Cleanup Action Implementation Compliance Monitoring Plan

Simplot Grower Solutions
J.R. Simplot Company

Warden, Washington
December 2021

August 2023 Addendum: Figure 1 has been added to this CAICMP per Ecology request on June 28, 2023.

Prepared by:
HDR Engineering, Inc.
412 E. Parkcenter Blvd., Ste 100
Boise, Idaho 83706-6659

Prepared for:
J.R. Simplot Company

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1800 W. 1st Street
Warden, WA 98857

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Boise, Idaho 83706

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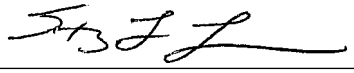

Stacey Lamer, P.E.
Project Manager

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Acronyms

Acronym	Definition
µg/L	micrograms per liter
µg/kg	micrograms per kilogram
AO	Agreed Order
CAICMP	cleanup action implementation compliance monitoring plan
CAP	*Cleanup Action Plan*
CUL	cleanup levels
CY	cubic yard
Ecology	Washington State Department of Ecology
EDB	ethylene dibromide
EDR	engineering design report
GAC	granular activated carbon
HASP	health and safety plan
HDPE	high-density polyethylene
HP	horsepower
IDW	investigation-derived waste
MS	matrix spike
MSD	matrix spike duplicate
MTCA	Model Toxics Control Act
QA	quality assurance
QAPP	quality assurance project plan
QC	quality control
SAP	sampling and analysis plan
SGS	Simplot Grower Solutions
Simplot	J.R. Simplot Company
SOP	standard operating procedure
SVE	soil vapor extraction
USEPA	U.S. Environmental Protection Agency
WAC	Washington Administrative Code

1 Introduction

This *Cleanup Action Implementation Compliance Monitoring Plan* (CAICMP) describes the procedures that the J.R. Simplot Company (Simplot) will perform during the cleanup action at the site, Simplot Grower Solutions (SGS) facility in Warden, Washington. The cleanup action is being conducted pursuant to Agreed Order (AO) DE 16890 and the Model Toxics Control Act (MTCA) regulations (Chapter 173-340 Washington Administrative Code [WAC]) to implement the remedies specified in the *Cleanup Action Plan* (CAP; Ecology 2019). The CAICMP was prepared consistent with the requirements of WAC 173-340-410.

Simplot entered into AO DE 16890 with Washington State Department of Ecology (Ecology) on May 7, 2020, to implement the CAP in accordance with the scope of work and schedule attached to the AO DE 16890.

1.1 Purpose and Objectives

Compliance monitoring includes protection monitoring, performance monitoring, and confirmational monitoring. This CAICMP describes the monitoring that will be performed during the construction, remedial operations and maintenance, and confirmation period of the cleanup action. The purpose of the compliance monitoring is to ensure that the remedy is effective and provides long-term protection of human health and the environment.

The sampling and analysis plan (SAP) (see Section 3), along with the accompanying *Quality Assurance Project Plan* (QAPP; HDR 2021c) (Appendix B), and the *Health and Safety Plan* (HASP) (separate cover)), describe the field and laboratory procedures that will be used during the compliance monitoring period. The purpose of the SAP is to confirm that the cleanup action is working to reduce ethylene dibromide (EDB) in soil and groundwater at the points of compliance. The objective of the QAPP is to maximize accuracy, reproducibility, and comparability of data between sampling events.

