturer technicians to service the instrument. Opening or removing covers may present an exposure to electric shock. Use the correct external power source.	L
Wrap up	Take home toxics-Pb Contaminated PPE	Decon at the site. Leave all PPE contaminated with Pb at site. DO NOT take contaminated clothing, boots into trucks or home. Store contaminated materials in accordance with all regulations. Shower immediately at end of work day.	L
General site work	Environmental Hazards • Biologicals (plants, insects, wild life) • Adverse weather • Temperature stresses • UV hazards	Refer to General Site Work AHA.	L

Job Steps	Hazards	Controls	RAC
Add Steps, Hazards, and Actions to Eliminate or Minimize Hazards based on conditions encountered in the field.			

***EXAMPLE OF INSTRUMENT USAGE AND RADIATION EXPOSURE AND RATIONALE FOR A RAC OF L**
Normal Operation - Dose to Hand:
User analyzes samples according to standard operating procedures.
Assumption:
Operator using system with x-ray tube ON for 8 hours/day, 5 days/week, 50 weeks/year. (Practically constant usage).
Maximum exposure is to operator's hand, at the trigger. Exposure is < 0.1 mrem/hr. Annual exposure to hand is then < 200 mrem (2mSv).
US: Maximum exposure under OSHA regulations is 50,000 mrem annually. Thus continuous operation provides a dose that is at least 250 times lower than maximum allowed by OSHA.

Equipment	Training	Inspection
Personal Protective Equipment: Level D: Hard Hat Safety Glasses Safety-Toed Boots Work Gloves/ Chemical resistant gloves ANSI Class 2 reflective warning vests Modified Level D: Refer to SSHP. Other Equipment: Generator Fire Extinguishers Emergency Eyewash First Aid Kit Insect repellant with DEET Repel Permanone™ Hand tools Spill containment supplies First aid supplies Containers as needed Tarps GFCI Heavy duty ext. cords Drinking water Weather radio and/or smart phone apps for weather and temperature Heat stress monitoring Soil jars/preservatives/coolers	Competent Person (CP) / Qualified Person (QP): NA CP/SSHO: TBD QP/First Aid and CPR: TBD QP/First Aid and CPR: TBD Training Requirements (as determined by the SSHO): HAZWOPER 40-Hour Site safety orientation Tailgate Safety Meetings Emergency procedures Hazard communication Hearing conservation MEC awareness Applicable AHAs Fire extinguisher use Biological hazard identification and control Tornado shelter location Lightning safety procedures Heat stress prevention and heat stroke treatment Cold stress prevention	Daily site safety inspection (SSHO): TBD Housekeeping (daily) Eye wash equipment (weekly) Fire extinguisher (monthly) Vehicle inspection daily Equipment and tools inspection daily and before use Survey areas for poisonous plants, insects, and animals (each work area) Check body for ticks (each evening during tick season) Identify closest usable tornado shelter that is available (each work area).

HGL HydroGeoLogic, Inc

ACTIVITY HAZARD ANALYSIS

Activity/Work Task: Water Level Gauging

Project Location: Blacktail Creek, Butte, MT

Contract Number: 421042

Date Prepared: 7/2/2022

Prepared By: Chris Robb

Corporate H&S Reviewer: Edie Scala-Hampson

Notes: (Field notes, review comments, etc.)

Overall Risk Assessment Code (RAC) (Use highest code)	L

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Job Steps	Hazards	Controls	RAC
Mobilization to water level sites. Off-road mobilization.	Traffic Road hazards. Possible examples include: ruts, snow, ice, puddles, poor traction. Maneuvering in tight areas/potential vehicle or personnel damage. General site hazards: Insect bites and stings .Contact dermatitis from poisonous and irritating plants (poison ivy, poison oak, and poison sumac). Severe weather Heat stress Cold stress Noise Lifting Slips, trips, falls UV hazards, etc.	See AHA General site work.	**L**

