Monitoring Well Installation, Injection, & Groundwater Monitoring Work Plan

Former Dodson Conoco
Barrett Avenue and US Highway 2
Dodson, MT
Facility ID 60-15101, TID 30860, Release 3912, Work Plan 35012

Prepared for:

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Montana Department of Transportation
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1.0 Introduction

West Central Environmental Consultants (WCEC) has prepared this Cleanup Work Plan for the Former Dodson Conoco Facility (Facility ID 60-15101, Release 3912) located in Dodson, Montana, as requested by the Montana Department of Environmental Quality (DEQ) in correspondence dated February 7, 2025. DEQ has required additional remedial investigation and corrective actions including installation of three monitoring wells, completion of an oxidant injection to address residual soil and groundwater contamination, and pre and post-injection groundwater monitoring to determine the effectiveness of the remedial injections.

2.0 Scope of Work

2.1 Required Scope of Work

The scope of work requested by the DEQ which will be completed by WCEC generally consists of:

- Prior to WP submittal, submit to DEQ a draft map of proposed soil boring, monitoring well, and injector well locations. Discuss the proposed number and locations of borings with DEQ. Update the map as needed to achieve WP objectives.
- Prepare the WP in accordance with the Montana Guidance for Petroleum Releases at the Petroleum Tank Cleanup Section (PTCS) webpage.
- Obtain Right-of-Way (ROW) permits as needed for work occurring within Dodson ROWs. Obtain traffic control measures as needed to ensure personnel safety and comply with associated permit requirements.
- Install soil borings and monitoring wells to determine the extent and magnitude of petroleum contamination in soil and groundwater and assess potential remedial strategies.
- Collect soil samples from the interval in each soil boring highest petroleum contamination based on field screening and the soil/groundwater interface.
- Complete select soil borings as groundwater monitoring wells, screened at similar depths of the existing on-site monitoring wells.
- Analyze soil samples for petroleum constituents as required by the Montana Risk-Based Corrective Action Guidance for Petroleum Releases.
- Install multiple injector wells. Add amendment to soil and groundwater to accelerate the attenuation of petroleum-contaminated media.
- Conduct one groundwater monitoring event at the Facility’s monitoring wells. Gauge fluid levels at all facility monitoring wells. Collect groundwater samples at select monitoring wells by low-flow sampling methodology according to DEQ’s Groundwater Sampling Guidance found under the Guidance dropdown at the PTCS webpage1.
- Analyze groundwater samples for petroleum constituents as required by the Montana Risk Based Corrective Action Guidance for Petroleum Releases. Based on prior monitoring results, sampling and analysis of volatile petroleum hydrocarbons and lead scavengers are required.
- Dispose of purge water according to the Disposal of Untreated Purge Water from Monitoring Wells flowchart found under the Guidance dropdown on the PTCS webpage.

- Validate all laboratory analytical data using DEQ's Data Validation Summary Form (DVSF).
- Discuss ongoing WP tasks and results with DEQ's project manager; submit written agreed-upon WP modifications as required to complete the WP objectives.
- Prepare a Release Closure Plan (RCP), discuss the results with DEQ's project manager. DEQ expects the RCP to cover the Release investigation, cleanup, and monitoring information. Use the RCP format found online under the Guidance dropdown at the PTCS webpage.
- Prepare and submit Remedial Investigation Report (Report) detailing the results of the investigation. The Report is expected to include all the content outlined in the Report format and the following:
    - Use the report format found under the Guidance dropdown at the PTCS webpage.
    - Recommendation of remedial action required to resolve the release.
    - Evaluation of the available soil and groundwater data to assess the need for intrusive investigation of potential exposure pathways (e.g., vapor intrusion, utility corridor, etc.).
    - Cumulative soil and groundwater data tables.
    - Append boring logs, well completion diagrams, groundwater field forms, laboratory analytical data, completed DVSFs, and updated RCP
- Use standardized DEQ WP and report formats found online at: http://deq.mt.gov/Land/lust/cap_reports .
- Submit the WP and report electronically following the Petroleum Tank Cleanup Section (PTCS) submittal requirements found under Resources at: http://deq.mt.gov/Land/lust