1.2 Site Description

Site Name	Simplot Growers Solutions Warden, Washington Site (in Agreed Order Ecology refers to site as Warden City Wells site)
Ecology Facility/sites ID	2802409
Agreed Order	No. DE 16890
Cleanup Site ID (CSID)	No. 1618 (Warden City Water Supply Wells 4&5)
Address	1800 West 1st Street Warden, WA 98857
Location:	GPS: 46.97025 46° 58' 13" North and -119.060309 -119° 3' 37" West UTM: Zone 11 N; 343279.18, 5203918.33 Legal: SW T17N R30E S9 Parcel: 060697000 County: Grant Washington

Ecology Site Manager	Christer Loftenius, LG, LHG State of Washington Department of Ecology Toxics Cleanup Program, Eastern Region 4601 N Monroe Street Spokane, Washington 99205-1295 clof461@ecywa.gov 509.329.3400
Potentially Liable Person (PLP)	J.R. Simplot Company P.O. Box 27 Boise, Idaho 83707
PLP Contact	Molly Dimick, MBA Environmental Engineer J.R. Simplot Company PO Box 912 1130 W. Hwy 30 Pocatello, ID 83204 208.235.5682 molly.dimick@simplot.com
Site Owner	Same as PLP
Work Plan Preparer	HDR Engineering Stacey Lamer 412 East Park Center Boulevard, Suite 100 Boise, Idaho 83706 stacey.lamer@hdrinc.com 208.387.7034

1.3 Plan Organization

This CAICMP is organized into the following sections:

- Section 1 provides an introduction;
- Section 2 describes the compliance monitoring program;
- Section 3 presents the sampling and analysis procedures;
- Section 4 identifies the health and safety requirements; and
- Section 5 describes the reporting submittals.

2 Compliance Monitoring

Compliance monitoring will be conducted in accordance with WAC 173-340-410 to ensure that the remedy is effective and provides long-term protection of human health and the environment. Long-term compliance monitoring is further detailed in the *Groundwater Monitoring Well Construction and Monitoring Plan* (HDR 2021b).

Following are descriptions of the compliance monitoring requirements for the cleanup action, including protection monitoring, performance monitoring, and confirmational monitoring:

- Protection monitoring is performed during the cleanup action to confirm that human health and the environment are adequately protected during the construction and maintenance period of the cleanup action. Protection monitoring for the project is addressed in the site HASP (prepared under separate cover).
- Performance monitoring is performed during the cleanup action and includes sampling and analysis of environmental media to ensure contaminated material above cleanup levels (CULs) have been excavated and stockpiled in preparation of treatment via ex-situ soil vapor extraction. For this project, performance monitoring is focused on sampling and analysis of soils collected from excavation pits and stockpiles. In addition, soil and vapor sampling of the ex-situ soil vapor extraction (SVE) system will be conducted to refine performance parameters and evaluate system performance. Performance monitoring also includes groundwater monitoring until the groundwater EDB concentrations reach the CUL. All performance monitoring parameters are detailed in the Performance Test Plan.
- Confirmational monitoring is performed following the cleanup action to confirm the long-term effectiveness of the cleanup action. Confirmational monitoring includes sampling the soils immediately from each ex-situ SVE treatment pile to ensure the EDB levels are below the CUL. Long term confirmational monitoring will be focused on the groundwater monitoring well network following completion of the remedial action. Confirmation monitoring for groundwater occurs during the time period when EDB concentrations are below the CUL. All confirmational monitoring parameters are detailed in the Performance Test Plan.

2.1 Protection Monitoring

Health and safety measures are required for those individuals working at and visiting the site. The contractor will prepare a site HASP (under separate cover), which will describe health and safety measures, including any protection monitoring necessary during construction activities.

The contractor will have primary responsibility for implementing the HASP during the construction phase of the cleanup action, including protection monitoring for their personnel, subcontractors, and visitors. The contractor's HASP will also include measures, as necessary, to protect surrounding communities and the environment during construction as part of protection monitoring.

The consultant, HDR (environmental consultant contracted by Simplot to oversee activities and provide monitoring services), may perform some protection monitoring tasks for the construction phase of the cleanup action; these tasks will be specified in the HASP. In addition, the consultant will

prepare a separate HASP for compliance monitoring tasks to be performed by its personnel during the construction phase and subsequent confirmational monitoring phase.

2.2 Performance Monitoring

Performance monitoring tasks associated with the cleanup action are summarized below and are described in greater detail in the SAP presented in Section 3.