Job Steps	Hazards	Controls	RAC
Taking water levels.	Contamination exposure	Wear nitrile gloves. Decontaminate water level meter between wells.	L
Taking water levels.	Inhalation of contaminants.	Measure with PID for VOCs if previous monitoring results are not available or if they indicate the presence of vapors. Monitor for methane at landfill monitoring wells. Follow PPE dictates of SSHP based on airborne measurements and action levels. Conduct real-time air monitoring as required by SSHP. Obtain or review chemical information on COIs and review SDSs. Open each well for a brief period before work is conducted to allow any vapors to clear. Follow respirator action level dictates of SSHP.	L
			L

Job Steps	Hazards	Controls	RAC
Add Steps, Hazards, and Actions to Eliminate or Minimize Hazards based on conditions encountered in the field.			

Equipment	Training	Inspection
Personal Protective Equipment: Hard Hat Safety Glasses Safety-Toed Boots Work Gloves/ Chemical resistant gloves ANSI Class 2 reflective warning vests Modified Level D: Refer to SSHP. Other Equipment: Fire Extinguishers Emergency Eyewash First Aid Kit Insect repellant with DEET Repel Permanone™ Hand tools Drinking water Weather radio and/or smart phone apps for weather and temperature Heat stress monitoring Water level meters PID Four Gas Meter for landfill water level gauging only	Competent Person (CP) / Qualified Person (QP):NA CP/SSHO: TBD QP/First Aid and CPR: TBD QP/First Aid and CPR: TBD Training Requirements (as determined by the SSHO): HAZWOPER 40-Hour Site safety orientation Tailgate Safety Meetings Emergency procedures Hazard communication Applicable AHAs Fall protection Fire extinguisher use Biological hazard identification and control Tornado shelter location Lightning safety procedures Heat stress prevention and heat stroke treatment Cold stress prevention	Daily site safety inspection (SSHO): TBD Housekeeping (daily) Fire extinguisher (monthly) Vehicle inspection daily Equipment and tools inspection daily and before use Survey areas for poisonous plants, insects, and animals (each work area) Check body for ticks Identify closest usable tornado shelter that is available (each work area).

HydroGeoLogic, Inc

ACTIVITY HAZARD ANALYSIS (AHA)

Activity/Work Task: Coronavirus practices to prevent exposure

Project Location: Blacktail Creek, Butte, MT

Contract number: 421042

Date Prepared: 7/2/2022

Prepared by: Steve Davis CIH, CSP

Modified by: Chris Robb

Notes: (Field Notes, Review Comments, etc.)

Overall Risk Assessment Code (RAC) (Use highest code)	**L**

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	***M***	***L***
Marginal	**H**	**M**	**M**	***L***	***L***
Negligible	**M**	**L**	**L**	***L***	***L***

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

Probability the likelihood the activity will cause a Mishap (near miss, incident, or accident). Identify as: Frequent, Likely, Occasional, Seldom, or Unlikely.

Severity the outcome/degree if a mishap occurred. Identify as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
Mobilization to site	Failure to plan/warn/train. Infection	Abide by CDC guidance and local or project requirements for vaccinations, masks, testing or other safety protocols. Readiness Review. Site Safety and Health Officer (SSHO) to identify potential infection sources due to the task, location, and surrounding areas. Include discussion of same in site specific training. SSHO to identify and implement any applicable local or state requirements for infection control measures. SSHO to discuss Coronavirus hazards and controls in the readiness review and initial tailgate safety meeting and provide any updated CDC guidance. The meetings should be held via teleconference, outdoors, or in a space large enough to allow space between participants. SSHO to verify that the necessary equipment and supplies are available and in good condition: face coverings, disinfectant, gloves, safety glasses. Meetings must include at least the topics listed below.	**L**