2.2 Soil Boring & Monitoring Well Installation

WCEC will install three soil borings that will be completed as monitoring wells. Prior to work beginning WCEC will request an underground utility locate at and surrounding the facility. Proposed soil boring/monitoring well locations are depicted in Figure 2. The soil borings/wells will be installed prior to completion of the oxidant injection. WCEC will confirm the final locations of the soil borings with MDT and MTDEQ personnel prior to installation. The soil borings/ monitoring wells will be installed by WCEC's Montana licensed monitoring well constructor using a track-mounted GeoProbe 7800 series rig equipped with 2.5-inch dual tube and 8.5 inch hollow stem augers. Soil borings will be completed to a total depth of 15 feet. Samples will be collected from each soil boring at the interval displaying the highest petroleum contamination and the soil/groundwater interface. The monitoring wells will be completed to a total depth of approximately 15 feet with the screened interval extending from 3 to 15 feet. General well construction will consist of a 2-inch diameter Sch. 40 PVC riser and 0.010 slot PVC screen. The well annulus will be filled with 10/20 silica sand from the bottom of the boring to 0.5 feet above the screened interval, with the remainder of the boring annulus consisting of a bentonite seal. Surface completion will consist of an 8-inch flush mount steel manhole set in concrete.

Cuttings from the monitoring well borings will be screened for hydrocarbon presence. Soils which do not exhibit hydrocarbon impacts will be thin spread at the facility. Any soils exhibiting petroleum odor or staining will be segregated and containerized in 55-gallon steel drums pending disposal profiling. WCEC personnel will develop the newly installed monitoring wells using an electric downhole pump. Purge water disposal will be completed in accordance with MTDEQ guidance.

The horizontal location and top of casing elevation of the monitoring well will be surveyed according to MTDEQ requirements. WCEC will obtain horizontal coordinates for the monitoring wells using a Trimble Geo7X centimeter GPS. A level loop survey, accurate to 0.01 feet, will be conducted to obtain vertical well casing elevations.

2.3 Pre-injection Groundwater Monitoring Event

Prior to the injection, WCEC will conduct an initial groundwater monitoring event of the three newly installed monitoring wells. Groundwater monitoring will be conducted using low-flow methods in accordance with DEQ's Groundwater Sampling Guidance using a peristaltic pump for purging and sample collection. Groundwater quality parameter data (conductivity, pH, salinity, dissolved oxygen, temperature, turbidity, and ORP) will be acquired from all site wells during each event during well purging using a flow through cell attached to the appropriate pump. Groundwater sample collection from each well will be completed following stabilization of groundwater quality parameters. Groundwater quality parameters, purge, and stabilization data for each well are recorded in the field using WCEC's Well Sampling Form. If present, any accumulations of free product (FP) in the monitoring wells will be noted and FP thicknesses will be recorded.

Groundwater samples will be preserved with hydrochloric acid, packed on ice, and delivered to Energy Laboratory in Billings, Montana under chain of custody. All groundwater samples collected will be submitted for Volatile Petroleum Hydrocarbons (VPH) and 1,2-DCA

2.4 Provect-OX2 Injection

Following the initial sampling event, WCEC will initiate the remediation injection event. The Provect-OX2 remedial injection design was completed by Provectus in consultation with MDT based on the most recent data available for the facility. The injection design calculations provided by Provectus resulted in a total mass of 7,000 pounds of Provect-OX2 mixed at a 20% weight/weight ratio (24 gallons of water per 50lb bag of Provect-OX2) creating 3,920 total gallons of injection slurry. The slurry will be injected via approximately 14 borings advanced in a 2,100 square foot treatment area with targeted injection from 5 to 17 feet. WCEC will coordinate with Provectus to discuss the injection design and determine the exact locations of injection points.

WCEC will utilize 275-gallon poly totes mounted on a flatbed trailer as a water tender. WCEC will contact the City of Dodson for access to the water supply used during the 2021 injection event. The treatment solution will be prepared in a 275-gallon poly tote or similar mixing vessel at the site. All injection locations will be surveyed using a Trimble Geo7X centimeter-edition GPS for inclusion on subsequent figures. Injection boring spacing, solution concentration, and injection volume per boring may be adjusted on-site following consultation with Provectus to complete the SOW. All injection borings will be sealed with bentonite shortly after installation and restored to existing surface conditions at the conclusion of the injection event. WCEC anticipates that the well installation and injection event will be completed over 5 total days on-site.

2.5 Post-Injection Groundwater Monitoring

Within six weeks following the completion of the injection, WCEC will conduct a post-injection groundwater monitoring event. WCEC will sample wells MW-2R, MW-3, MW-6R, MW-7, MW-8, MW-9R, MW-10, MW-11, MW-12, MW-13, MW-14, and the three newly installed monitoring wells. Groundwater elevations will be collected from all site wells. Groundwater monitoring will be conducted using low-flow methods in accordance with DEQ's Groundwater Sampling Guidance using a peristaltic pump for purging and sample collection. Groundwater quality parameter data (conductivity, pH, salinity, dissolved oxygen, temperature, turbidity, and ORP) will be acquired from all site wells during each event during well purging using a flow through cell attached to the appropriate pump. Groundwater sample collection from each well will be completed following stabilization of groundwater quality parameters. Groundwater quality parameters, purge, and stabilization data for each well are recorded in the field using WCEC's Well Sampling Form. If present, any accumulations of free product (FP) in the monitoring wells will be noted and FP thicknesses will be recorded. Wells containing a measurable amount of free product will not be sampled.

