

Chouteau County Shop #1 Big Sandy Groundwater Monitoring Work Plan

*1062 Park Avenue, Big Sandy, Montana
Facility ID 08-02363, Release 2032, Work Plan 35190*

Prepared for:

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1 Executive Summary

Water and Environmental Technologies (WET) presents this Groundwater Monitoring Work Plan (WP) for the petroleum release at Chouteau County Shop #1 (Facility), as required in the work plan request letter from the Montana Department of Environmental Quality (DEQ), dated May 12, 2026. The Facility is located east of U.S. Highway 87 at 1062 Park Avenue, Big Sandy, Chouteau County, Montana.

The results of the previous workplan indicate that the elevated concentrations in MW-1 are in exceedance of Risk Based Screening Levels (RBSLs) and Human Health Standards (HHSs). The intent of this workplan is to detail the annual sampling procedures necessary to document the degradation of elevated concentrations through monitored natural attenuation.

The proposed scope of work includes:

- Monitoring at the Facility monitoring well MW-01 annually for 2 years, which includes:
 - Gauging fluid levels at the Facility wells.
 - Collecting groundwater samples by low-flow sampling methodology according to DEQ's Groundwater Sampling Guidance.
 - Analyzing groundwater samples for volatile petroleum hydrocarbons (VPH).
 - Disposing of purge water according to the DEQ Purge Water Disposal flow chart.
- Validating all laboratory analytical data using DEQ's Data Validation Summary Form (DVSF).
- Discussing ongoing WP tasks and results with DEQ's project manager (PM) and submitting written agreed-upon WP modifications as required to complete the WP objectives.
- Preparing and submitting a Monitoring Report detailing the method and results of both groundwater monitoring events completed under this WP, which will include:
 - Discussion of the monitoring method results, deviations from the approved WP, assessment of attenuation rates, recommendations, and conclusions.
 - Cumulative groundwater data tables.
 - Updated site features and potentiometric surface maps.
 - Appended groundwater monitoring field forms, laboratory analytical data, completed DVSFs, and an Release Closure Plan.

2 Facility History and Release Background

2.1 Facility History

Chouteau County Shop #1 has been in operation at this location since 1974. The underground storage tanks (UST) were installed in 1974 and utilized until 1993. On December 13, 1993, Chouteau County personnel removed the USTs, and collected soil samples from beneath the USTs which revealed evidence of soil contamination above DEQ regulatory standards. Subsequent investigations discovered evidence that the hydrocarbon contaminants have infiltrated into the groundwater table. Environmental management and monitoring have been in place since the initial investigations with sampling periods in 2018, 2019, 2023, and 2025.

WET has provided environmental services for the site since 2013. The Chouteau County Shop #1 well network originally consisted of five monitoring wells with an additional well (MW-6) drilled between 2004 and 2005. It is suspected that monitoring wells MW-2, MW-4, MW-5, and MW-6 have been destroyed. None of the samples collected from these wells have exhibited concentrations above screening levels. During the 2025 sampling, field parameters and samples were collected only for MW-1. Water level

measurements were recorded at MW-3. However, due to low water levels, a sample was unable to be collected.

3 Objectives of Groundwater Monitoring

The objectives of groundwater monitoring are to evaluate the status of petroleum contaminated groundwater and identify additional work needed to resolve the release. These objectives will be achieved through annual groundwater monitoring, which involves fluid level measurement and sampling. Samples collected will be analyzed for VPH.

4 Minimum Work Plan Tasks

WET's approach to completing the required work, except work plan preparation (Task 1), is detailed below.

4.1 Project Management (Task 2)

WET personnel will provide Rick Darlington (Owner) and DEQ's project manager with any ongoing WP tasks and relevant results on an as-needed basis. Other duties associated with this task include scheduling field work, project reporting administration, monitoring the project budget and deliverables, and any submitted written agreed-upon WP modifications to complete the objectives.

4.2 Mobilization (Task 3)

Mobilization will include vehicle mileage and personnel travel time between the WET Butte office and the Facility to perform the groundwater monitoring events. Two mobilizations are planned to complete the scope of work in this WP; totaling approximately 936 miles and 17.75 hours driving. One hour of loading/unloading is included for each mobilization.

