REMOVAL ACTION DESIGN
REPOSITORY REMOVAL AND DISPOSAL
Bonner, Montana

Prepared for
Bonner Property Development

December 2019

SMART Consulting, LLC

REMOVAL ACTION DESIGN
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Bonner, Montana

Submitted to

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REMOVAL ACTION DESIGN

1.0 INTRODUCTION

This removal action design presents the site preparation, removal methods, health and safety requirements, confirmation sampling and haul routes to removal approximately 60,000 tons of impacted soil from the Bonner Mill Repository. This removal action design is an attachment to the Administrative Order on Consent in Docket SF-10-0001 dated April 29, 2010 (AOC).

Soils impacted by polychlorinated biphenyls (PCBs) removed during previous remedial actions at the former Bonner Mill, with concentration between 0.22 mg/kg and 10 mg/kg; ppm, were placed in an onsite repository (**Sheet 1 of 10 Repository Plans Cover Sheet**). Bonner Property Development desires to remove the impacted soil from their property and dispose of the impacted material in the Republic Services Missoula landfill operating under DEQ permit number 116b.

1.1 LOCATION

The Bonner Mill Site is in Bonner, Montana approximately 6.5 miles east of Missoula, Montana. The repository is located approximately 500 feet north of the main entrance gate along US HWY 200. The repository consists of the basement area of the former dry kiln facility and impacted soils placed above ground on the surrounding pavement. Impacted soils sit directly on the former basement concrete to about 10 feet below the ground surface and on the asphalt pavement area at ground level (**Sheet 3 of 10 Repository Plans Work Plan Exhibit #1**).

2.0 BACKGROUND AND APPROACH

Impacted soil from former remedial actions surrounding PCBs released at the old fire pond lagoon, log pond, mill cooling pond and surrounding impacted areas was removed and placed in appropriate facilities under a previous AOC, Docket Number SF-10-0001 dated April 29, 2010. Stimson Lumber Company removed material greater than 10 ppm PCBs and disposed of impacted soils at offsite facilities. Materials greater than 0.22 ppm and less than 10 ppm PCBs were placed in a DEQ and EPA approved onsite repository.

The owners of the Bonner Mill Site, Bonner Property Development, would like to develop the area occupied by the repository because the repository is a growing impediment to the increased traffic at the former mill property. Bonner Property Development reached out to staff at the DEQ, Missoula County and Stimson Lumber Co. to discuss the removal of the impacted soil in the repository area and dispose of the material at the Republic Services Landfill in Missoula. *This work follows the pending approval of an AOC between Bonner Property Development, Missoula Co. and the DEQ.*

2.1 OBJECTIVES

The objectives of the removal action are:

1. Remove approximately 18” of the 24” of vegetated topsoil cover on the repository and stockpile the topsoil for future use. Stockpile will be maintained during removal to eliminate erosion and dust emissions.

2. Remove approximately 60,000 tons of low-level PCB impacted soil from the repository and dispose of the material at the Missoula landfill.

3. Clean remaining earth material from the former dry kiln basement concrete and surrounding asphalt pavement area and dispose of the concrete either in an onsite repository or at the Missoula landfill. Asphalt will be disposed of at the Missoula Landfill. Concrete sampling and analysis will determine the final disposition of the concrete.

4. Using confirmation sampling methods, remove any PCB impacted soil beyond the concrete basement foundation and pavement area to the DEQ industrial standard established for the mill property at 0.74 mg/kg. Materials sampled and found to be below 0.74 mg/kg may remain on site because the site is zoned industrial property by Missoula County.

2.2 SCOPE OF WORK

1. Prepare a Remedial Action Design for approval by the DEQ and EPA. The Remedial Action Design will include a Sampling and Analysis Plan guiding the confirmation sampling process and a Quality Assurance Project Plan to ensure that confirmation soil samples are validated and appropriate for use.

2. Prepare a construction work plan package suitable for contractor bidding and selection. The DEQ/EPA must approve the work plan. The work plan will include the 40-hour HAZWOPER training requirements, a requirement for a contractor health and safety plan, staging area details for loading haul-trucks and cleaning haul-trucks before they leave the site, a traffic plan for the approved haul route, and requirements for covered hauling and dust control. The work plan will be a companion document to this removal action design.

3. Prepare a final removal action report documenting the removal, sample closure results and sample data quality for closure of the repository area.

4. Place controlled structural fill in the cleared repository excavation suitable for construction, level with the existing grade.

5. Assist the DEQ with any additional project close out paperwork, if needed.

3.0 REMOVAL DESIGN

The following work will be completed to remove the Bonner Mill PCB repository materials and haul and dispose of it in the Missoula landfill.

3.1 REMOVAL ACTION DESIGN

Territorial Landworks and SMART Consulting will prepare a construction work plan package for competitive bid. The work plan is a companion document to this design and is subject to DEQ and EPA approval. The work plan will help guide the construction work effort through the requirements of the removal and disposal summarized in this removal action design.

3.1.1 Mobilization

The initial project mobilization will begin following completion, review, and acceptance of the remedial action design and approval of contractor required submittals discussed below. Workforce infrastructure will be established including small equipment storage, sanitary facilities, project office, power, setup of the surveying control points, and communications. Heavy equipment and labor will be mobilized as needed. All equipment will be inspected as it arrives on Site for condition, cleanliness and operability.

3.1.2 Health and Safety

The successful contractor will assign a Health and Safety Officer (HSO) to the project. The HSO serves as the "Site safety and health supervisor" as defined in the "HAZWOPER" regulations (29 CFR 1910.120/1926.65(b)). All workers at the site will need to have their current 29 CFR 1910.120/1926.65(b) HAZWOPER certification.

The HSO is authorized to administer the requirements of the Health and Safety Plan (HASP), the contractor’s Health and Safety Program, and compliance with applicable Occupational Safety and Health Administration (OSHA) regulations on Site.

A HASP will be required from the contractor for the Removal Action. The successful contractor will need to have an approved HASP prior to commencement of work. The HASP, Activity Hazard Analysis, and Site safety procedures that address Site hazards (such as weather-related hazards, electrical hazards, work near water though none is expected during this action, and heavy equipment operation) will be reviewed with all personnel working on Site prior to them starting work. Training will include daily morning safety briefings where employees will review safety issues relevant to the day's activities including changes in work zones, schedules, traffic routes, etc., or review lessons learned from other projects. The HSO implements the provisions of the HASP, conducts and documents training and daily Site safety inspections, and monitors compliance with requirements of the landowner, and OSHA.

3.1.3 Site Preparation

Site preparation will consist of a minimal amount of clearing the planned excavation area around the repository area, as well as the establishment of soil stockpile zones, installation of silt fence and other stormwater controls, as well as the delineation of work and transit zones. BMPs, like silt fencing, straw waddles, and other controls will be installed in accordance with industry standard guidelines as approved by the DEQ. In addition to straw waddles, the storm drains located within the construction zone (**Sheet 3 of 10 Repository Plans Work Plan Exhibit #1**) will have control measures to prevent sediment from entering the drains. Other Site preparation tasks will include construction of onsite haul roads, lay-down areas, and stockpile areas for overburden and PCB-impacted soils, and defining controlled Site-access points for transport trucks (**Sheet 4 of 10 Repository Plans Work Plan Exhibit #2**). Stockpile areas located over unpaved surfaces will be covered with plastic sheeting.

Safety barriers, orange construction fence and signs will be installed to isolate the excavation, haul roads, and other hazardous areas. Locations of these activities will be approved by the Site owner and DEQ (**Sheet 3 of 10 Repository Plans Work Plan Exhibit #1**).

3.1.4 Delineate Excavation Limits

The excavated material will be classified as one of the four following types:

1. Soil and impacted materials with PCB concentrations below 0.74 ppm are deemed acceptable to remain within the excavation limit.
2. Soil and impacted materials containing equal to or more than 0.74 ppm but less than 10 ppm PCBs are acceptable for disposal at the Republic Landfill in Missoula.
3. Concrete containing PCB concentrations below 0.74 ppm are deemed acceptable for disposal onsite pending DEQ approval.
4. Concrete with concentrations greater than 0.74 ppm will be disposed of offsite at the Missoula landfill.

Soil excavation, segregation, and disposition will be based on the soil analytical results obtained during confirmation sampling. The extent of the final excavation will be further guided by the results of in-situ soil confirmation sample analysis. A final survey of the excavated area will be used to produce as-built drawings documenting the removal action.

3.1.5 Excavation and Stockpiling

The project start date will depend on an agreement between the DEQ, stated in the approved AOC. The work is currently planned with an approximate 45-day performance period. Excavation will begin after the erosion control features, truck inspection area, and support structures have been installed and approved by DEQ.