Groundwater samples will be preserved with hydrochloric acid, packed on ice, and delivered to Energy Laboratory in Billings, Montana under chain of custody. All groundwater samples collected will be submitted for Volatile Petroleum Hydrocarbons (VPH) and 1,2-DCA.

3.0 Report Preparation & Release Closure Plan

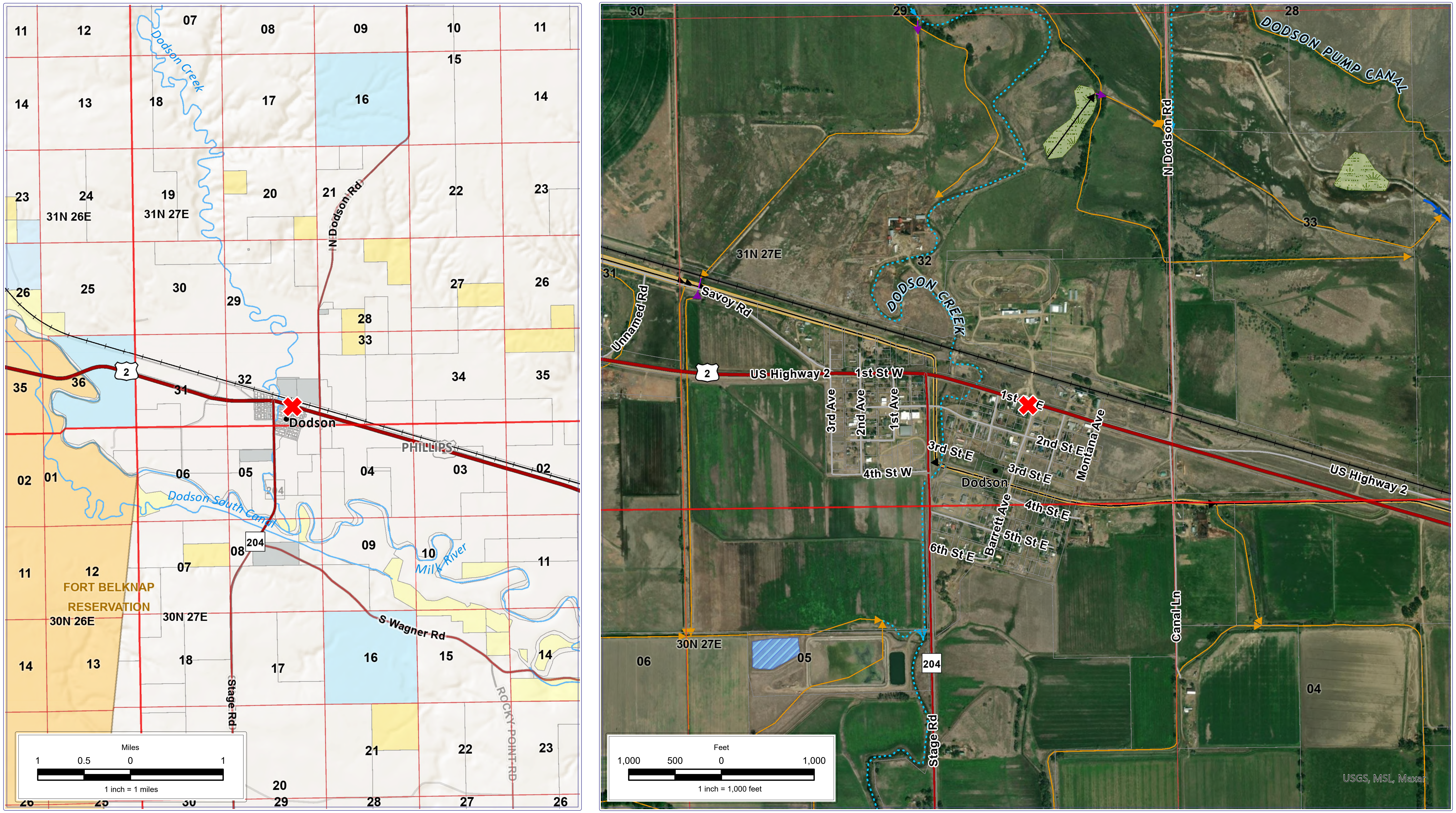
WCEC will contact the DEQ project manager to discuss the results of the monitoring well installation and initial groundwater monitoring event. Any necessary modifications to the injection will be discussed with the DEQ project manager and approved in a work plan extension / modification letter. Following completion of the second groundwater monitoring event, WCEC will prepare and submit a report that includes details of the monitoring well installation, Provect-OX2 injection, and groundwater monitoring events. The Release Closure Plan (RCP) will be updated and submitted as a component of the report.