4.3 Groundwater Monitoring (Task 4)

Two total groundwater monitoring events during the high groundwater period of late summer (July or August) are planned. One annual event per year is planned for well MW-01. All monitoring wells on the facility will be monitored so that a complete picture of conditions at the facility can be created.

Fluid levels will be measured with an oil-water interface meter prior to purging the well in accordance with WET standard operating procedure (SOP) SOP-5: Measurement of Fluid Levels. SOPs are included as Appendix A.

Groundwater field parameters to be monitored as specified in SOP-6: Measurement of Groundwater Field Parameters (Appendix A) and are subject to stabilization criteria listed in Table 1. Additionally, temperature and drawdown will also be monitored but are not subject to stabilization criteria. However, drawdown is not intended to exceed 0.3 feet. If pumping rates are lowered to the minimum achievable rate and drawdown still exceeds 0.3 feet, this will be noted on the field data sheets, and a sample may be collected prior to achieving stabilization. Turbidity will be measured with a turbidity meter, drawdown will be measured with the oil-water interface meter, and the rest of the field parameters will be measured with a YSI multi-

parameter combination meter and flow-through cell. Field parameter readings should be recorded every 3-5 minutes until three consecutive readings are within stabilization range.

Table 1. Stabilization Parameters

Water Quality Parameter	Unit	Stabilization Range	Exception
pH	standard units (s.u.)	±0.1 s.u.	
Specific Conductance (SC)	microsiemens per centimeter (µS/cm)	±3%	
Dissolved Oxygen (DO)	milligrams per liter (mg/L)	±10%	<0.50 mg/L
Turbidity	nephelometric turbidity units (NTU)	±10%	<5 NTU
Oxidation/Reduction Potential (ORP)	millivolts (mV)	±10 mV	

Once parameters have stabilized, a groundwater sample will be collected and preserved for laboratory analysis of VPH. The oil-water interface probe and bladder pump will be decontaminated between each site using a laboratory-grade detergent and tap water mixture followed by distilled water in accordance with SOP-2: Equipment Decontamination (Appendix A). The oil-water interface probe will be sprayed, while the bladder pump will be flushed with approximately 700 mL of each decontamination media (to cover approximately three bladder volumes and tubing volume).

Following the DEQ disposal of untreated purge water from monitoring guidance dated July 27, 2015, the purge water originates from the shallowest aquifer, is not likely to result in an exceedance of soil screening levels, is not discharged to a surface water, and is not from a mine audit or long-term pumping test. Therefore, the purge water from the groundwater sampling event will be discharged to pervious Facility ground. All non-reusable sampling equipment and spent personal protective equipment will be disposed of in garbage bags.

4.4 Laboratory Analysis (Task 5)

Groundwater samples will be submitted on ice to Energy Laboratories in Helena, Montana for analysis of VPH.

4.5 Quality Assurance/Quality Control (Task 6)

Quality assurance/quality control (QA/QC) samples including duplicates and field blanks (water) will be collected at a minimum frequency of 1 per 20 natural samples (5%) in accordance with SOP 16. One duplicate groundwater sample and one field blank sample will be collected in conjunction with natural groundwater samples. The duplicate will be collected simultaneously with its parent sample. The field blank will be collected during representative sampling conditions at the Facility by pouring laboratory provided

organic-free deionized water into laboratory provided sample containers. QA/QC samples will be analyzed for the same constituents as the natural samples. WET personnel will validate all laboratory analytical data using DEQ's Data Validation Summary Form (DVSF). This summary form will be included in the final report.

4.6 Reporting (Task 7)

Upon completion of the WP tasks, WET will prepare a Groundwater Monitoring Report in the DEQ guidance format detailing the results of groundwater monitoring, including the following:

- Discussion of the monitoring method results, deviations from the approved work plan, assessment of attenuation rates, recommendations, and conclusions.
- Cumulative groundwater data tables.
- Updated site features and potentiometric surface maps.
- Appended groundwater monitoring field forms, laboratory analytical data, completed data validation summaries, and an updated Release Closure Plan.