Job Steps	Hazards	Controls	RAC
Mobilization to site (continued)	Failure to plan/warn/train Infection (continued)	1. The virus is highly contagious and is spread primarily by airborne droplets ejected when infected people talk, cough, sneeze, or possibly just breathe. Most of these droplets settle out of the air within about 6 feet. 2. The most frequent symptoms are fever, coughing, shortness of breath. 3. Current CDC guidance. 4. Do not share tools, pens, or anything else without disinfecting between uses. Use your own pen. 5. Site personnel are required to report: • Potential exposure to infected people • Symptoms of illness • A positive Covid-19 test. 6. Site personnel should consider bringing personal thermometers to monitor their temperatures. 7. When possible, limit vehicle occupancy to 2 people and adjust vehicle's air handling system to maximize outside air. Both occupants must wear face coverings. 8. Discuss and follow any state and local restrictions on gatherings (# of people that can congregate) and closings. Bring your own food and drinks. 9. See HGL COVID-19 information: https://hydrogeologic.sharepoint.com/sites/COVID-19 CDC document How It Spreads: https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/how-covid-spreads.html	L

Job Steps	Hazards	Controls	RAC
Travel to site	Infection Fire	All travelers must wear masks over nose and mouth in airports, on planes, and on any public transportation. Disinfect high contact surfaces in and around plane seats with disinfectant wipes. Adjust seat air ventilation to high flow. If renting a vehicle personnel should wipe the steering wheel and other high-contact surfaces with disinfectant. Any cloth or tissue saturated with disinfectant such as >60% isopropyl alcohol, >120 proof clear liquor (keep sealed or in trunk when in transit), or commercial disinfectant. Concentrated alcohol is flammable so use in well ventilated area away from ignition sources. Any disinfectant product from a reputable supplier should inactivate the virus. Use gloves or wash or disinfect hands after touching commonly handled items such as gas dispenser handles. Use disinfectants in area with good ventilation and away from ignition sources.	L
Hotel stays	Infection	Request no maid service for short stays. Minimize time spent in public areas like the hotel lobby, exercise facility, or restaurants. Practice social distancing with hotel staff and other guests. Wipe high-contact areas like doorknobs and countertops with disinfectant. Any cloth or tissue saturated with disinfectant such as >60% isopropyl alcohol, >120 proof clear liquor, or commercial disinfectant spray. Concentrated alcohol is flammable so use in well ventilated area away from ignition sources. Note that any disinfectant from a reputable supplier (Lysol, Clorox) is likely to be effective on Coronavirus.	L
Transportation or shipment of disinfectants	Violation of Department of Transportation hazardous materials shipping regulations Spills, leaks, and fires	Comply with airline requirements for transporting disinfectants in carry-on or checked luggage. Transport disinfectants in vehicles in compliance with DOT Materials of Trade exception: • Materials in labeled leak-tight containers, • Containers secured so that they do not move while in transit, driver aware of hazardous materials in vehicle. • No more than 5 gallons of flammable liquid in any single container. If disinfectants must be shipped (for example by FedEx) use ground shipment.	L

Job Steps	Hazards	Controls	RAC
Tasks that involve large crews and travel to distant locations	Logistical issues related to managing infected personnel far from home	HGL's Project Manager (PM), in concert with senior management, will provide coordination and support to facilitate isolation/quarantine, as necessary. If suspected infected personnel must be within 6 feet of other personnel (in a car, for instance) the suspected infected individual and any personnel within a 6-foot radius must wear a N95 or KN95 mask (without exhalation valve) or double layer surgical mask with cloth mask on top.	L
Site tasks	Infection or spread of infection	• Stay at least 6 feet from other personnel unless closer spacing is necessary for the work (and maintain this spacing during breaks and lunch). If unable to maintain 6-foot distance, wear a face mask over mouth and nose. • Hold tailgate safety meetings outdoors or in a space large enough to allow separation. • Do not share pens or tools. • Do not pass or exchange items like paperwork or clipboards. • When possible, limit vehicle occupancy to two if possible and set the vehicle's air handling system to maximize intake of outside air. The driver and passenger should both wear face coverings. • Avoid touching high contact surfaces like shared pens, toilet valve handles, doorknobs, etc. with your bare skin and if you cannot avoid that, wash, or disinfect your hands afterward. • Avoid handshakes and hugs. • Provide handwashing station or hand sanitizer and use often. • Disinfect high-contact surfaces (i.e. door handles, copy machine keypad, coffee pot, refrigerator door handle, etc.) frequently.	L
Site tasks (continued)	Infection or spread of infection (continued)	• Perform a self-assessment each morning and if symptoms like fever, cough, or shortness of breath that might indicate infection are present, self-quarantine and notify the SSHO, supervisor and HRhelpline@hgl.com by email or phone call. The SSHO can also notify Supervisor, PM and Human Resources (HR). SSHO may not release the name of personnel to others without coordination with HR. Follow current CDC guidelines for isolation/quarantine and testing. • Surfaces that have been touched by personnel who are ill should be thoroughly disinfected (door handles, vehicles) or disposed (pens, pencils, hard hat liners) to minimize potential for disease transmission. Enclosed areas such as vehicles or equipment cabs will be placed under lockout/tag out procedures for 24 hours to remove airborne virus particles, then thoroughly disinfected prior to return to service.	L