The report will summarize all data related to the oxidant injection, results of the continued groundwater investigation, cumulative groundwater monitoring data tables, updated site maps, and two-dimensional groundwater isoconcentration maps as appropriate. The RCP will include an analysis of the Provect-OX2 injection and recommendations to address any remaining petroleum impacts in soil and groundwater at the facility and progress the release towards closure. The report will be submitted within 60 days of receipt of laboratory analytical results from the second groundwater monitoring event.

4.0 Timeline & Costs

The attached *Remediation Services Estimated Cost Spreadsheet* [Appendix A] details anticipated project costs to complete the DEQ required scope of work. The scope of work outlined in this work plan is tentatively scheduled to begin in Autumn 2025, pending approval from DEQ and review by the MT PTRCB.

List of Maps



❌ Former Dodson Conoco

Site Location

Former Dodson Conoco
Hwy 2 & Barrett Ave
Dodson, MT 59538

DRAWN BY: TCP

DATE: 09/05/25

SCALE: 1:12,000

PROJECT NUMBER: 2509-0131

IMAGE SOURCE: ESRI BASEMAPS

WCEC
ENVIRONMENTAL CONSULTANTS

FIGURE 1

Legend

- Monitoring Wells
- Proposed Monitoring Well
- ▨ Injection Area
- Subject Property
- Fiber
- Water
- Sewer

Former Dodson Conoco
Hwy 2 & Barrett Ave
Dodson, MT 59538

Site Details Map

JOB NO.: 2509-0131
DATE: 09/05/25
DRAWN BY: TCP
IMAGE SOURCE: Google

WCEC
ENVIRONMENTAL CONSULTANTS

FIGURE 2

Appendix A

Provectus Treatment Plan

provectus
ENVIRONMENTAL PRODUCTS™

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VIA EMAIL: kgustafson@mt.gov

May 9, 2025

Mr. Kendall Gustafson
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2701 Prospect Avenue
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Tel: (406) 461-2193

Subject: **Privileged and Confidential**
Provect-OX2™ Combined ISCO + Sustained Bioremediation Technology
Former Dodson Conoco Site – Dodson, Montana
Provectus Proposal No. PEP25-0027

Dear Kendall:

Please find herewith a conceptual remedial design and cost estimate for employing Provect-OX2™ combined *in situ* chemical oxidation (ISCO) + enhanced bioremediation (iron cycling) technology to remove organic constituents of interest (COIs) from saturated soil and groundwater at the former Dodson Conoco site.

In developing this proposal, Provectus Environmental Products, Inc. (Provectus) recognizes that we may have received sensitive data and confidential information. We maintained all information in confidence and have not shared Site data with any unapproved party. We understand that Montana Department of Transportation will provide contractor oversight and general consulting services including groundwater verification sampling and required Montana Department of Environmental Quality (MDEQ) reporting, permitting, and application submittals. Provectus will provide project-specific technology and design information to develop the Remedial Action Workplan and obtain the permit-by-rule.

We understand the remedial goal is to reach MDEQ Risk Based Screening Levels (RBSLs). Therefore, we developed an approach that can aggressively address the dissolved phase mass. Our approach utilizes combination technologies that take advantage of aggressive ISCO and long-term bioremediation contaminant destruction processes. We are recommending a proven technology in conjunction with an implementation team that has over 100 combined years of in situ experience including the remediation of more than 3,500 sites domestically and internationally. Our technology background, chemistry, conceptual design, and remediation costs are outlined below.

PROVECT-OX2™ TECHNOLOGY BACKGROUND

Provect-OX2™ (US Patent 9,126,245; patents pending) rapidly oxidizes a wide variety of organic COIs present in impacted soil, sediment and groundwater (including chlorinated solvents, petroleum hydrocarbons, and pesticides) and provides long-term, sustained secondary bioremediation to manage residuals and prevent contaminant rebound (COI rebound is a common problem encountered with conventional ISCO technologies). This is accomplished by using ferric iron (Fe III) as a safe and effective means of activating persulfate, which quickly yields sulfate radicals and ferrate for ISCO treatment (see below for more details). The process also enhances subsequent utilization of sulfate and iron as terminal electron acceptors for facultative redox reactions to support secondary biodegradation of any residual COIs. This remedy combines treatment mechanisms thereby allowing for a more cost-efficient use of the technologies.