Materials characterized as having PCB concentrations exceeding Site cleanup levels will be excavated using methods and equipment selected by the successful contractor as necessary for

completion of the work. Excavation will begin on portions of the repository above existing grade. Excavation will continue on the portion of the repository in the former Dry Kiln basement and asphalt pavement area. Excavation will progress to the vertical and horizontal of the concrete basement footing and slab, then concrete will be cleaned and removed. Asphalt pavement will be swept and/or vacuumed until all visible dust and debris is removed. During the excavation phase, concrete blocks, slabs, walls will be broken and pulverized to the proper size and with rebar cut to allowable lengths. Concrete over the 0.74 ppm industrial guideline will be disposed offsite.

An over-the-road truck loading area will be established adjacent to the excavation zone to minimize material handling (**Sheet 4 of 10 Repository Plans Work Plan Exhibit #2 and Sheet 5 of 10 Repository Plans Work Plan Exhibit #4**). The loading area will consist of a jersey barrier lane, separating clean loading from the impacted soil and equipment. The loading area will be outside of the repository limits and can be moved as material is removed, underlying pavement is approved as clean as described in 3.1.6.1. The truck loading area will be underlain by plastic sheeting and will be cleaned, as needed, to minimize impacted material contact with the truck tires (**Sheet 10 of 10 Repository Plans Detail Sheet**). If significant impacted materials are spilled in the loading area, the plastic sheeting should be rolled-up and disposed as waste at the landfill. After the tarps truck covers have been secured on each truck bed, the trucks will be inspected and broom-swept (as necessary) prior to being released for offsite transport and disposal. Due to scheduling this work during the cold season, ground conditions should remain frozen minimizing the amount of mud and other materials sticking to equipment and truck beds. Material disposition as follows:

1. Soil containing more than 0.74 ppm will be loaded directly into over-the-road dump trucks equipped with tarps for transportation to the Republic landfill located in Missoula, Montana. The over-the-road trucks may not be directly loaded on impacted repository soil. Republic approval is pending profile completion.
2. Concrete containing greater than 0.74 ppm PCBs will be removed for off-Site disposal. Concrete containing less than 0.74 ppm PCB's will be disposed of onsite within industrial property.

3.1.6 Confirmation Sampling

When the approximate limits of excavation have been reached and concrete is removed, the base and sidewalls of the excavation will be sampled to determine whether in-situ soils contain PCBs at concentrations less than 0.74 ppm. Analysis of the confirmation samples will be performed with a 2-day turnaround time (TAT) rush analysis. The 2-day TAT will limit delay. See Sampling and Analysis Plan (attached in Appendix A) for more details on sampling protocols, analytical methods, and quality assurance. Confirmation samples will be collected in general accordance with the approved SAP as follows:

1. Any observed staining on exposed and cleaned concrete will be sampled using an incremental sampling methodology including at least 30 subsamples and two replicates of the top one-inch of concrete (see SAP, Appendix A).
2. Base of excavation samples – Any area where sampling confirms impacted concrete, a 25 foot-by 25-foot area (approximately 625 square feet) or lesser area of underlying earth will be exposed, and a sample consisting of at least 30 subsamples and three replicates will be obtained for analysis.

3. Excavation sidewall samples – Any area where sampling confirms impacted concrete, a 25 length by 10-foot height area of underlying earth will be exposed, and a sample consisting of at least 30 subsamples and three replicates will be obtained for analysis.

Confirmation sampling will be collected by a sampling technician wearing disposable nitrile gloves, and using a stainless-steel trowel decontaminated between samples or using a disposable device. Subsamples will be mixed in a decontaminated stainless-steel bowl or disposable plastic container to create composite samples. Samples collected from within excavations will be obtained using safe excavation-entry procedures as described in the HASP. All sampling, sample reservation, shipping, and documentation will be conducted according to standard operating procedures. Chain-of-custody forms will be completed and samples will be placed on ice in coolers for shipment to the lab. Samples will be analyzed by Energy Laboratories of Billings, Montana for PCBs by Method 8082. DEQ will be provided with confirmation sample results within 24-hours of receiving the preliminary results.

3.1.6.1 Pavement Cleaning and Confirmation

Asphalt paving lies beneath most of the repository earth materials. Asphalt that is in contact with PCB impacted repository material will be removed along with two inches of underlying base course material. Areas where asphalt may not be present and repository material is in direct contact with soil, will be sampled on a 25-foot by 25-foot area, using Incremental Sampling Methodology (see SAP, Appendix A).

3.1.7 Dewatering

No dewatering is planned for this work.

3.1.8 Stormwater Protection

Stormwater runoff must be prevented from leaving the construction contaminant zone. There are a number of surface storm drain sumps around the construction zone that need to be protected and/or capped (**Figure 2 – Sheet 3 of 10 and Figure 3 – Sheet 4 of 10**). Minimal best management practices (BMPs) for stormwater pollution prevention runoff include: straw waddles, berms, drain caps, witch's hats and silt fence (**Figure 5 Sheet D1 of D1**). The primary method for controlling storm water runoff will be to contain and collect runoff from impacted areas before leaving the construction site or entering a storm drain. This includes placing hay bales, straw waddles and silt fence in strategic runoff locations. As a contingency could include modification of the construction schedule, if BMPs are deemed not successful. This is considered not likely necessary.

3.1.9 Transportation Methods and Routes

Material to be disposed at the Republic Services Missoula landfill (soils containing more than 0.74 ppm PCBs) will be transported using over-the-road dump trucks with covered beds. These trucks, after being inspected and dry decontaminated onsite, will enter Highway

200 from the main mill entrance traveling south and west to Interstate 90, continuing on Interstate 90 to the Reserve Street exit and thence south to Grant Creek Road, Cemetery Road, Rodgers Street, Shakespeare Street, and Old Coal Mine Road to the landfill entrance. A haul map is shown on **Sheet 6 of 10 Repository Plan Work Plan Exhibit #3 Haul Route**.

3.1.10 Transportation and Disposal of Impacted Materials

PCB-impacted soils and materials with concentrations greater than 0.74 ppm will be transported to Republic Services Missoula Landfill under Special Waste Profile # 50022010828. The waste stream must pass the "paint filter test" (method 9095B) which applies to the soil and material planned for transportation and disposal at its Missoula facility. Bonner Property Development will ensure that these standards are met (e.g., no free liquids over a five-minute test period). Disposed quantities will be tracked using Republic Services' standard weigh tickets that show truck identification, time of arrival, and net tonnage of material delivered to its Missoula landfill.

3.1.11 Traffic Control

Since the haul trucks will be using an existing entrance on the south side of the Site, these drivers will be following the same requirements for current truck traffic in and out of the Site. Signage is necessary to warn traffic of trucks entering HWY 200. Cones, candles and/or barrels will need to cordon off the truck loading area to unauthorized vehicles and prevent traffic from entering the work zone.

3.1.12 Dust Control

Due to the time of year this project will be completed, dust control is not anticipated to be a major issue. In the event of dry periods, a water truck will be used to spray dirt haul roads, the excavation, and any active and uncovered impacted soil stockpiles, as needed, to prevent fugitive dust. All measures for controlling fugitive dust emissions will comply with ARM 17.24.761.

Haul roads constructed for this project will include using as much of the existing paved surfaces through the facility as possible. For those roads to be constructed onsite, these sections will be graded, compacted, and watered, as necessary. Selecting the final onsite haul route alignment will be based on avoiding low areas or where excessive mud and soft spots could be encountered.

The haul roads will be inspected periodically during hauling activities; if dry, the roads will be sprayed with water. The haul roads will not be sprayed excessively, which could lead to excessive mud tracked off-Site as well as vehicle safety hazards. However, all trucks leaving the Site will be inspected prior to exiting the project Site. Haul roads will be cleaned and sampled after the PCB contaminated materials are properly disposed of. A contingency Truck Decontamination Plan is described below in section 3.1.14.1, and includes periodic vehicle confirmation sampling to demonstrate that the decontamination process is sufficient.

3.1.13 Quality Assurance/Quality Control

Excavation limits will be controlled by surveying; this surveying will be supervised and checked by a Montana-licensed Professional Land Surveyor, who will also be responsible for producing the as-built drawings. Excavation and final grading tolerances will be +/- six inches. All sampling activities will be conducted according to the SOPs included in this Design's Appendix A. Samples will be documented using a dedicated field sampling logbook; the sampling technician will complete logbook entries as to date, time, sample location(s), unique sample number, and any unusual observations. Field duplicate samples will be collected at a rate of 5 percent to evaluate data quality. Sample blanks and trip blanks are not considered relevant for this project. Laboratory QA/QC will comply with Energy Laboratories' standard Quality Assurance Manual. Clean material will be generated either onsite through overburden segregation or imported from the Republic Landfill or identified from another source. Material imported from any new sources, other than those identified here, will be sampled and analyzed to confirm that it is suitable for use as fill. Backfill confirmation sampling of off-Site materials will consist of 5-point composite samples collected from stockpiled excavated material and analyzed for PCBs. The analytical results will be provided to the DEQ for review and approval. Backfilled soil will be compacted, using conventional equipment including roller compactors.