- Soil sampling and analysis
- Soil vapor sampling and analysis

Also performance monitoring includes groundwater monitoring during the time period when EDB in any well is above the CUL.

2.2.1 Excavation Pit

Soil samples from excavation bottoms and sidewalls were collected and analyzed to verify that soils remaining are less than the EDB CUL of 0.27 micrograms per liter (µg/L). Sampling of the excavation pit generally followed Ecology's *Guidance for Remediation of Petroleum Contaminated Sites* (Pub. No. 10-09-057) and HDR's *Engineering Design Report* (HDR 2021a):

- One sample every 20 feet horizontally along the side walls.
- One sample every 400 square feet of exposed bottom.
- Multiple samples may need to be taken vertically along the side walls for deeper excavations. If the vertical profile exceeds 20 feet, then two samples along the wall (upper and lower sample to be determined in the field), every 20 feet horizontally.

Samples were submitted for EDB analysis per U.S. Environmental Protection Agency (USEPA) Method 8011. Laboratory analysis were performed on an accelerated turnaround basis, as needed, to minimize delays. When confirmation samples equaled or exceeded the EDB CUL, further excavation was performed to remove the affected soil and additional confirmation samples were collected.

2.2.2 Soil Stockpiles

A series of lined stockpiled areas were established:

- Overburden stockpile area (this is surface soil to just above the caliche).
- Caliche material above the impacted soil zone (see *Engineering Design Report* [EDR; HDR 2021a] for explanation).
- EDB-impacted soils as identified from previous sampling (see EDR for explanation) and any additional soils excavated based on in-situ pit bottom and wall confirmation samples.

Overburden and caliche above the impacted zone were reused as excavation backfill. Soil stockpiles were placed on plastic (20-mil or greater) and covered with plastic (6-mil or greater) and secured from the wind and rain to prevent dust and stormwater runoff.

The overburden stockpile soil was sampled. Sampling procedures generally followed Ecology's *Guidance for Remediation of Petroleum Contaminated Sites* (Pub. No. 10-09-057):

- Discrete grab samples were collected (no compositing of soils).
- Samples were collected by hand tools 6 to 12 inches beneath the surface of the pile.
- Piles were divided into sections and each section sampled.
- Number of samples was based on the volume of soil (see Table 6.9 in the above referenced guidance) and are summarized as follows:
    - 100 to 500 cubic yards = 5 discrete samples
    - 501 to 1000 cubic yards = 7 discrete samples
    - 1001 to 2000 cubic yards = 10 discrete samples
    - > 2000 cubic yards = 10 +1 for every 500 cubic yards
- As an example, if the stockpile was estimated at 1,500 cubic yards, then the pile would be evenly divided into 10 sections, and one sample collected from each section for a total of 10 samples. If a sample result exceeded the CUL for EDB, then that section of the pile was considered contaminated and appropriate remediation required.

2.2.3 Ex-situ Soil Vapor Extraction

Approximately 3,000 cubic yards (CY) of EBD-impacted soil will be treated with ex-situ SVE. Due to the size of the stockpiled soil pile and the limits of excavation at the site, the amount of space available for ex-situ SVE is limited. To accommodate space constraints, the SVE contractor will create one treatment bed at the site. The shape and size of each treatment pile will be trapezoid prism with a base area of 80 feet by 10 feet and 5 feet high. Each treatment bed will be able to treat approximately 148 cubic yards at a time. Therefore, it will require approximately 21 batches to remediate approximately 3,000 CY of EDB-impacted soil. The ex-situ SVE treatment bed is anticipated to be located along the southern boundary of the west pit. Actual locations will be determined by the contractor, but all stockpile soils will be on site and within the fenced area.

The EDR (HDR 2021a) addendum for the ex-situ SVE dated May 24, 2021 was approved by Ecology in a letter dated July 20, 2021. A pilot study will be performed to gather performance data necessary for full-scale remediation. Also, refer to the CAP for details on ex-situ system construction, material placement, and operation.