The use of ferric iron to activate persulfate was thoroughly described in 1958 (J.F. Henderson, McGill University, Montreal, Canada). However, the safe, non-extreme, advanced activation catalyst is unique when considering its ability to enhance bioremediation processes over an extended period of time (patents pending). Alternative methods of stimulating secondary biodegradation processes using oxygen release compounds are limited in that they will remain active for only a few months, after which time the oxygen release is exhausted. Iron, on the other hand, will remain active for years. Moreover, oxygen release compounds inherently increase the local pH to extremely basic conditions (>10 pH units) which is simply not conducive to biological activity. Given its non-extreme activation chemistry, additional benefits include: i) Provect-OX® will not generate excessive heat / off-gases, ii) nor will it mobilize heavy metals or generate secondary impact issues such as elevated arsenic or chromium resulting from grossly elevated pH.

PROVECT-OX2™ MODE OF ACTION

Provect-OX2™ maximize the synergy between persulfate and iron for coupled oxidation and enhanced bioremediation: i) sulfate is generated from persulfate, ii) ferric iron (Fe III) is microbiologically reduced to ferrous iron (Fe II), readily supplying electrons to exchange and react with sulfide. Together, sulfide and iron form pyrite, an iron bearing soil mineral with a favorable reductive capacity.

ISCO: Immediately upon wetting, persulfate is activated by Fe III. This compound requires a lower activation energy than alternative mechanisms while not consuming the persulfate oxidant. The mechanism is believed to elevate the oxidation state of the iron transiently to a supercharged iron ion, which in itself may act as an oxidant. As this supercharged iron cation is consumed, the resulting ferric species can act as a terminal electron acceptor for biological attenuation. Coincidentally, the generated sulfate ion from the decomposition of the persulfate provides a terminal electron acceptor for sulfate reducers which may further remediate the targeted compounds in groundwater and soil.

When ferric oxide is used to activate persulfate, the process quickly yields ferrate (tetraoxy iron or FeO_4^{2-} or Fe(VI)) - Equation 1 - in addition to the standard persulfate radicals ($SO_4\bullet$; $E^o = 2.600$ V).

$$S_2O_8^{-2} + Fe^{+3} \text{---------}> Fe^{(+4\ to+6)} + SO_4^{2-} + SO_4^{2-\bullet} \quad \text{(Eq. 1)}$$

Ferrate functions both as an oxidant and subsequent coagulant in the form of Fe(III) (hydro)oxides that can immobilize heavy metals, such as arsenic, cadmium, copper, and zinc. Ferrate also has one of the highest oxidation potentials of any chemical realistically usable in water and wastewater treatment; $E^o = 2.20$ V under acidic condition and $E^o = 0.72$ V under basic condition, making the protonated forms of ferrate the most reactive, but least stable and shorter lived. As such, it is beneficial to generate ferrate *in situ* for the treatment of groundwater contaminants.

SECONDARY ATTENUATION PROCESS: Provect-OX is uniquely designed to couple sulfate radicals and ferrate for ISCO with a strong biological component to the remedial action.

Sulfate Residuals: After dissolved oxygen has been depleted in the treatment area, sulfate (a by-product of the persulfate oxidation) may be used as an electron acceptor for anaerobic biodegradation by indigenous microbes. This process is termed sulfidogenesis and results in the production of sulfide. Stoichiometrically, each 1.0 mg/L of sulfate consumed by microbes results in the destruction of approximately 0.21 mg/L of BTEX compounds. Sulfate can play an important role in bioremediation of petroleum products, acting as an electron acceptor in co-metabolic processes as well. For example, the basic reactions for the mineralization of benzene and toluene under sulfate reducing conditions are presented in Equations 2 and 3:

$$C_6H_6 + 3.75\ SO_4^{2-} + 3\ H_2O \text{-->} 0.37\ H^+ + 6\ HCO_3^- + 1.87\ HS^- + 1.88\ H_2S^- \quad \text{(Eq. 2)}$$
$$C_7H_8 + 4.5\ SO_4^{2-} + 3\ H_2O \text{-->} 0.25\ H^+ + 7\ HCO_3^- + 2.25\ HS^- + 2.25\ H_2S^- \quad \text{(Eq. 3)}$$

Ferric Iron: Ferric iron is also used as an electron acceptor during anaerobic biodegradation of many contaminants, sometimes in conjunction with sulfate. During this process, ferric iron is reduced to ferrous iron, which is soluble in water. Hence, ferrous iron may be used as an indicator of anaerobic activity. As an example, stoichiometrically, the degradation of 1 mg/L of BTEX results in the average consumption of approximately 22 mg/L of ferric iron (or “production” of ferrous iron) as shown below (Equations 4-6).