3.1.14 Equipment Decontamination

All trucks and equipment leaving the Site will be inspected and decontaminated prior to exiting. Care will be taken during loading operations to minimize tire contact with sediments. Onsite haul roads will be swept clean of mud or other materials. All over-the-road-trucks transporting materials destined for offsite disposal will be inspected, prior to being released from the Site, for visible contamination or soil materials. Dry decontamination methods, including the use of brooms, shovels and other implements, will be employed to remove any loose dirt or materials from the wheels and chassis of these trucks.

3.1.14.1 Truck and Equipment Decontamination Contingency Plan

If dry decontamination is not sufficient or if wet weather persists during construction, additional decontamination efforts may be required. These include set up and maintaining a self-contained, wet decontamination station for all trucks and over the road vehicles. The system proposed for this project is the Desko Environmental Solutions model Maximus II Series, fully self-contained, truck and equipment decontamination station shown in Appendix B (or equivalent as approved by the DEQ). This unit is powered by a stand-alone generator or wired directly to a 220V power drop.

The temporary decontamination station will most likely be stationed near the jersey barrier loading land near the construction site. The contractor will determine the location of the decontamination station in consultation with the DEQ. Depending on the time of year and haul road conditions, each truck may be inspected prior to leaving the site. Since the station is unmanned, the driver will exit his vehicle, activate the unit and proceed across the decontamination platform. Automatic sensors will activate and cycle the wash station pumps as the truck proceeds across the platform and down the ramps. At that point, the driver can inspect the truck and determine if the unit is adequately decontaminated.

The automated wash station is equipped with a solids separation system that allows the unit to be serviced and solids removed using a rubber-tired backhoe or equivalent. When this happens, the solids will be collected and stockpiled on a lined area, sampled with the results determining the final disposition. Water is re-circulated with make-up water brought in on an as needed basis. The water will be allowed to evaporate after final use and the decon station cleaned. Dry sludge will be disposed of as impacted waste.

3.1.15 Final Grading

Final grading of the backfilled excavation will be to the approximate pre-existing surface grade with a positive 2% slope away from the center. The estimated final ground elevations and long-term stormwater features will not be altered after the removal. Depressions, other than those required for stormwater collection/retention, will be eliminated, and the disturbed area will be blended with surrounding areas. The design calls for structurally placed fill to the engineer's designed specifications construction oversight.

3.1.16 Storm Drain Sediment Confirmation Sampling

A composite, confirmation sample will be collected from the bottom of the storm drain dry well within 30 days of construction completion to confirm that the BMPs performed adequately or if any BMPs fail and sediment enters drain. Any impacted sediments will be removed from the storm drain and additional confirmation sample(s) will be collected.

4.0 SCHEDULE

An estimated project schedule is as follows:

90% Design submitted to DEQ	December 6, 2019
First set of DEQ comments sent to SMART Consulting	January 5, 2020
Removal Action Work Plan: approved by DEQ and EPA	April 10, 2020
Invitation to Bid Issued	September 10, 2020
Bid advertisement #1 Missoulian	September 10, 2020
Mandatory Pre-bid meeting	September 21, 2020
Bid due	October 1, 2020
Notice to Proceed	October 28, 2020
Construction complete	December 23, 2020
Weekly On-site Construction Meetings – Throughout Construction	
Final Clearance and Closure:	December 23, 2020
Final Closure Report	February 23, 2020

5.0 DELIVERABLES

Once work is approved to proceed by DEQ, a Bonner Property Development representative will conduct a weekly on-site construction meeting with the contractor and DEQ staff every Tuesday at 10am. The representative will also provide DEQ 48-hour written and verbal notice when the BMPs and fencing are ready to be inspected and approved by DEQ so there is no delay in the work effort for the contractor.

Because the project will only take 6-weeks to complete, Bonner Property Development or their approved representative, will submit a bi-weekly email documenting progress in the removal action to DEQ. The email shall describe all significant developments during the preceding week, including the actions performed and any problems encountered, analytical data received during the reporting period, and the developments anticipated during the next reporting period, including a schedule of actions to be performed, anticipated problems, and planned resolutions of past or anticipated problems.

6.0 REMEDIAL ACTION FINAL REPORT

The work addressed in this design is intended to make all remaining tasks required under the AOC obsolete, because the repository will be removed and no groundwater monitoring around the repository will be required. A draft final report will be submitted to DEQ for review and comments within 60 days of completion of all work under this removal action design. After addressing DEQ's comments, the final report will include a narrative of project activities and all required supporting documents in accordance with the AOC.

A Remedial Action Final Report will be produced and submitted within 60 days of completing all work required by the AOC. The AOC may detail what is required in the Report. As a minimum, the report will include a narrative of project activities, approved deviations from this design (with justifications for any deviations), As-Built drawings, photographs, copies of field log notes, confirmation sample results (both tabulated results and copies of lab reports), data validation, completed transportation and disposal manifests, and a summarized tabulation of disposal weight tickets.

DEQ will submit a letter of work completed once the requirements of this design and AOC are fulfilled and stating that 'no further action' is needed and the project is considered 'completed'.

APPENDIX A
SAMPLING ANALYSIS PLAN/QUALITY ASSURANCE PROJECT PLAN

SAMPLING AND ANALYSIS PLAN
QUALITY ASSURANCE PROJECT PLAN

BONNER MILL REPOSITORY REMOVAL AND DISPOSAL

Bonner, Montana

Prepared for
Bonner Property Development

January 2020

SMART Consulting, LLC

SAMPLING ANALYSIS PLAN/QUALITY ASSURANCE PROJECT PLAN
BONNER MILL REPOSITORY REMOVAL ACTION
Bonner, Montana

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January 2020

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APPENDICES

SAMPLING AND ANALYSIS PLAN/QUALITY ASSURANCE PROJECT PLAN

1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) identifies the soil, concrete, pavement, and materials sampling and analytical procedures that will be employed for removing soils placed in the repository at the former Bonner Mill containing polychlorinated biphenyls (PCBs). This repository contains soil containing between 0.22 mg/kg and 10 mg/kg (parts per million, PPM) PCBs, placed during the remediation of the former Stimson Cooling Pond and Fire Pond Lagoon. PCB containing materials at concentrations greater than 10 ppm were disposed of at approved off-site locations. Previous analysis of the waste placed in the repository concluded that at concentrations below 13 ppm, PCB compounds did not leach from the waste. Project team discussions concluded that waste was placed on concrete and asphalt paving in the repository and is not in contact with the soil. The project team concluded that all asphalt in contact with repository soil will be disposed of as waste. The project team determined that concrete exposed after removal of the repository material and will be visibly inspected for staining. Stained concrete will be sampled and analyzed as per Section 3.0 below.

The work is being conducted on behalf of Bonner Property Development in coordination with Stimson Lumber Company and Missoula County and under the regulatory supervision of the requirements of the Montana Department of Environmental Quality (DEQ).

The confirmation sampling requested by the DEQ will:

1. provide validated data for:
    a. guiding the excavation and disposal of PCB-impacted material containing more than 0.74 part per million (ppm) PCBs that will be disposed of off-site to the Republic Services Landfill in Missoula, MT.

1.1 PROJECT DESCRIPTION

Bonner Property Development desires to use the area occupied by the repository and will engage a contractor to remove soil and dispose of impacted soils at the Republic Services Landfill in Missoula. This SAP was requested by the DEQ, in consultation with EPA, to develop sampling strategies to confirm that PCB impacted soils are removed from the site.

1.2 PROJECT OBJECTIVES

The objectives of this confirmation sampling plan are to assess the concrete and/or soils beneath the repository for PCB concentrations after impacted soil and any impacted underlying concrete are removed. Concrete will also be characterized where visible oil staining is present on the concrete. The data will be used to: characterize the soil beneath the repository; characterize the concrete; and, determine if the repository excavation is suitable for backfill and closure.

2.0 DATA QUALITY OBJECTIVES

Data quality objectives (DQOs) are qualitative and quantitative statements that define the types and quality of information and data necessary to support decision making. DQOs for this investigation were developed consistent with the seven-step process described in *Data Quality Objectives Process for Hazardous Waste Site Investigations* (EPA, 2000). The DQO process is an iterative planning approach used to develop sampling designs to collect the right type, quantity, and quality of data to support decision making.

The seven steps of the process are as follows:

Step 1: State the problem;
Step 2: Identify the decision;
Step 3: Identify the inputs to the decision;
Step 4: Define the boundaries of the investigation;
Step 5: Develop a decision rule;
Step 6: Specify tolerable limits on decision errors; and
Step 7: Optimize the design for obtaining data.

2.1 PROBLEM STATEMENT

Step 1 of the DQO process is to define or describe the environmental problem to be studied so that the focus of the study will be unambiguous. To accomplish this, the following tasks need to be completed:

- Describe the problem; and
- Develop a conceptual model of the environmental hazard to be investigated.