Job Steps	Hazards	Controls	RAC
Use of sanitizers and cleaning sprays	Skin irritations-dermatitis, increased risk of eczema	When cleaning high contact surfaces wear gloves. When sanitizing hands, if soap and water cleaning is not available-wait for the sanitizer to dry completely before donning gloves. Sanitizer can breakdown the skin making an individual more prone to chemical and biological exposures. Sanitizers in close contact with the skin may also cause dermatitis. Use hand sanitizers from reputable manufacturers. Conduct hazard communication training on disinfectants that are being used.	L

Job Steps	Hazards	Controls	RAC
Add Steps, Hazards, and Actions to Eliminate or Minimize Hazards based on conditions encountered in the field.			

Equipment	Training	Inspection
PPE Level D: Hard hat (if there are overhead hazards) Safety glasses Safety-toed boots Work gloves/chemical resistant gloves Other Equipment: Face coverings Hand sanitizer Disinfectant wipes	Competent Person (CP) / Qualified Person (QP):NA CP/SSHO: TBD Training Requirements (as determined by the SSHO): Tailgate meetings Emergency procedures Hazard communication	Daily inspection (SSHO): TBD Housekeeping (daily) Hand washing station or hand sanitizer solution available and used. Distancing being practiced. Do any personnel show signs of infection? SSHO to notify Project Manager and HR of any reports or signs of infection immediately. SSHO is not to provide names of involved personnel to others without authorization from HR. HR.

ACTIVITY HAZARD ANALYSIS

Activity/Work Task: Mobilization/Demobilization (includes set-up, take down, and staging of equipment

Project Location: Blacktail Creek, Butte, MT

Contract number: 421042

Date Prepared: 7/2/2022

Prepared By: Chris Robb

Corporate H&S Reviewer: Edie Scala-Hampson

Notes: (Field notes, review comments, etc.)

Overall Risk Assessment Code (RAC) (Use highest code)	L

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. Review-Health and Safety needs	Inadequate preparation which can lead to the pain and suffering of an accident or personal injury	Confirm all field personnel understand the project hazards and hazard controls and are trained in the procedures corresponding to work assignments. Conduct pre-entry H&S briefing. Confirm all site hazards are recognized. Confirm all necessary equipment to evaluate and control site hazards is available, calibrated and in good working condition. Confirm applicable engineering, administrative and personal protective equipment (PPE) controls are ready to be implemented as needed. Confirm emergency safety and first aid supplies are available. Review emergency procedures and evacuation plans.	L