2.2.3.1 PILOT SCALE EX-SITU SOIL VAPOR EXTRACTION

The pilot scale phase will include collection of soil and soil vapor samples as follows:

- The collection of soil samples prior to system operation to determine pre-treatment EDB concentrations, percent moisture and total organic carbon (TOC). Four discrete core soil samples of the treatment pile will be collected randomly using hand tools prior to SVE startup and analyzed for EDB, percent moisture and TOC. Samples will be submitted for analysis of the site EDB per U.S. Environmental Protection Agency (USEPA) Method 8011. Statistical evaluation of the EDB soil data will be conducted in accordance with the procedures outlined in Section 2.3.
- The collection of three sets of vapor samples during the first day of operation (startup/mid-day and end of day) from the sampling ports located at the influent and effluent of the GAC drum (total of 6 vapor-phase samples on day 1) biased towards any elevated PID readings. One set of vapor samples will be collected each day from day 2 to day 5 (total of 2 samples

per day). The vapor samples will be collected using Tedlar bags recommended for EDB and submitted for laboratory analysis of EDB by EPA Method TO-15. Teflon tubing will be used to connect the Tedlar bag to the valve stem.

- The collection of soil samples after 5 days of operation to determine post-treatment EDB concentrations, percent moisture and total organic carbon (TOC). Again, four discrete core soil samples of the treatment pile will be randomly collected after the treatment period is completed and will be analyzed for EDB, percent moisture and TOC. Statistical evaluation of the EDB soil data will be conducted in accordance with the procedures outlined in Section 2.3 to determine if cleanup levels have been met.

- If the post-treatment soil does not meet the EDB CUL, the SVE system will typically continue to run for at least an additional two days minimum before retesting soil.

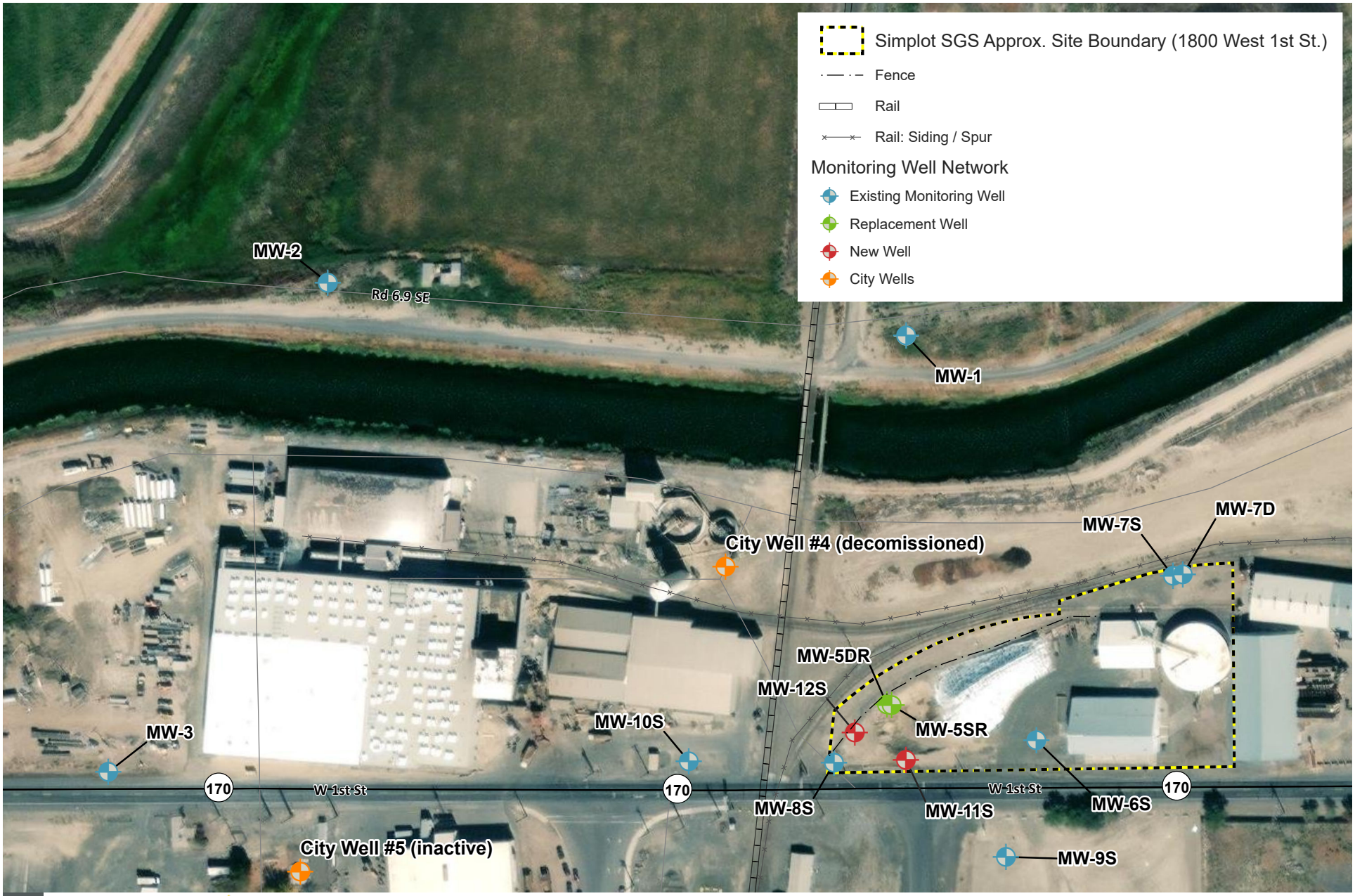
After the completion of the pilot-test phase, the SVE contractor will communicate with HDR and Simplot to incorporate the data and experience gained from the pilot test to develop processing times to expeditiously treat the stockpile of EDB-soil and determine if vapor treatment is required. HDR and Simplot will communicate the results of the pilot study along with recommendations, if any, for modifications to system operation to Ecology.