Problem Description: An onsite repository contains PCB impacted soils with concentrations between 0.22 ppm and 10 ppm. The soils beneath the any removed impacted concrete should be below the 0.74 ppm industrial soil clean-up level prior to backfill and closure.

Conceptual Model: Based on historical sampling, soil placed in the repository on a concrete basement slab and footing contain elevated concentrations of PCBs at concentrations between 0.22 ppm and 10 ppm. Low level Extractable Petroleum Hydrocarbons are present in some of the backfill. Groundwater monitoring from wells surrounding the repository have not detected PCBs or in the water. Tests of the waste placed in the repository concluded that at concentrations less than 13 ppm, PCB compounds did not leach from the soil. This suggests that concrete and soil should not be impacted with PCB compounds.

2.2 DECISION REQUIREMENTS

This step identifies the principal study questions and defines options for addressing those questions. The outputs for this step are decision statements that link the principal study questions to possible actions that will solve those questions. To accomplish this, the following tasks need to be accomplished:

- Identify the principal questions;
- Define alternative actions;
- Develop decision statements; and
- Organize multiple decisions.

The principal questions focus on determining PCB concentrations for industrial properties planned for redevelopment to determine if material disposal is required and how material requiring disposal should be disposed of. The principal questions are:

Principal Study Questions	Decision Statements and Alternative Actions
Has PCB data adequate for the purpose of determining removal and disposal requirements been collected in the past?	If yes, prior sample collection results will be compiled and compared to the 0.74 ppm PCBs action levels to determine if additional removal/disposal is required. If no, additional soil data collection will be conducted; and the results compared to the site-specific action levels to determine if additional removal/disposal is required.

2.3 DECISION INPUTS

This step identifies the information required to resolve the decision statements.

- Identification of the needed information.
- Use the approved soil cleanup action levels for the soil beneath the removed repository.
- Develop a list of information that may be important for future data use. This includes ensuring that the newly collected data/information can be merged into, or is compatible with, an existing database.
- Confirm that sampling and analytical methods exist to meet detection limit criteria and action levels.

Information Needed: Soil and concrete samples will be analyzed for PCBs using EPA Method 8082a. Sample collection will be completed by SMART Consulting.
Action Levels: Risk-based action levels for solid media have been established for the repository site. PCBs are the primary contaminants of concern (COCs). The DEQ action level for PCBs in soil located within an industrial area requiring excavation and off-site disposal is 0.74 ppm.
Integration of New Data: SMART Consulting will ensure that standard practices are employed during this sampling and analysis campaign so that the analytical results will be internally consistent and comparable with other similar studies, to the extent possible.
Sampling and Analytical Methods: The media to be sampled, sampling procedures, analytical parameters, expected parameter concentrations, and laboratory methods planned for this investigation are consistent with standard guidelines and practices as described in the SAP.

2.4 STUDY BOUNDARIES

This step defines the spatial areas to which decisions will apply and determines where, and

when, data should be collected.

- Define the target population of interest;
- Specify the spatial boundaries that clarify what the data must represent; and
- Determine the practical constraints on collecting data.

Target Population of Interest: The target population of interest includes the repository fill materials.
Spatial Boundaries: The general spatial boundary is areas within the Bonner Mill Site as defined by the repository area on **Sheet 1 of 10 Repository Plans Cover Sheet**.
Practical Constraints on Collecting Data: Practical constraints on data collection include weather conditions.

2.5 DECISION RULE

This step includes the following:

- Specify the parameters important to making decisions about the target populations;
- Select action levels that set the boundaries between one outcome of the decision process and another outcome; and
- Select the measurement and analytical methods capable of performing over the expected range of values and verify that the action levels are greater than the detection limits of the measurement method when practicable.

Parameters and Action Levels: The key parameters for this investigation are concentrations of PCBs. The industrial remediation goals for PCBs in solid media is 0.74 ppm (mg/kg) and will apply throughout the removal action areas of interest.
Sample Analysis: Samples collected during this effort will be analyzed in accordance with standard EPA and/or nationally accepted analytical procedures, or by alternative methods if approved by the EPA in consultation with DEQ. The analytical laboratories will adhere to all applicable QC requirements established by the methods approved.
Data Usability: Data generated under this sampling and analysis QA/QC work plan will be evaluated in accordance with appropriate criteria contained in the document, "Guidance on Environmental Data Verification and Data Validation" (EPA, 2002). If the data are determined to be unusable, then re-sampling may be necessary.

2.6 ACCEPTANCE CRITERIA

Decision makers are interested in knowing the true value of the constituent concentrations. Since analytical data are only estimates of the true values, decisions that are based on measurement data could be in error, which is referred to as decision error. There are two reasons why the decision maker may not know the true value of the constituent concentration, these are:

(1) Concentrations may vary over time and space. Limited sampling may miss some features of this inherent variation because it is usually impossible or impractical to measure every point of a population. Sampling design error occurs when the sampling design is unable to capture the complete extent of variability that exists in the true state of the

environment.
(2) Analytical methods and instruments are never absolutely perfect; hence a measurement can only estimate the true value of an environmental sample. Measurement error refers to a combination of random and systematic errors that inevitably arise during the various steps to the measurement process.

The combination of sampling design and measurement error is the total study error. Since it is impossible to completely eliminate total study error, steps to reduce or control sampling and analytical error are to be employed so that decision error is minimized. These errors may lead to either over-estimating or under-estimating the concentration of contaminants in site media. Over-estimating contaminant concentrations could result in the removal of solid media that is not a risk and the wasting of resources. Under-estimating contaminant concentrations may result in leaving contaminated soil in-place. To minimize decision errors, the following steps are anticipated:

- identifying representative portions of a soil component for subsurface soil sampling;
- for composite sampling, careful compositing of subsamples following Standard Operating Procedures (SOPs);
- for discrete sampling, careful collection following Standard Operating Procedures (SOPs);
- the use of field quality assurance (QA) samples (duplicates, trip blanks, decontamination blanks);
- rigorous adherence to approved chain-of custody protocols;
- proper laboratory sample preparation;
- analytical determination is conducted while instrumentation is shown to be in statistical control;
- acceptable laboratory QA results; and
- data generated under this sampling and analysis plan will be evaluated in accordance with appropriate criteria contained in the document," Guidance on Environmental Data Verification and Data Validation" (EPA, 2002).

All the information and data gathered during this evaluation will be checked by a qualified environmental professional to ensure they are usable for their intended purposes. For the laboratory analytical data, an evaluation of analytical control limits and of the precision, accuracy, representativeness, completeness, and comparability parameters will be performed. Data results will then be discussed in the context of the risk-based action level, and it will be determined if the total study error could result in an incorrect decision. Using this approach, the probability of making an incorrect decision (i.e., either a false negative or positive) based on the information collected is considered small.

2.7 OPTIMIZE THE DESIGN

This step identifies a resource-effective data collection design for generating data that are expected to satisfy the DQOs. The data collection design (i.e., sampling program) is described further in Section 3.0 of the SAP.

3.0 SAMPLING PLAN

3.1 SAMPLING TYPES

An Incremental Sampling Methodology will be used on Decision Units where a mean concentration of PCBs is desired over the sampling Decision Unit (ITRC, 2012).

1. Stained concrete confirmation:
    a. PCB-driven repository base confirmation sampling – After PCB impacted soil is removed, oil staining on the underlying concrete could imply that PCBs leached unexpectedly from the repository soil. The action level for PCB compounds on the surface of the concrete will be 0.74 ppm. Impacted concrete will be disposed of at the Missoula landfill and the soil beneath the removed concrete will be sampled.

2. Soil removal confirmation:
    a. PCB-driven excavation confirmation sampling – When the approximate limits of the planned excavation beneath removed impacted concrete have been reached, the base and/or sidewalls of the excavation will be sampled to determine whether remaining soils beneath the removed stained concrete contain PCBs below the action level. The excavation base or sidewall PCB action level will be 0.74 ppm.

2. Backfill Material – Material proposed for use as backfill will be sampled to confirm that the material is acceptable prior to importation for use on site after the removal action.

Bonner Property Development will notify DEQ two days in advance of significant sampling activities and DEQ will be afforded the opportunity to collect and analyze split samples.

3.1.1 Excavation Extent Sampling

Soil containing more than 0.74 ppm PCBs will be disposed at the local Missoula landfill. Concrete containing more than 0.74 PCBs will be disposed of at the local Missoula landfill.

3.2 PCB SAMPLING REGIME

Bulk samples will be collected from any oil stained concrete at the base of the repository that was part of the former Kiln building basement foundation and slab. Samples will be submitted for laboratory analysis using EPA Method 8082a. Samples will be pulverized in the field prior to placing in sample jars for analysis. Sample results will determine the proper disposition of removed concrete. Stained concrete will become a PCB Decision Unit for PCB confirmation samples. The size of the Decision Unit will be based on the size of a stain. Whether a stain is 25 feet by 25 feet size or three feet by three feet, at least 30 random, unbiased surface samples of equal volume will be collected from the Decision Unit and combined to form a single sample. The 30-sample process will be repeated three times to have three replicate samples of a Decision Unit. The three replicate

sample results will be used as a mean concentration of any stained concrete surface. Concrete containing greater than 0.74 ppm PCBs will be removed and disposed of at the Missoula landfill.