Job Steps	Hazards	Controls	RAC
2. Mobilize Equipment, Tools and Safety Gear/Demob same.	Strains, sprains, awkward bending/lifts and ergonomic hazards	Move the load inside the truck as close to the edge of the bed as possible to be ready for unloading/ loading Test the load first by nudging the item or container to estimate its weight and to determine if it is able to be moved alone. Seek assistance in moving the object or load if it is heavier than 50 pounds. Slide the load across the track bed, do not lift and move. Move obstructions inside the truck to allow the load to slide across the truck bed. Use a step stool or step ladder to gain access to bed. Use proper lifting techniques. Lift with legs and a straight back. Do not twist while carrying a load. Move feet to avoid twisting. Know your limitations Ensure walking pathway is clear Do not lift greater than 50 pounds without mechanical assistance or 2 man lift Limit repetitive awkward motions See General Site Work AHA	L
3. Travel	Traffic (road and site traffic)	Adjust seat and mirrors to ensure that you can reach controls and see behind you. Inspect vehicle to confirm it is in good working order and all cargo is secured and distractions are minimized. Familiarize yourself with the route and directions.	L
4. On-site Mobilization/Demob • Determine location for set up/staging equipment. Determine strategy for demob. • Develop capability at the site, to include installation of office/equipment storage trailers, etc., as needed • Set up/ take down trailers and other support services, as need	Traffic-Struck by hazards	Select location away from traffic Place barricades for work site protection, if necessary Wear high visibility vest Stay clear of traffic and equipment. Have all necessary PPE (hardhat, safety glasses, hearing protection, vest, etc)	L
	Driving over soft ground Uneven and rough terrain	Choose location with level and firm soils	
	Site access control-unwanted entry	Use barricades or caution tape to mark the work area if there is a potential for intrusion by unauthorized personnel	
	Electric shock	Require that all electrical power hook up, installations and disconnections be made or certified by a qualified electrician who will provide written certification of installation and grounding.	
5. Removal and transport of equipment and supplies from the site	Take home toxics	Decontaminate equipment and clothing as needed to minimize transfer of contaminants. Do not bring contaminated PPE or boots into truck. Use liners to prevent contamination of truck	L
	Same hazards as in step 4 above	See action to eliminate or minimize hazards in step 4	

Job Steps	Hazards	Controls	RAC
6. General site work	General site hazards: Insect bites and stings .Contact dermatitis from poisonous and irritating plants (poison ivy, poison oak, and poison sumac). Vehicle traffic Severe weather Heat stress Cold stress Noise. Lifting Slips, trips, falls UV hazards, etc.	Refer to General Site Work AHA Pack what you will need for control of hazards	L

Job Steps	Hazards	Controls	RAC
Add Steps, Hazards, and Actions to Eliminate or Minimize Hazards based on conditions encountered in the field.			

Equipment	Training	Inspection
Personal Protective Equipment: Level D: Hard Hat Safety Glasses Safety-Toed Boots Work Gloves/ Chemical resistant gloves ANSI Class 2 reflective warning vests Other Equipment: Generator Fire Extinguishers Emergency Eyewash First Aid Kit Insect repellant with DEET Repel Permanone™ Hand tools Spill containment supplies First aid supplies Containers as needed Tarps GFCI Heavy duty ext. cords Drinking water Weather radio Heat stress monitoring Wind sock Sampling equipment: including pumps, pump controllers, PID/OVM, water level probe, misc. hand tools	Competent Person (CP) / Qualified Person (QP): NA CP/SSHO: TBD QP/First Aid and CPR: TBD QP/First Aid and CPR: TBD Training Requirements (as determined by the SSHO): HAZWOPER 40 hour Site safety orientation Tailgate meetings Emergency procedures Hazard communication Hearing conservation Applicable AHAs Fire extinguisher use Biological hazard identification and control Tornado shelter location Lightning safety procedures Heat stress prevention and heat stroke treatment Cold stress prevention	Daily site safety inspection (SSHO): TBD Housekeeping (daily) Eye wash equipment (weekly) Fire extinguisher (monthly) Vehicle inspection daily Equipment and tools inspection daily and before use Survey areas for poisonous plants, insects, and animals (each work area) Check body for ticks (each evening during tick season) Identify closest usable tornado shelter that is available (each work area).

HydroGeoLogic, Inc

ACTIVITY HAZARD ANALYSIS

Activity/Work Task: Decontamination of Equipment

Project Location: Blacktail Creek, Butte, MT

Contract number: 421042

Date Prepared: July 2, 2022

Prepared by: Chris Robb

Corporate H&S Reviewer: Edie Scala-Hampson

Notes: (Field notes, review comments, etc.)