$$C_6H_6 + 18\ H_2O + 30\ Fe^{3+} \text{------->} 6\ HCO_3^- + 30\ Fe^{2+} + 36\ H^+ \quad \text{(Eq. 4)}$$
$$C_7H_8 + 21\ H_2O + 36\ Fe^{3+} \text{------->} 7\ HCO_3^- + 36\ Fe^{2+} + 43\ H^+ \quad \text{(Eq. 5)}$$
$$C_8H_{10} + 24\ H_2O + 42\ Fe^{3+} \text{------->} 8\ HCO_3^- + 42\ Fe^{2+} + 50\ H^+ \quad \text{(Eq. 6)}$$

Pyrite Formation: While ferrous iron is formed as a result of the use of the ferric species as a terminal electron acceptor, residual sulfate is utilized as a terminal electron acceptor by facultative organisms thereby generating sulfide under these same conditions. Together, the ferrous iron and the sulfide promote the formation of pyrite as a remedial byproduct (Equation 7). This reaction combats the toxic effects of sulfide and hydrogen sulfide accumulation on the facultative bacteria, while also providing a means of removing targeted organic and inorganic COIs via precipitation reactions. Moreover, pyrite possesses a high number of reactive sites that are directly proportional to both its reductive capacity and the rate of decay for the target organics.

$$Fe^{2+} + 2S^{2-} \text{------->} FeS_2 + 2e \quad \text{(Eq. 7)}$$

ADVANTAGES OF USING BUFFERED PROVECT-OX2 ISCO TECHNOLOGY

Buffered Provect-OX2™ is a dry, pre-mixed powder material that can be applied to the subsurface environment in a variety of ways, based on site-specific designs. Application methods include direct mixing, hydraulic fracturing, pneumatic fracturing, and injection of slurries or liquids. Direct placement in trenches and excavations are also reliable application methods. Once emplaced, a number of synergistic reactions take place that offer some notable advantages over other persulfate-based oxidation processes:

More Effective: Promotes multiple oxidation reactions and free radicals yielding the most effective *in situ* oxidation of a wide range of organic contaminants. Also provides a unique microbiological component for multiple accelerated attenuation processes.

More Efficient: Significantly lower costs as a result of multiple oxidants and secondary treatment processes. Use of ferric oxide conserves oxidant when compared to EDTA-Fe (III) chelated iron activation.

Safer: Fewer health and safety concerns as compared to use of traditional activation methods such as heat, chelated metals, hydrogen peroxide or pH extremes using NaOH.

- ✓ Contains built-in activation which eliminates the need for additional and potentially hazardous chemicals required to achieve traditional persulfate activation.
- ✓ Will not generate excessive heat / off-gases.

Easy to Use: Pre-mixed, multi-component oxidant with integrated buffer, ferrate stabilizer and persulfate activator results in simplified logistics and application.

- ✓ No additional containers or multi-step mixing ratios required during field application.
- ✓ Fewer handling logistics and equipment compatibility issues.

Improved Performance: Combined remedy maximizes the inherent geochemistry of a “post-oxidation” environment for biologically based attenuation to prevent “rebound.”

- ✓ The ferrous iron and sulfide promote the formation of pyrite to combat the toxic effects of sulfide and hydrogen sulfide accumulation while also providing a means of removing targeted organic and inorganic contaminants via precipitation reactions.
- ✓ Will not mobilize heavy metals or lead to the generation of secondary impact issues such as elevated arsenic or chromium resulting from grossly elevated pH.

Longevity. Uniquely supports long-term, sustained (>2 years), secondary bioremediation processes to manage residuals and prevent contaminant rebound. Iron will remain in place and be active for many years.

Patented Technology. US Patent 9,126,245 and patents pending allow us to utilize our preferred suppliers and protects our clients against external patent claims / monopolized persulfate suppliers.