3.3 EXCAVATION CONFIRMATION PCB SAMPLING

The extent of the final excavation for PCBs contamination beneath removed impacted concrete will be guided by excavation base and/or sidewall soil confirmation sample analyses. Excavation will cease when confirmation sampling indicates that soil contains less than 0.74 ppm PCBs.

In cases where action level exceedances remain, additional material in that area will be excavated and the new base or sidewall(s) sampled until no exceedances remain in-situ. All final confirmation samples will be analyzed quantitatively (by EPA Method SW8082a). Confirmation samples will be collected as follows:

- Base of excavation samples below removed concrete – three PCB sample containing 30 individual soil samples will be collected for every 25-foot by 25-foot area (approximately 625 square feet, or less). Very small areas of removed concrete will be sampled in the same manner.
- Excavation sidewall samples – three PCB composite sample, consisting of 30 individual subsamples, collected from sidewalls every 25 lineal feet by ten feet (height) of sidewall will be analyzed for areas of sidewall concrete removed.

3.4 DECONTAMINATION CONFIRMATION SAMPLING

A visual inspection of all trucks leaving the site will be made to confirm that trucks are clean of any excess material or thick dusts. If necessary, excess material build up (i.e. caked soil) on equipment will be sampled by scraping or brushing the material from the equipment with a decontaminated stainless-steel spoon or brush and composited. The composited sample will be tested for PCBs. As part of the decontamination plan, if necessary, decontamination sampling will be conducted to verify the decontamination of equipment used to perform the sampling and removal action activities.

Any decontamination waste solids or liquids will be disposed of in the active excavation and included within the contaminated soil matrix.

3.5 SOIL SAMPLE COLLECTION

3.5.1 Soil Sampling Depths

If material is in place, a sample will be collected based on criteria stated in relevant previous sections. The depth increment sample shall be collected from the entire interval and not biased by sample mass collected largely from the top or bottom of the increment. Decisions regarding the collection depths of samples will be made in the field by sampling personnel and approved

by on-site DEQ personnel. Excavation closure samples will be collected from the top six inches of exposed earth.

3.5.2 Soil Sample Compositing

For all composite sampling, the composite sample will be submitted to the laboratory for analysis. During the homogenization process, large particles (greater than 0.5 inches in diameter) will be discarded. The sampler will record the soil properties, such as surface conditions, presence and average diameter of rock, and presence of roots. Samples will be collected by a sampling technician wearing disposable nitrile gloves, and using a stainless-steel trowel decontaminated between samples or using a disposable sampling device. Subsamples will be mixed in a decontaminated stainless-steel bowl or disposable plastic container. Samples collected from within excavations will be obtained using safe excavation-entry procedures as described in the Health and Safety Plan (HASP).

3.6 SAMPLING MAPS

A field figure of each soil unit to be sampled will be created to document individual soil components, sample locations. All subsample locations shall be shown on this map. Locations of all sampling will be recorded on with global positioning system (GPS) survey equipment or other available survey equipment in accordance with the site topography. For stockpile sampling, a sketch of the stockpile and sampling locations will be recorded in the field notebook.

3.7 ANALYTICAL METHODS

The samples will be analyzed for PCBs using Gel Permeation Chromatography (GPC) methods described by EPA Method SW8082a (EPA, 2005). Energy Labs is proposed to complete the lab analysis for the samples. Energy Labs reporting limits (RLs) for EPA Method SW8082a are 0.5 ug/L.

3.8 STANDARD OPERATING PROCEDURES FOR SAMPLING ACTIVITIES

The following standard operating procedures (SOPs) will guide the soil and composite soil sampling activities for the project. Individual SOPs are attached in Appendix:

SOP 12 Soil Sample Collection
SOP 20 Equipment Decontamination
SOP 21 Field Documentation
SOP 22 Sample Documentation
SOP 23 Sample Packaging and Shipping
SOP 24 Composite Soil Sample Collection
SOP 25 Concrete Sampling

4.0 QUALITY ASSURANCE PROJECT PLAN

4.1 FIELDWORK DATA QUALITY

4.1.1 Decontamination

Latex gloves will be worn during sampling to minimize potential cross-contamination. Used gloves will be discarded after sampling and a new pair will be worn for sampling at each sampling location. Pre-cleaned sample containers provided by the laboratory will be used for all samples. Sample containers will be filled and/or compacted, and inspected to insure there is no headspace within the container. After each sample is filled, it will promptly be placed into a cooler containing ice.

All sampling equipment will arrive at the site fully decontaminated. Equipment will be decontaminated between each sampling station, during each sampling station, after each sampling station, and prior to leaving the site. All sampling equipment will be decontaminated according to the following protocol:

- Clean with tap or bottled water and a non-phosphate laboratory detergent, using a brush to remove particulate matter and surface films.
- Triple rinse with tap water.
- Single rinse with a 75%-25% methanol-tap water blend.
- Triple rinse with tap water.
- Triple rinse with deionized water.

4.1.2 Sample Labeling

Each sample will be labeled with a unique identifier consisting of project number-sample location-sample number. Combined with the sampling date and time, this provides unique identification for database management. **Table 4-1** (Sample Nomenclature) identifies the nomenclature, sample type, and location of the samples to be collected. **Table 5-2** shows the sampling requirements and containers. **Table 5-3** (Quality Assurance and Quality Control Sampling Plan) identifies the number and type of QA/QC samples to be collected.

Table 4-1 Sample Nomenclature

Sample ID#	Project Name	Sample Grid Location	Sample Depth Interval
BR-B01.2-6	BMR	B01.2	6,12,18,…

Notes: BMR – Bonner Mill Repository
B # - Grid Square Location Row B
BO1 – Sample Column Number in Grid Row B, .2 – second sample from grid location
6 – Depth Interval in Inches

4.1.3 Requirements and Containers

Table 4-2 Sampling Requirement and Containers

Sampling Objective	Matrix	Parameter	EPA Method	Sample Container	Sample Preservation	Holding Time
Presence and Magnitude of Contamination	Soil	PCBs	SW8082a	One, 4oz. glass jar	4º C	14 days

4.1.4 Quality Assurance Quality Control

Table 4-3 Quality Assurance and Quality Control Sampling Plan

Sample ID (example)	Analytical Laboratory	Quality Control Sample Type	Rationale
BR-0000-DP#	Energy	Duplicate	Provide information about the effect of each sample matrix on the sample preparation procedures and the measurement methodology
BR-0000-EB#	Energy	Equipment Blank	Provide information about potential cross contamination effects of decontamination procedures
Lab QC	Energy	Lab Quality Control	Provide information about the effect of each sample matrix on the sample preparation procedures and the measurement methodology

The quality of analytical data collected in the field will be evaluated by the following sampling procedures.

- Equipment blanks will be collected from distilled/deionized water rinsate which are collected at the conclusion of equipment decontamination in the field. The rinsate will be submitted to the laboratory "blind" in the appropriate sample container with required preservatives. Equipment blanks should contain no parameter of interest greater than two times the method detection limit. An equipment blank exceeding this limit will trigger an investigation of contaminant sources and corrective action. Equipment blanks are generally required where non-dedicated sampling equipment is in use to insure against cross contamination. One (1) equipment blank will be collected from rinsate after completion of one-day fieldwork. The equipment blank will be analyzed for PCBs.
- Field duplicate samples will not be collected to assess combined field and laboratory precision. Three replicate samples will be collected from each Decision Unit sampled.

4.1.5 Fieldwork and Sample Documentation

All sample documents will be completed legibly, in ink in a bound logbook. Any corrections or revisions will be made by lining through the incorrect entry and initialing the error. The

following sample documentation will be maintained: field logbook, sample labels, chain-of-custody record, and custody seals. Specific procedures for sample documentation are discussed in Sections 4.2 and 4.3.

4.1.6 Field Logbook

The field logbook is a descriptive notebook detailing site activities and observations so that an accurate account of field procedures can be reconstructed in the writer's absence. All entries will be dated and signed by the individual making the entries and should include (at a minimum) the following information:

- Site name and project number
- Names of personnel on site
- Dates and times of all entries (military time preferred)
- Descriptions of all site activities, including site entry and exit times
- Noteworthy events and discussions
- Site observations and weather conditions
- Identification and description of samples and locations
- Subcontractor information and names of on-site personnel
- Date and time of sample collections, along with chain-of-custody information
- Record of photographs
- Site sketches

Optional, but pertinent, information is the sampling location. Sample labels will be securely affixed to the sample container. Tie-on labels can be used if properly secured.