Overall Risk Assessment Code (RAC) (Use highest code)	L

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Job Steps	Hazards	Controls	RAC
Determine location for set up	Traffic-Struck by hazards	• Select location away from traffic • Place barricades for work site protection, if necessary • Keep all unnecessary personnel out of the work area and in an upwind location • Wear high visibility vest	L
	Driving over soft ground Uneven terrain	Choose location with level and firm soils	L

Job Steps	Hazards	Controls	RAC
Movement to and in the DECON area	Contact with heavy equipment-struck by hazards Vehicular and pedestrian traffic	• Shut down all machinery or equipment by positive means in order to prevent its operation while decontamination is being done. • Lower and block bulldozer and scraper blades, end-loader bucket and similar equipment (if applicable). • Prohibit unattended machinery or equipment that has not been turned off. • Prohibit getting off or on any equipment while it is in motion • Require all mobile equipment be equipped with back up alarm. Confirm operation. • Use signs, barricades, and other traffic control devices as necessary. • Determine if supplemental lighting will be needed in low light conditions. • Wear high visibility vests when performing work within the decon area. • Use long-handled brushes, brooms or other appropriate device to remove loose materials at dry decon; hand brushing will not be permitted. • Require the driver or operator to set brakes and keep the dry decon personnel in view at all times. • Require equipment operators and truck drivers to not move a stopped vehicle that is subject to a ground-man's decon activity except by the signal of the individual who directed the vehicle to stop.. • Require trucks to pull out of dry decon at a moderate speed with attention to other traffic areas and ground personnel in the support area.	L

Job Steps	Hazards	Controls	RAC
	Heat Stress: Exposure to high ambient temperatures See also General Site Work AHA	• Acclimatize to work in hot weather by gradually working in heat and taking more frequent breaks, systematically building up tolerance to heat. • Conduct field activities in the early morning if possible to avoid heat or inclement weather. • Have enough water onsite so that each worker can consume at a minimum, one quart per hour per shift. • Review with personnel, by frequent reminders, to take water breaks so that each person can consume enough water. • Provide access to shade (i.e., blockage from direct sunlight), that is reasonably close to the work area. Keep in mind that a vehicle or other enclosed area with no air conditioning is NOT considered shade. The area must be a well-ventilated area or have air conditioning. • Conduct training on risk factors, signs and symptoms of heat illness, importance of hydration and acclimatization, and importance of reporting symptoms and what to do in case of heat illness emergency, and contacting emergency medical services (see APP,Heat Stress Monitoring Plan). • Follow the requirements for physiological monitoring. (e.g., During work in temperatures above 90 adjusted temperature, perform physiological monitoring—see safety plan if wearing Tyvek for when to start monitoring) and document on the heat stress physiological monitoring form. • Be conscious of your individual tolerance to work in hot weather and • Monitor yourself and co-workers for signs and symptoms of heat stress. Take breaks as necessary in shady or cool areas and drink plenty of liquids.	

Job Steps	Hazards	Controls	RAC
Decontamination	Exposure / Inhalation & Contact with Hazardous Substances Exposure/ High noise levels Struck by- flying debris	• Perform Dry decontamination dry in the Exclusion Zone • Remain out of the line of fire of dust or contaminated soils while using hand tools • Stage equipment, to the maximum extent possible, to avoid contamination (i.e., running on clean or overburden soils). • Position decon area to minimize potential for cross-contamination or release of any contamination outside the EZ areas. • Decon from greater contaminated area to a lesser-contaminated area. • Lay down Poly or a composite mat to minimize the potential of re-contaminating the equipment while moving it out of the EZ • Decontaminate a grossly contaminated piece of equipment, (dry) before it is moved from the EZ to the Decon pad • Provide hearing protection on site and require employees to be in a hearing conservation program if exposed to noise above 85 dBA TWA. • Use engineering controls (i.e., guards, mufflers, distance) to reduce worker exposure to noise. • Conduct noise surveys on activities in question. • Place signs to notify employees of high noise areas (85 dBA) where hearing protection is required. • Reinforce that dry decon will not sweep materials at any time. Dust must be kept to a minimum. • Use a face shield when performing wet decon procedures using pressure washers. • Use wet methods to sweep out cabs. • Use a face shield when using a sledge hammer to remove gross contamination.	L