5 Scheduling

WET will begin implementing this WP upon DEQ approval. A detailed project cost estimate is included as Appendix B.

Figures



Site Location Map

CHOUTEAU COUNTY SHOP #1, BIG SANDY, MT

FIGURE 1

JOB#: CHOTOM02
DATE: 8/6/2025

Path: M:\CHOTOM02\GIS\BigSandy_Constituents_20230727\BigSandy_Constituents_20230727.aprx, Author: Smagann

NOTES:

NO.	DESCRIPTION	DATE	DRAFT	REVIEW
1	MAP CREATION	8/6/25	SMM	TD
2				
3				
4				
5				



Appendix A—WET SOPs



FIELD LOGBOOK AND FORMS

All pertinent field investigation and sampling information will be recorded in a field logbook, field form, or a Daily Activity Log (DAL) during each day of the field effort and at each sample site. The field crew leader will be responsible for ensuring that sufficient detail is recorded in the field logbook or DAL. No general rules can specify the extent of information that must be entered in the field logbook or form. However, field logbooks, field forms, or DALs must contain sufficient information such that someone could reconstruct all field activities without relying on the memory of the field crew. All entries shall be made in indelible ink, weather conditions permitting. Each day's or site's entries will be initialed and dated at the end by the author.

At a minimum, entries on the field sheet or in field notebook must include:

- Project information and location
- Project and task number
- Date and applicable times
- Name(s) of field personnel
- Environmental, site, or weather conditions
- Safety briefing attendance
- Details of actual work effort, particularly any deviations from the field work plan or standard operating procedures
- Comments or observations regarding any unusual circumstances
- Any field measurements made (e.g., PID readings, pH, temperature)

For sampling efforts, specific details for each sample should be recorded using a standardized field form designed specifically for the sampling activity being conducted (e.g., low-flow groundwater monitoring, soil gas sampling). Sampling field forms contain fill-in-the-blank type information to ensure that all pertinent information will be recorded. In addition to the items listed above, the following information is recorded on field forms during sampling efforts:

- Sample identification
- Date and time samples were collected
- Sampling methods, particularly any deviations from field work plan or standard operating procedures
- Field data and measurements
- Containers used to collect samples
- Sample preparation (filtration, preservation)
- Analyses and methods requested
- Note any QA/QC samples collected (duplicates, blanks)

Strict custody procedures will be maintained with the field forms. Field forms must always remain with the field team while being used in the field. Upon completion of the field effort, the original field forms will be scanned and copied to the project folder. Original field forms will be filed in an appropriately secure manner.



EQUIPMENT DECONTAMINATION

INTRODUCTION

The purpose of this section is to describe general decontamination procedures for field equipment. Decontamination will be performed on all non-dedicated and non-disposable sampling equipment that may contact potentially contaminated media. Field personnel must wear disposable latex or nitrile gloves while decontaminating equipment at the project site and change gloves between every sample. Personnel must take every precaution to prevent contaminating themselves with the wash water and rinse water used in the decontamination process.

EQUIPMENT

- Liquinox (or equivalent laboratory-grade detergent)
- Sufficient volume of tap water
- Sufficient volume of deionized water
- Sufficient volume of methanol or pesticide-grade acetone for organics
- Sufficient volume of any other decontamination solutions specifically required by the project work plan.
- Necessary containers for each decontamination station (totes or tubs, graduated cylinders or similar tubes, spray bottles, etc.)
- Tarp or other platform to form barrier between decontamination stations and ground (if necessary)
- Applicable brushes (if necessary)
- Aluminum foil (for soil sampling devices)
- Latex or nitrile gloves
- Paper towels
- Garbage bags

PROCEDURES

The following should be done in order to complete thorough decontamination:

1. Set up the decontamination zone downwind from the sampling area to reduce the chances of windborne contamination.
2. Visually inspect sampling equipment for contamination; use brush to remove visible material.
3. The general decontamination sequence for field equipment includes washing with Liquinox (or equivalent laboratory-grade detergent), deionized water rinse, additional solution rinse specified by project work plan, and triple deionized water rinse.
4. Store equipment in clean containment or according to project work plan if not used immediately.
5. All disposable items (e.g., paper towels, latex gloves), as well as rinse and wash water generated during decontamination, should be disposed of in accordance with SOP-17 (Management of Investigation-Derived Waste).