4.1.7 Chain-of-Custody Record

A chain-of-custody record will be maintained from the time the sample is collected to its final deposition. Every transfer of samples and custody will be noted and signed for, and a copy must be kept by each individual who signs. When samples (or groups of samples) are not under the direct control of the individual responsible for them, they will be stored in a locked container sealed with a custody seal. The chain-of-custody record should include (at a minimum) the following:

- Sample identification number
- Sample information
- Sampling location
- Sampling date
- Names and signatures of samplers
- Signatures of any individuals with control over samples

4.1.8 Sample Handling and shipment

Before shipping, each sample jar will be sealed, and caps will be secured with custody seals.

Sample jars will be labeled as described above. Sealed containers will be placed in the appropriate transport containers, and the containers will be packed with an appropriate absorbent and packaging material. All sample documents will be affixed to the underside of each transport container lid. The lid will be sealed, and custody seals will be affixed to the transport container.

4.2 CUSTODY SEALS

Custody seals demonstrate that a sample container has not been tampered with or opened. The individual in possession of the samples will sign and date each seal, affixing it in such a manner that the container cannot be opened without breaking the seal. The name of this individual, along with a description of the sample packaging, will be noted in the field logbook. All packaging, marking and labeling, and shipping of hazardous materials will be completed in accordance with U.S. Department of Transportation (DOT) regulations. In addition, air carriers that transport hazardous materials, in particular, Federal Express and Airborne Express, require compliance with the current edition of the International Air Transport Association (IATA) dangerous goods regulations, which apply to shipment and transport of hazardous materials by air carrier. Following current IATA regulations will ensure compliance with DOT regulations.

4.3 QUALITY ASSURANCE REQUIREMENTS

The following requirements apply to the respective QA objectives and parameters identified in Section 4.0. The following QA protocols for QA data are applicable to all sample matrices:

1. Provide sample documentation in the form of field logbooks and chain-of-custody records. Chain-of-custody records are optional for field screening locations.
2. Summarize and document all instrument calibration and performance check procedures and methods in the field or instrument logbook.
3. Determine and record the detection limit, along with the data, where appropriate.
4. Document sample holding times, including sample collection and analysis dates.
5. Provide initial and continuing instrument calibration data.
6. Collect performance evaluation samples, if appropriate.

Additional QA/QC procedures are described in the SOPs (Appendix A).

4.4 DATA VALIDATION

Definitive data validation requires that at least 10 percent of the samples in the laboratory data package be evaluated for all of the elements listed in Section 4.1.3; for the remaining samples, precision, accuracy, error determination, detection limits, and confirmed identification will be reviewed. Definitive data validation also requires review of all elements, for all samples, in each

analyte category in every tenth data package received from a laboratory. Data generated under this sampling and analysis QA/QC work plan will be evaluated in accordance with appropriate criteria contained in the document," Guidance on Environmental Data Verification and Data Validation" (EPA, 2002). The results of 10 percent of the samples in the analytical data packages should be evaluated for all of the elements listed in Section 4.1.3. The holding times, blank contamination, and detection capability will be reviewed for all remaining samples.

5.0 REPORTING

Upon receipt of the PCBs, EPH, and potentially other parameter results, validated data will be submitted to DEQ for approval of excavation limits and disposal determination. Within 48 hours of receiving data, SMART Consulting will provide DEQ with validated confirmation data to document that cleanup levels have been met. Once all cleanup goals are achieved, a summary report, as described in Section 6.0 of the Removal Action Design, will be submitted to all parties.

6.0 REFERENCES

EPA, 2000. *Guidance for Data Quality Objectives Process*: EPA QA/G-4: August 2000.

EPA, 2002. *Guidance on Environmental Data Verification and Data Validation*. Prepared by the Environmental Protection Agency (EPA) as one of its *U.S. Environmental Protection Agency Quality System Series* documents. November 2002.

EPA, 2005. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA publication SW-846.

DEQ, 2008. Circular DEQ-7, Montana Numeric Water Quality Standards. February.

ITRC, 2012. Technical and Regulatory Guidance, Incremental Sampling Technology, prepared by the Interstate Technology Regulatory Council, Incremental Sampling Methodology Team, February 2012.

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APPENDIX A
STANDARD OPERATING PROCEDURES

SOP 12 SOIL SAMPLE COLLECTION

This SOP describes the field equipment and sampling methods for surface and subsurface sampling of soil material. Methods explained in this SOP may be different from those identified in the project-specific Sampling and Analysis Plan (SAP) and the SAP should be referenced for additions or deletions to the methods noted below. All sample equipment should be cleaned before arriving on site.

FIELD EQUIPMENT

Shovel
Stainless steel mixing bowl and sampling trowel
Dilute (10%) hydrochloric acid
Hand lens (10 power)
Measuring tape (10 foot)
pH and electrical conductivity meters (if required)
Munsel color book (if required)
No. 10 sampling screen
Field forms and field book
Hand augers

SURFACE SAMPLING

Surface soil/tailings samples are collected from the surface to a depth of one inch unless otherwise specified in the project specific SAP. Sufficient sample will be collected for the analysis that will be performed but generally this will be on the order of one gallon. Soil samples will be collected in either wide-mouth glass jars or re-sealable polyethylene bags (Ziploc or equivalent).

Samples should be described according to the procedures outlined in the Unified Soil Classification System (USCS; method ASTM D2487) or the Soil Conservation Service (SCS) classification system. Soil texture should be classified by either of the above systems. Descriptions shall be recorded in field books or on standard morphological description logs as provided in the SAP.

Samples should be collected from an area of approximately six square feet by digging up the top inch with the sampling trowel and placing it in the mixing bowl. The sample should be screened

with the 10 mesh sieve if coarse fragments are to be excluded from the sample. If a sod or duff layer is present, this layer should be peeled back to the top of the mineral soil.

The sample placed in the mixing bowl shall be well mixed and then a portion of the sample placed in the sample container. To select a sample from the mixing bowl, quarter the sample in the bowl and place an equal volume of soil from each quarter in the sample container. When sampling for organics, the samples should not be mixed.

All equipment used in the sampling of surface soils will be decontaminated according to the appropriate SOP. All necessary paperwork will be filled out in accordance with the appropriate SOP.

SUBSURFACE SAMPLING

Subsurface sampling will be completed using a bucket auger, split-spoon sampler, or hand-dug or backhoe excavated pits unless otherwise specified in the project specific SAP. Sampling procedures for each type of equipment are described below. Sample collection, homogenation, and transfer to sampling containers should follow the same procedures as outlined for collection of surface samples.

Hand Auger

- Arrive on site equipped with stainless steel auger rod and stainless-steel bucket augers.
- Advance the bucket auger to the desired sampling interval depth and empty the contents of the auger in a stainless-steel mixing bowl. This may require filling and emptying the bucket many times. The auger bucket may need to be decontaminated just before reaching the desired sampling interval.
- Select sample intervals for packaging for laboratory analysis in accordance with procedures described in the SAP.
- Fill out appropriate paperwork and sample labels as necessary before leaving the site.
- Decontaminate all equipment between sample locations.

Split-Spoon Sampler

- The driller provides the split spoon samplers. If geotechnical information is desired a 140 pound drive hammer is required and an 18 inch by 1.4 inch inside diameter split-spoon sampler is necessary. Larger split-spoon samplers may be used if the purpose of the sampling is to collect soil samples.

- Use the drill rig to install sampler into borehole and advance to the desired depth with the 140 pound drop hammer or equivalent means. If geotechnical information, record number of blows to complete sampling over each 18-inch interval, as necessary. Retrieve sampler and place on work table. Using the other sampler, repeat this sequence.
- Split spoons should be fitted with stainless steel or brass sample liners when intact samples are desired.
- Record lithology and percent recovery from cores retrieved from split-spoon sampler.
- Collect the soil sample based upon the project work plan or SAP.
- Decontaminate sampling equipment between each interval sampled if required by the SAP. Decontaminate sampling equipment between sampling sites.

Backhoe or Hand-Dug Excavations

- Locate the site to be sampled and insure that equipment can safely access the site. Minimize off-road travel to prevent off-site damage to surrounding vegetation.
- Orient excavation to maximize use of the angle of the sun to illuminate the pit for photographs. Place excavated material a sufficient distance from the excavation.
- Excavate to the prescribed depth. If the pit exceeds five feet in depth, OSHA construction standards for shoring or sloping must be observed prior to any personnel entering the pit to prevent accidental burials. Sampling personnel should enter the pit with care during and after excavation.
- Never enter a test pit or excavation greater than five feet in depth.
- Soil profile descriptions shall be made from a hand cleaned surface along the pit wall. Complete profile descriptions and take photographs before pit is sampled.
- Soil samples shall be collected from depth intervals specified in the SAP. When a depth interval is sampled, an equal volume of soil should be collected from the entire interval exposed on the pit wall. Soil samples will be collected with the stainless steel trowel and mixing bowl according to methods described for surface soil sampling. When sampling for organics, the sample should not be mixed.
- After sampling is completed, the pit should be backfilled with excavated material in the reverse order that it was excavated so that topsoil material is returned to the top of the pit. When backfilling is complete, the area should be cleaned up to its original condition.
- Decontaminate sampling equipment between sampling sites. Excavation equipment should be cleaned between sites with water (where possible) or with a shovel to remove accumulated dirt and mud.