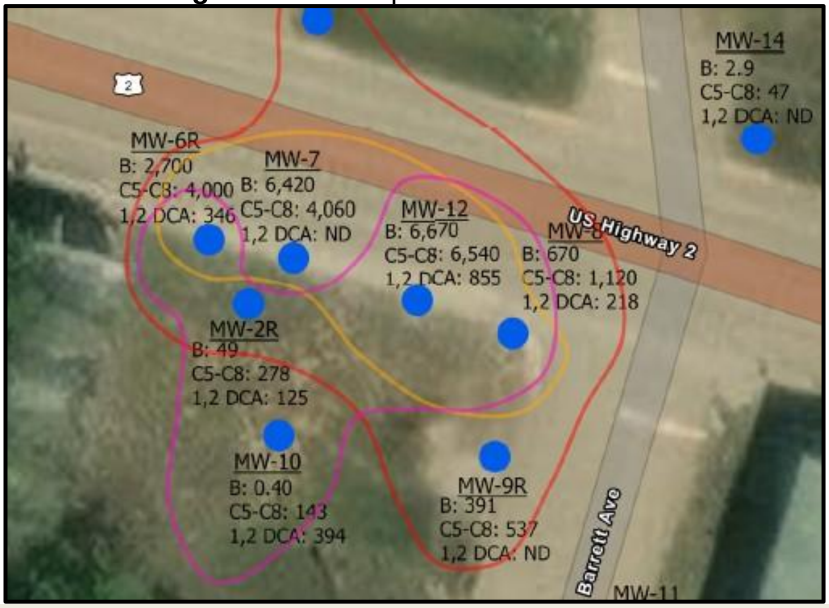
UNDERSTANDING SITE CONDITIONS

The site is a former Conoco fueling station in Dodson, Montana. The site building has been demolished and previous remedial efforts including excavation and treatment with ORS substrates completed. Subsurface soils at the site consist of grayish brown, well-drained, nearly level loams that formed over the Milk River alluvium. Depth to groundwater at the site area typically ranges from 5 feet to 10 feet below ground surface (bgs). Groundwater flow in the vicinity of the facility is generally to the south.

CONCEPTUAL REMEDIAL DESIGN AND MATERIAL REQUIREMENTS

The Remedial Action Objective (RAO) is to reduce the groundwater benzene concentrations to below the MDEQ RBSLs which applies to groundwater and consists of current DEQ-7 Human Health Standards, where available. For compounds without DEQ-7 standards, the risk-based screening levels (RBSLs) have been developed using EPA's RSL equations. To reach the RAO, Provect-OX2 will be applied via fourteen direct push temporary injection points throughout a targeted area proximal to monitoring wells MW-6R to MW-8 laterally down to MW-10 to the south of US Highway 2. The remedial program will focus on an approximate 2100 ft^2 treatment area (**Figure 1**) with a 12-ft vertical treatment interval (e.g., 5 to 17 ft bgs). Based on the provided site data, we recommend a total of 7,000 lbs. of Provect-OX2 is applied or 500 lbs. per injection point. Each injection point will have three vertical injection intervals (e.g., 5 to 8, 10 to 12, and 14 to 17 ft bgs). This will be mixed at a 20% weight/weight ratio (24 gallons water per 50 lb. bag Provect-OX2) resulting in 3,920 total gallons of slurry. This will require 280 gallons amendment slurry per point or 23.3 gallons of slurry per vertical interval foot of treatment. This is within the recommended injection volume of this amendment per vertical foot. The amendment mass of 7,000 pounds of Provect-OX2 represents approximately 0.25% of the treatment soil mass which is also within the recommended dosage of the amendment.

Figure 1: Conceptual Treatment Area



DISTRIBUTION OF RESPONSIBILITIES

For field scale work at the Site, Provectus will provide environmental technology, and design support. Montana DOT (Client) will be responsible for permitting, remedial construction (e.g., drilling and injection), water, performance monitoring and reporting. The distribution of responsibilities envisioned is as follows:

1. Provectus will provide and arrange delivery of Provect-OX2 to the Site.
2. Client will provide remedial construction services (e.g., drilling, injection, crew, etc.).
3. Provectus will provide data interpretation and technical writing support to Client, upon request.
4. Client will provide workforce for monitoring treatment performance and collecting samples.
5. Client will maintain overall project responsibility and control of the Site.
6. Client will be responsible for all health and safety, water, permitting and approvals, sampling and analytical costs along with all data management and reporting costs.

COST ESTIMATE

Provectus material, delivery, and remedial construction costs are presented below.

COST ITEM	**Remedial Program Costs**
Buffered Provect-OX2 Mass Required (lbs)	7,000 lbs.
Buffered Provect-OX2 Unit Price[1]	$3.05 / lb.
Provect-OX2 Cost	$21,350
Shipping, handling, warehousing **Estimate**[2]	$4,590
TOTAL COST[3]	**$25,940**

1) Price valid for 120 days. Price assumes payment within 60 days. Any applicable taxes not included.

2) Shipping rate provided is an estimate. Cost does not include add-ons (liftgate and pallet jack).
3) Provectus terms and conditions apply.

DISCLAIMER

The estimated dosage and recommended application methodology described in this document are based on the site information provided to us but are not meant to constitute a guaranty of performance or a predictor of the speed at which a given site is remediated. The calculations in outlined in our cost estimate regarding the amount of product to be used in your project are based on stoichiometry, and do not consider the kinetics or speed of the reaction. As a result, these calculations should be used as a approximation for purposes of an initial economic assessment.