Job Steps	Hazards	Controls	RAC
Handle equipment and materials. Wrapping and securing contaminated equipment for transport. Wiping, scraping and brushing of contaminated equipment. Pressure-washing equipment. Collection and handling of decontamination fluids.	Slip, trip and fall hazards	• Cover the importance of housekeeping in Safety Briefings • Wear slip resistant footwear • Keep work area picked up and as clean as feasible and free of tripping and fall hazards.	L
	Flying debris-Eye hazards	• Wear safety glasses or goggles and a face shield • Ensure eyewash is available	
	Burns-Heat/ Chemical associated with pressure washing	• Wear rain suits or suits of chemical resistant material to prevent direct contact with hot water or chemicals of concern • Prohibit decon or washing of PPE, with hot water, while on a person. The pressure/steam washer shall be inspected before each use. The manufacturer's instruction manual shall be used to guide the inspection process. • Train personnel in the use of the washing equipment and emergency shut-off procedures for the equipment being used. • Use the minimum amount of steam/pressure that will complete the job. Pressure washers exceeding 3000 psi shall not be used without the approval of the Health and Safety Manager. • Direct the spray from such equipment at surfaces to be cleaned and never at body parts or other personnel. • Use face shields (those in the immediate area of spraying). • Keep a firm grip on wand and not point it at anything that is not being washed. • Be aware of slipping and be conscious of good footing. • Never wire/fix open the trigger on the wand. • Take adequate breaks to avoid fatigue. Hot surfaces shall be avoided. • Shut off units and allow to cool prior to re- fueling (if gas-powered). • Monitor carbon monoxide if gas-powered pressure washers are used. Carbon monoxide concentrations should not typically exceed 5 parts per million within any indoor areas. The TLV for carbon monoxide is 25ppm, for 8 hours.	

Job Steps	Hazards	Controls	RAC
Handle equipment and materials. Wrapping and securing contaminated equipment for transport. Wiping, scraping and brushing of contaminated equipment. Pressure-washing equipment. Collection and handling of decontamination fluids.	Contact with potentially contaminated materials: Inhalation and skin contact hazards	• Conduct real-time monitoring (PID). • Wear required PPE as indicated in SSHP such as: chemical resistant gloves based on the identified chemicals, boot covers and splash suit protection. Follow respirator action level dictates of SSHP • Maintain good housekeeping to safe guard against cross contamination of surrounding areas and eliminate safety hazards. • Practice good personal hygiene • Refer to SSHP for chemical hazard discussion • Require only essential personnel be in the decon area. All others should be in an upwind location.	L
Measure with PID for VOC	Inhalation of contaminants	Follow PPE dictates of SSHP based on airborne measurements and action levels	L
Personal decon	Take home toxics	• Decon per SSHP • Remove all contaminated clothing and materials and leave on-site. • Shower as soon as possible	L
Containerize water	Spills-Environmental damage	Use absorbents and containers for rinse water	L
General site work	General site hazards – Environmental: Biologicals (plants, insects, wildlife) Adverse weather Temperature stresses UV hazards, noise, lifting, etc.	Refer to General Site Work AHA	L

Job Steps	Hazards	Controls	RAC
Add Steps, Hazards, and Actions to Eliminate or Minimize Hazards based on conditions encountered in the field.			