SOP 20 EQUIPMENT DECONTAMINATION

Field equipment that comes into contact with media being sampled must be decontaminated between sample collection points to avoid cross contamination. When possible, disposable sampling equipment is used. Disposable latex or nitrile gloves must be worn for both sampling and equipment decontamination. Gloves are changed between each sample location. Care should be used to prevent personnel from coming into contact with water used in the decontamination process. Inspect all equipment in the field prior to sampling. If there is any question regarding the cleanliness of the sampling equipment, decontaminate it prior to use.

DECONTAMINATION PROCEDURES

- The decontamination zone should be set up away from the sample collection area.
- If clean water is not available at the site, it will be brought to the site in 5 gallon containers. Fill two clean wash tubs or buckets with clean water. Put an appropriate amount of soap (Enviroclean or other approved soap) into one of the buckets. The other bucket is used as the rinse bucket.
- Inspect the sampling equipment and remove any visible contamination. Clean the equipment in the soapy water followed by a rinse in the clean water. If metals are the object of the sampling, rinse the equipment in a 10% HNO_3 solution. If organics are being sampled, a methanol rinse is used in place of the HNO_3 rinse. All equipment gets a final deionized water rinse.
- Periodically replace the wash and rinse water if they appear dirty. Either squeeze bottles or buckets can be used for the HNO_3 or methanol rinse, depending on the volume of equipment being decontaminated. Collect a decontamination blank, if necessary.
- Properly dispose of all disposable items and wash water.

SOP 21 FIELD DOCUMENTATION

All information regarding field activities and sampling are to be recorded on appropriate field forms or in the field notebook for the site. The project manager or field team leader is responsible for insuring that all information regarding the field activities is recorded. The field forms and notes should contain sufficient detail that the field activities can be reconstructed without relying on memory. The person recording the field data will initial and date the end of each entry at the end of each work day.

Information to be included on the field sheet or field notebook is the following:

- Date and time of beginning daily field work.
- Weather conditions and a description of site conditions.
- Names of all personnel participating in the field event.
- Descriptions of any unusual circumstances or conditions at the site.
- Time and date that samples were collected.
- All information regarding quality control samples.
- Locations and other pertinent information regarding sample collection. If a map is not available a map shall be constructed in the field notes of sufficient detail that an accurate figure can be constructed at the office.
- Details of the work conducted and any field observations.
- Details of any measurements made in the field.

SOP 22 SAMPLE DOCUMENTATION

All samples collected in the field need to accompanied with proper documentation. Sample documentation can be done on either a field sample form or in the field notebook for the site. If a field notebook is used in place of the field sample form, the same information required on the field form must be included in the field notebook. The field form includes date and time sample was collected, any observations about the sample, other measurements taken at the time of sampling, name of the sampler, and any other information required by the sampling plan. The field form or field notebook should contain all the information necessary to complete the chain of custody.

CHAIN OF CUSTODY

A chain of custody form accompanies all samples. The laboratory that is going to analyze the samples generally provides the chain of custody form. Information included on the chain of custody include the date and time the sample was collected, sampler, job contact, and analysis to be performed. Both the laboratory and site work plan should be consulted for the proper laboratory methods to be used on the samples. The chain of custody remains in the possession of the person in control of the samples until custody of the samples is transferred. When possession of the samples is transferred, the chain of custody must be signed and dated by the person transferring possession of the samples.

CUSTODY SEAL

When the cooler containing the samples is shipped to the laboratory, a minimum of two custody seals is placed across the seal between the top and body of the cooler. The person with custody of the samples, the same person who filled out the chain of custody, signs and dates the custody seal prior to placing the seal on the cooler. The custody seal remains in place until the laboratory receives the samples.

SOP 23 SAMPLE PACKAGING AND SHIPPING

All environmental samples should be packaged and shipped using the following procedures:

PACKAGING

- Label all sample containers with indelible ink (on the side, not on the cap or lid, preferably on the label provided with the sample container). Wrap labeled, glass sample bottles with bubble wrap, place samples in Ziploc bag if possible, and place in a high quality cooler containing an adequate amount of ice and/or frozen blue ice (appropriate for season), making sure the cooler drain plug is taped shut.
- Place the samples in an upright position and wrap the samples with absorbent, cushioning material for stability during transport. Samples should not be loose; the cooler should be able to withstand rough handling during shipment without sample breakage. Ice should be placed in Ziploc Bags to prevent samples from getting wet and ruining labels.
- Fill out the appropriate shipping forms, place the paperwork in a Ziploc bag and tape it to the inside lid of the shipping container. Shipping forms usually include a chain of custody form documenting the samples included in the shipment and the laboratory analyses requested for each sample. If more than one cooler is used per chain of custody, put a photocopy in the other coolers and mark them as a copy.
- Close the cooler then apply the signed custody seals and seal the cooler using strapping tape.
- Secure the shipping label with address, phone number, and return address clearly visible.

SHIPPING HAZARDOUS MATERIALS/WASTE

Hazardous materials need to be shipped using procedures specified under Federal Law. Samples need to be shipped in Ziploc bags or paint cans filled with vermiculite, depending on the level of hazard. Special package labeling may be needed. Consult the project manager for specific shipping procedures.

SOP 24 SOIL COMPOSITE SAMPLING

Purpose: Compositing methods will be used when it is desirable to obtain a single sample representing the mean or average characteristics of a soil interval. This technique is good for obtaining average soil contaminant values; however, it tends to mask or obscure variations within the soil column. This procedure applies to samples taken for inorganic analysis. Volatile or semi-volatile organic compounds would be lost using these methods and thus shall not be sampled in this manner.

SAMPLING

The procedure applies primarily to split spoon sampling, but can be adapted to suit other sampling methods.

1. After the spoon is withdrawn from the boring and opened, and the upper several inches of potentially disturbed material is removed and discarded, the sample shall be split lengthwise with a stainless steel knife.
2. One-half of the sample is transferred to a large stainless steel mixing bowl or pan. The other lengthwise half is placed in a glass sample jar and retained as a sample split for that depth interval.
3. This procedure is repeated until the desired number of discrete split spoon samples have been collected for the composite.
4. The material in the mixing bowl or pan is then broken up and mixed thoroughly with a stainless steel spoon or trowel.
5. Careful observation of the soil will indicate when homogenization is complete.
6. The soil is then spread evenly in the bottom of the bowl or pan.
7. The soil mass is quartered, and a subsample taken from each quarter. These subsamples are placed in the sample jar to be sent to the laboratory for analysis.
8. The remainder of the homogenized soil composite is saved and archived as a split.

SOP 25 CONCRETE SURFACE SAMPLING

Purpose: Areas of concrete exposed to hazardous materials will be sampled when it is desirable to obtain a single sample representing the mean concentration of a suspected compound on the concrete surface. This technique is good for obtaining average contaminant values of a pulverized surface. This procedure applies to samples taken for inorganic or semi-volatile organic compound analysis. Volatile organic compounds would be lost using these methods and thus shall not be sampled in this manner without project team agreement.

SAMPLING

The procedure applies primarily to roto-hammer drill sampling, but can be adapted to suit other sampling methods.

1. Site a power source, extension cord or generator near the area to be sampled. A roto-hammer drill with a one-inch boring tip will be used to grind out a one-inch deep core in the surface of the concrete. After the bit is withdrawn from the core, the pulverized concrete is placed in a large sample aluminum or stainless-steel sample tray.
3. This procedure is repeated until the desired number of discrete subsamples have been collected for the sample.
4. The material in the sample tray is then mixed thoroughly with a stainless-steel spoon or trowel.
5. Careful observation of the sample will indicate when homogenization is complete.
6. The sample is then spread evenly in the bottom of the bowl or pan.
7. The soil mass is quartered, and a subsample taken from each quarter. These subsamples
are placed in the sample jar to be sent to the laboratory for analysis.
8. The number of replicate samples of a given concrete area to be sampled will be discussed in the Sampling and Analysis plan.