FIELD MEASUREMENT OF GROUND-WATER LEVELS/LIGHT NON-AQUEOUS PHASE LIQUID LEVELS

INTRODUCTION

In general, groundwater levels (and LNAPL levels, if applicable) in wells will be measured prior to commencing development, purging, sampling, pumping tests, or other activities that disturb the fluid pressure relationships in the well. Measurements may be taken during such events for purposes other than determining static conditions and may also be taken to determine static conditions after such activities if an appropriate period has elapsed to allow steady-state conditions to return.

EQUIPMENT

- Electronic water level monitoring probe (for water levels only),
- Electronic multi-phase interface monitoring probe (for measuring water levels and LNAPL levels)
- Keys for well locks
- Tools to open well covers (e.g., socket wrench, spanner wrench, etc.)
- Watch or stopwatch
- Pens and field logbook or other appropriate field forms (e.g., groundwater purge and sample forms)
- Monitoring well construction data (for total depth and screen intervals of well)
- Personnel and equipment decontamination supplies (refer to SOP-2)

PROCEDURES

1. If more than one well will be measured, conduct measurements in the order of lowest to highest chemical concentrations previously detected in samples from the monitoring wells.
2. Allow the well to equilibrate by removing the protective cap and leaving the well open for a period before beginning taking measurements. Generally, removing all site well caps prior to collecting the first liquid level measurement provides sufficient time to reach equilibrium.
3. Examine the monitoring well for any structural damage, poorly fitting caps, and leaks into the inner casing. Record all well maintenance issues on the appropriate field sampling form or field log book.
4. If LNAPL is not present, use a pre-cleaned water level probe or equivalent to measure depth to water from the indicated survey mark on the well casing. If a mark is not present, measure from the top of the northern side of the well casing.
5. If LNAPL may be present, use a pre-cleaned, electric, multi-phase interface probe to measure depth of the LNAPL and depth to water. Record both measurements on the sampling form or field logbook. Unless otherwise instructed, always measure depths to LNAPL layer and groundwater from the indicated survey mark. If a mark is not present, measure from the top of the northern side of the well casing.
6. Repeat measurements at least once by lifting the probe tape at least one foot out of the well, allowing the measurer to confirm the accurate foot, tenth-of-a-foot, and hundredth-of-a-foot mark on the tape.
7. Follow personnel and equipment decontamination procedures outlined in SOP-2.



MEASUREMENT OF FIELD

PARAMETERS: Temperature, Dissolved Oxygen (DO), Specific Conductance, pH, Oxidation Reduction Potential, and Turbidity

INTRODUCTION

This guideline describes the procedures typically used to measure the temperature, DO, Specific Conductance (SC), pH, Oxidation Reduction Potential (ORP), also referred to as redox potential, and turbidity of ground- or surface water.

EQUIPMENT

- Multi-parameter water quality meter
- Flow-through cell or plastic cup
- Transport/calibration cup
- Probe sensor guard
- Operations manual
- Spare batteries
- Standard conductivity calibration solutions [447, 1413, 2074, 8974 microSiemens per centimeter ($\mu\text{S}/\text{cm}$)]
- pH buffers (4.00, 7.00, 10.00)
- ORP calibration solution
- Pens, field logbook, and/or appropriate field forms (e.g., groundwater purge and sample form)
- Personnel and equipment decontamination supplies

PROCEDURES

Calibrate multi-parameter water quality meter at the office prior to commencement of field activities to check instrument is in proper working order. At a minimum, calibrate before use each day (or more frequently as necessary) as indicated below. The initial daily calibration may be performed at the office (if located in proximity to the site), motel, or in the field.