Equipment	Training	Inspection
Personal Protective Equipment: PPE Level D: Hard Hat Safety Glasses Safety-Toed Boots Work Gloves/Chemical resistant gloves ANSI Class 2 reflective warning vests Or One PPE grade lower than the work in Exclusion Zone Other Equipment: Generator Fire Extinguishers Emergency Eyewash First Aid Kit Insect repellant- DEET Hand tools Spill containment supplies First aid supplies Containers as needed Tarps Drums GFCI Heavy duty ext. cords Drinking water Weather radio and/or smart phone apps for temperature and noise Heat stress monitoring Steam cleaner Alconox/cleaning brushes/buckets/as needed	Competent Person (CP) / Qualified Person (QP): NA CP/SSHO: TBD QP/First Aid and CPR: TBD QP/First Aid and CPR: TBD Training Requirements (as determined by the SSHO): HAZWOPER 40 hour Site safety orientation Tailgate meetings Emergency procedures Hazard communication Hearing conservation MEC awareness, if needed Applicable AHAs Fire extinguisher use Biological hazard identification and control Tornado shelter location Lightning safety procedures Heat stress prevention and heat stroke treatment Cold stress prevention	Daily inspection (SSHO): TBD Housekeeping (daily) Fire extinguisher (monthly) Vehicle inspection (daily) Eye Wash Equipment and tools inspection (daily and before use) Survey areas for poisonous plants, insects, and animals(each work area) Check body for ticks (each evening during tick season) Identify closest usable tornado shelter that is available (each work area)

HydroGeoLogic, Inc

ACTIVITY HAZARD ANALYSIS

Activity/Work Task: Creek Inspections

Project Location: Blacktail Creek, Butte, MT

Contract Number: 421042

Date Prepared: 7/2/2022

Prepared By: Chris Robb

Corporate H&S Reviewer: Edie Scala-Hampson

Notes: (Field Notes, review comments, etc.)

Overall Risk Assessment Code (RAC) (Use highest code)	L

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely.

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Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Job Steps	Hazards	Controls	RAC
Travel to and from outfalls	Driving hazards	Wear seatbelts; No talking or texting on cell phone; Keep vehicle windows clean; Review transportation and traffic plan; and Obey speed limits.	**L**
Assessing outfalls	Slips, trips, and falls	Hazards will be identified and remedied by implementation of engineering controls if possible. Use caution: Slopes are extremely dangerous. Watch out for burrowing animals. Use slow cautious steps in descending and ascending slopes at all times. Tall weeds make visibility difficult.	**L**
Inspections	Working near water	**Use the buddy system.** Use lifeline and life vest as deemed necessary.	**L**

Job Steps	Hazards	Controls	RAC
Required maintenance	See above hazards	Use harness and appropriate anchorage if working on structure.	L
	Hand injury	Use leather gloves. Use correct tool for the job. Wear face shield if deemed necessary. Wear Hard hat	L

Job Steps	Hazards	Controls	RAC
Add Steps, Hazards, and Actions to Eliminate or Minimize Hazards based on conditions encountered in the field.			

Equipment	Training	Inspection
Personal Protective Equipment: Level D: Hard Hat Safety Glasses Safety-Toed Boots Work Gloves/ Chemical resistant gloves ANSI Class 3 high visibility vests Modified Level D: Refer to SSHP. Other Equipment: Fire Extinguishers Emergency Eyewash First Aid Kit Insect repellant with DEET Repel Permanone™ Hand tools Drinking water Weather radio or smart phone apps for temperature and noise Heat stress monitoring Fall protection equipment	Competent Person (CP) / Qualified Person (QP): NA CP/SSHO:TBD QP/First Aid and CPR: TBD QP/First Aid and CPR: TBD Licensed Operator: TBD Training Requirements (as determined by the SSHO): HAZWOPER 40-Hour LOTO policies and procedures Forklift Site safety orientation Tailgate Safety Meetings Emergency procedures Hazard communication Applicable AHAs Fall protection Fire extinguisher use Biological hazard identification and control Tornado shelter location Lightning safety procedures Heat stress prevention and heat stroke treatment Cold stress prevention Spill Prevention and Emergency Response Plan	Daily site safety inspection (SSHO): TBD Housekeeping (daily) Eye wash equipment (weekly) Fire extinguisher (monthly) Vehicle inspection daily Equipment and tools inspection daily and before use Survey areas for poisonous plants, insects, and animals (each work area) Check body for ticks Identify closest usable tornado shelter that is available (each work area).