APPENDIX B
CONTINGENCY MECHANICAL TRUCK WASHER/DECONTAMINATION

System / Products Details

Portable

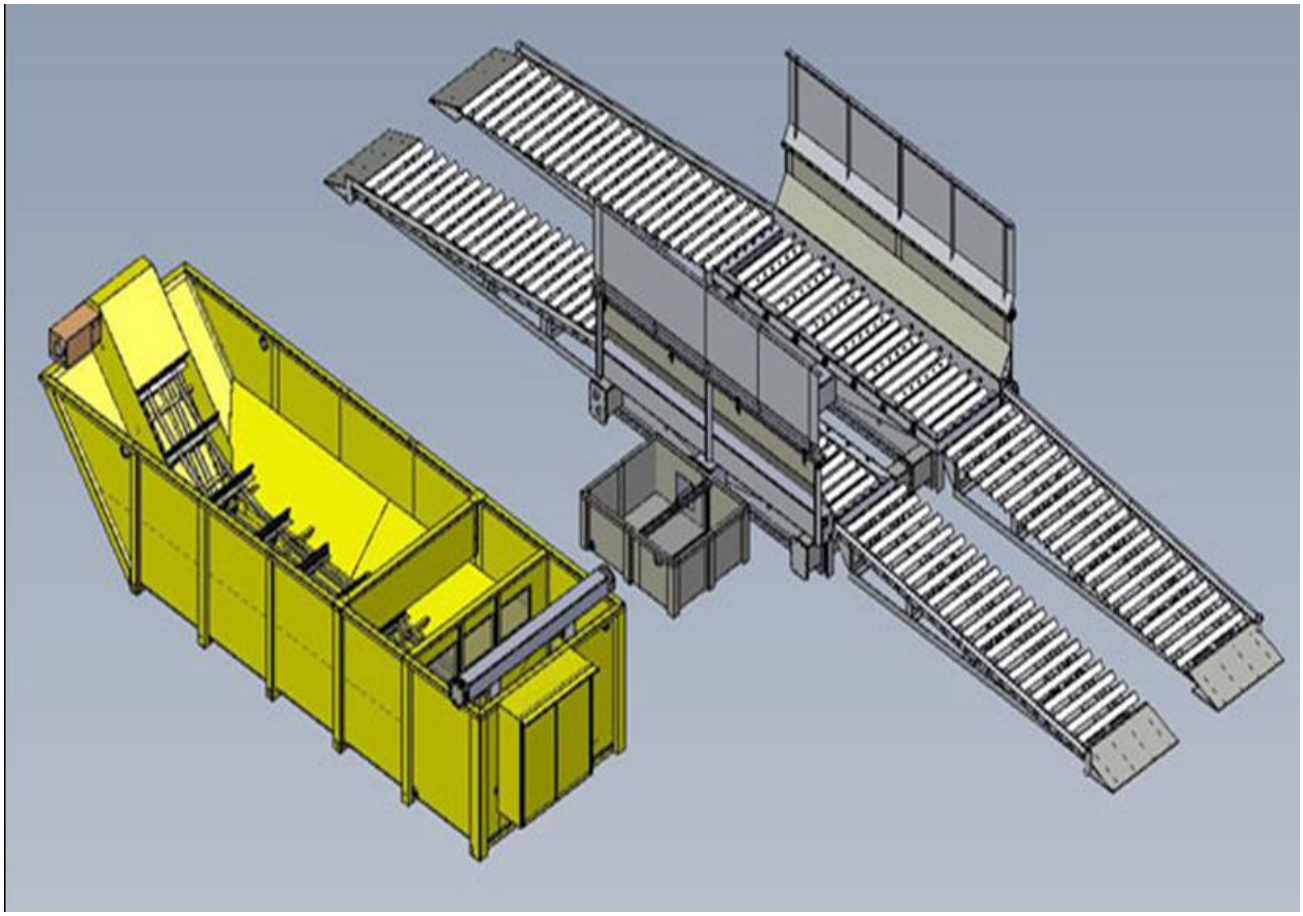
Maximus II

- 1 HOMA 7.5 hp pump with Auto Coupler
- 1 Flex Pro flocculent pump
- Control panel with automatic sensor and 50 feet of cable
- 1 water collection chamber
- 1 HOMA 3.2 hp return pump
- Includes set of ramps
- Can be configured with or with out scraper conveyer

The DES MAXIMUS II is a self contained wheel washing system that delivers two (2) full tire revolutions of cleaning power and is designed for permanent or temporary applications. The Wash Unit in the system is designed to be used either in ground or above ground as the customer chooses without requiring modification to the unit. MAXIMUS II is suitable for all commercial vehicles and trailers that have permitted use on public road

The operation of the system is simple and requires no operator. As the vehicle approaches the wheel wash system, the wash cycle is automatically activated by a Proximity Sensor. A technically engineered spray system creates an effective washing result for the complete length of the vehicle as it slowly drives through the wheel wash system at walking speed. The angled profile construction of the wash area flexes open the tire profiles and supplements the cleaning effect. The MAXIMUS II was specifically engineered using the principle of High volume and Low pressure to eliminate track out and is the ideal solution for this application.

The DES MAXIMUS II is a one (1) wash pump and one (1) return pump system which utilizes state of the art submersible water pumps that are made in the United States. The control panel will be individually configured to meet your site specific requirements in regards to timing and adjustability using readily available and easy to operate standard component parts.



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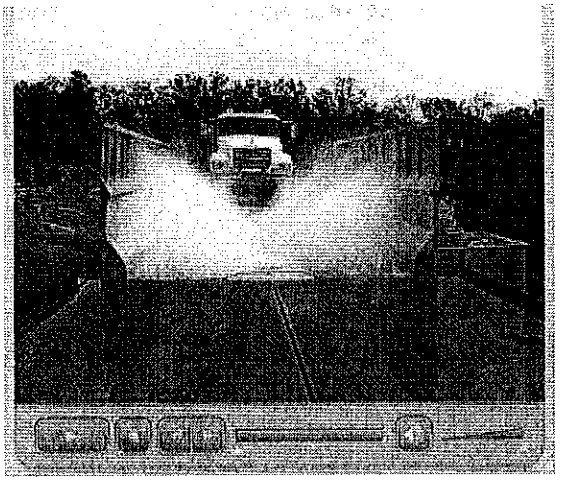
The operation of the system is simple and requires no operator. As the vehicle approaches the wheel wash system, the wash cycle is automatically activated by a Proximity Sensor. A technically engineered spray system creates an effective washing result for the complete length of the vehicle as it slowly drives through the wheel wash system at walking speed. The angled profile construction of the wash area flexes open the tire profiles and supplements the cleaning effect. The MAXIMUS II was specifically engineered using the principle of High volume and Low pressure to eliminate track out and is the ideal solution for this application.

The DES MAXIMUS II is a one (1) wash pump and one (1) return pump system which utilizes state of the art submersible water pumps that are made in the United States. The control panel will be individually configured to meet your site specific requirements in regards to timing and adjustability using readily available and easy to operate standard component parts.

View Video(s)



Maximus III Series

The Maximus III Series of totally portable wheel wash systems offer the ideal solution on sites where no excavation is allowed or where you need the flexibility to easily relocate your system. The Maximus Series is configured with three full tire revolutions. For more cohesive soils, the systems can be outfitted with our Turbo Wash package which includes an extra pump and additional high output nozzles that are specifically designed to target the solids that collect between the dual tires. This Turbo Wash feature, coupled with additional water recycling and solid separation capacity allows the Maximus Series to effectively deal with a wide range of soil conditions. The Maximus Series do not require an operator and are rugged and dependable.

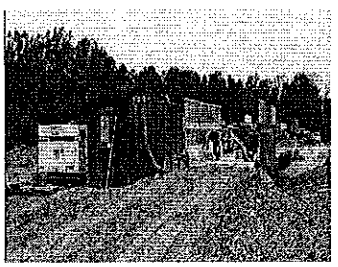
The DES MAXIMUS III is a self contained wheel washing system that delivers three (3) full tire revolutions of cleaning power and is designed for permanent or temporary applications. The Wash Unit in the system is designed to be used either in ground or above ground as the customer chooses without requiring modification to the unit. MAXIMUS III is suitable for all commercial vehicles and trailers that have permitted use on public roads.

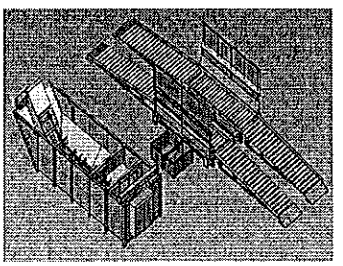
The operation of the system is simple and requires no operator. As the vehicle approaches the wheel wash system, the wash cycle is automatically activated by a Proximity Sensor. A technically engineered spray system creates an effective washing result for the complete length of the vehicle as it slowly drives through the wheel wash system at walking speed. The angled profile construction of the wash area flexes open the tire profiles and supplements the cleaning effect. MAXIMUS III will deliver three (3) full tire revolution of washing cycles to effectively clean the tires. The MAXIMUS III was specifically engineered using the principle of High volume and Low pressure to eliminate track out and is the ideal solution for this application.

The DES MAXIMUS III is a two (2) wash pump and two (2) return pump system which utilizes state of the art submersible water pumps that are made in the United States. The control panel will be individually configured to meet your site specific requirements in regards to timing and adjustability using readily available and easy to operate standard component parts.

- More Information

Additional Product Images:





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