1. Press the On/Off key. Check the battery charge indicator located at the bottom of the liquid crystal display (LCD) screen. Replace batteries if the battery charge indicator is low.
2. Calibrate the meters according to the manufacturer's instructions. *Note: The meter must be calibrated for each field parameter in accordance with the instructions in the operations manual at the beginning of each sampling day. Additional calibrations may be performed during the day if deemed necessary.*
3. If instruments were used in humid or wet environmental conditions, store them in the case open overnight for evaporation so that moisture and mold do not infiltrate sensitive parts.
4. Multi-parameter water quality meter use:
 - a. Connect the probe sensor to the flow-through cell. If the flow cell is not used, make sure the probe sensor guard is installed.
 - b. Begin passing water into the flow-through cell. If the flow-through cell is not used, place the probe module into a sample of the water or directly into the body of water being evaluated. Be sure to completely immerse all sensors into the water.
 - c. Provide a constant flow of fresh water across the probe module to actuate readings.

- d. Observe the meter's LCD display and record the values on the groundwater purge and sample form or field logbook.
 - e. Once purging is complete, remove the probe from the sample water and rinse the probes and flow-through cell with distilled water.
5. Place the probe sensor in the transport/calibration cup with 0.5-1 inch of 4.00 pH buffer for short-term/overnight storage for optimal calibration conditions the next day. Place the probe sensor in the transport/calibration cup with 0.5-1 inch of potable water for long-term storage. The transport/calibration cup should be sealed to prevent evaporation. *Note: Storing the probes in dry conditions will damage the sensors.*
6. Turbidity meter use:
- a. Fill a turbidity meter sample vial with water to the fill indication line. Cap the vial securely.
 - b. Dry the outside of the sample vial. Line the arrow or alignment indication line on the vial with the arrow or alignment indication line on the turbidity meter. Push the vial all the way into the sample vial port. Ensure that the cap/cover is closed all the way.
 - c. Ensure that the turbidity meter is on a level surface and will not be disturbed during the analysis process. Press the Read key. Do not disturb the turbidity meter or open the cap/cover during reading.
 - d. Record the value provided. If the reading seems inaccurate, ensure that the sample vial is dry and does not have any streaking or staining and re-read the sample.



Quality Control (QC) samples are submitted along with natural samples to provide supporting laboratory data to validate laboratory results. QC samples are submitted blind except for matrix spikes and trip blanks, and do not have any unique identifying codes that would enable the lab or others to bias these samples in any way. Usually, the time or sampling location is modified in a way which will separate blank and standard samples from the rest of the sample train. QC samples are identified only on field forms and in field notebooks. The following codes are typically used:

Code	Type	Description
N	Natural Sample	Soil, water, air, or other of interest material from a field site.
SP	Split Sample	A portion of a natural sample collected for independent analysis; used in calculating laboratory precision.
FD	Duplicate Sample	Two samples taken from the same media under similar conditions; also used to calculate precision.
FB	Field Blank	Deionized water collected in sample bottle; used to detect contamination introduced during the sampling process.
RB	Rinsate Blank	Deionized water run through or over decontaminated equipment; used to verify the effectiveness of equipment decontamination procedures.
TB	Trip Blank	Inert material (deionized water or diatomaceous earth) included in sample cooler; sent by the lab, the sample is used to detect any contamination or cross-contamination during handling and transportation.

In general, selected QC samples will be inserted into the sample train within a group of twenty samples. QC samples will be prepared in the field, apart from trip blanks. Trip blanks will be supplied by the laboratory and will accompany each sample cooler containing samples for analysis of volatile organic compounds.

Typical QC sample collection frequencies are presented in the table below. Refer to the project-specific sampling and analysis plan or quality assurance plan for the appropriate QC sample frequency. Each field crew leader will be responsible for all QC samples prepared by that crew.

QC Sample	Purpose	Collection Frequency
Field Duplicate	Measure field precision.	1 per 20 natural samples per media
Rinsate Blanks	Evaluate effectiveness of equipment decontamination and sample handling procedures.	1 per 20 natural samples per media
Field Blank	Assess possible cross-contamination of samples due to ambient conditions during sample collection.	1 per 20 natural samples per media, or 1 per day
Trip Blank	Evaluate sample preservation, packing, shipping, and storage.	1 per cooler containing samples with volatile constituents