As part of this proposal, Provectus provides no warranty or representation, expressed or implied, and nothing herein should be construed as to guaranteeing results from use of the products in the field. Our obligation in the event that remedial goals are not met is explicitly limited to the reduced product cost offer outlined above. Furthermore, by providing this estimate, Provectus is not giving any permission or making any recommendation to infringe any third-party patent. No agent, representative or employee of Provectus is authorized to vary any terms of this notice. Provectus is the owner or licensee under various patents, trade secret know-how, and patent applications relating to the use of the products and/or technologies described in this document. All material must be handled in strict accordance with their SDS.

On behalf of Provectus Environmental Products, Inc., we thank you for your interest in our products, services and technologies. Please contact me via email at troy.lizer@provectusenv.com or by phone (330 284-7428) if you have any questions regarding this proposal.

Yours truly,

Provectus Environmental Products, Inc.

via e-mail

Troy Lizer – Technical Director

Appendix C

WCEC SOPs for Field Investigations

WCEC
Standard Operating Procedures

A.1 FIELD NOTES

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

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

A.2 BORING LOGS/ WELL LOGS

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

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

A.3 PHOTOGRAPHS

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

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

A.4 SAMPLE IDENTIFICATION AND SAMPLE LABELS

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

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

A.5 SAMPLE CUSTODY

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

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

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

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

A.6 HEALTH & SAFETY PLAN

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

A.7 SAMPLING/HANDLING PROCEDURES

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

A.8 EQUIPMENT DECONTAMINATION

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

A.9 QUALITY ASSURANCE / QUALITY CONTROL

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

Duplicate water samples are collected to evaluate the variability in laboratory analytical methods. When possible, an additional set of samples is collected from a well with petroleum contamination. This duplicate is labeled as an additional monitoring well and is kept with the other samples to be analyzed for all project parameters.

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

A.10 INVESTIGATION PROCEDURES: Surface Soil Sampling

The following procedure is used to collect surface soil samples:

- Carefully remove the top layer of soil or debris to the desired sample depth with a pre-cleaned spade.

- If volatile organic analysis is to be performed, transfer the sample directly into an appropriate, labeled sample container with a stainless steel lab spoon or equivalent, and secure the cap tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval.

- Place the sample into appropriate, labeled containers and secure the caps tightly; or, if composite samples are to be collected, place a sample from another sampling interval or location into the homogenization container and mix thoroughly. When compositing is complete, place the sample into appropriate, labeled containers and secure the caps tightly.

Solid Investigation Derived Waste (IDW)

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

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

A.11 HEADSPACE ANALYSIS

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

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

A.12 RECEPTOR SURVEY

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

A.13 WELL MONITORING PROCEDURES

Monitoring Well Water Level Measurement

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

Monitoring Well Free Product Measurement

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

Monitoring Well Purging and Sample Collection

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

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

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

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

Disposal of Contaminated Groundwater Monitoring Purge Water

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

Sample Handling

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

Equipment and Work Area Decontamination

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

Chain-of-Custody

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

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

Quality Assurance / Quality Control

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

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

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

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

Survey of Monitoring Wells

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

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

A.14 PROCEDURES FOR LOW-FLOW SAMPLING WITH PUMP

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

- To avoid disturbing particulates, complete a round of water levels before sampling; record water levels and measuring point in logbook.

- Calibrate field water quality instruments at the beginning of each sampling day.

- Wearing gloves, install tubing and/or pump equipment and slowly lower until intake is positioned at selected depth.

- Purge well; if using an adjustable rate pump, adjust pump rate to achieve minimal drawdown.

- Every 5 minutes measure water levels (using an electric water level probe) and pumping rate (using a bucket graduated for volume measurement).

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

A.15 WATER SUPPLY WELL SAMPLING PROCEDURES

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

- Samples are collected from the point in the waterline closest to the well; that is before water is softened, filtered, or heated.

- All aerators, filters, or other devices are removed from the tap before sampling. If possible, samples are taken before the water enters the pressure tank. If that is not possible, the water is run to waste long enough to empty the tank and the water in storage in the pipes. One well volume (and the pressure tank) is evacuated to obtain a sample of fresh aquifer water.

- The water being collected should be withdrawn from the source at a slow rate.

- Water samples are collected according to protocol for laboratory analysis in laboratory-supplied, test-specific sample containers.

- Samples are labeled and logged onto a chain-of-custody form in the field, then stored and shipped at 4° C in an ice-filled cooler along with the completed chain-of-custody. Any pertinent details regarding the samples or sampling procedure are noted in the Site Specific project notebook.