2.2.3.2 FULL SCALE EX-SITU SOIL VAPOR EXTRACTION

During the full-scale implementation, performance data collection will be limited. Soil samples will be collected after the pilot-determined treatment time and evaluated in accordance with the Section 2.3 if EDB cleanup levels have been met, remediation for the pile can be considered complete.

2.2.4 Groundwater Monitoring

Performance monitoring is focused on collecting groundwater samples from the monitoring well network on a semi-annual basis (twice per year, in August and January). Sampling will take place until EDB concentrations in groundwater monitoring wells have reached 0.05 µg/L New monitoring wells, MW-11S and MW-12S, will be included, and MW-5S and MW-5D will be replaced once excavation is complete. A total of 13 wells (MW-1, MW-2, MW-3, MW-5DR, MW-5SR, MW-6S, MW-7D, MW-7S, MW-8S, MW-9S, MW-10S, MW-11S, and MW-12S) will be monitored as part of the groundwater monitoring program. In addition to this CAICMP, a *Groundwater Monitoring Well Construction and Monitoring Plan* (HDR 2021b) has been developed that describes new well construction as well as field sampling and analytical procedures to support groundwater monitoring. The monitoring well network is presented in **Figure 1**.



COMPLIANCE MONITORING WELL NETWORK

Figure 1

2.3 SVE Compliance

During the ex-situ SVE remediation, soil samples will be collected to assess SVE effectiveness and determination of when CULs are met. Samples will be submitted for analysis per USEPA Method 8011. Sampling procedures will follow the CMP. For soils placed in the lined ex-situ SVE treatment cell(s), discrete soil samples will be collected as follows.

- Per each treatment cell (148 CY), four discrete soil samples will be collected at SVE startup. While the samples are being analyzed, SVE system will operate continuously.
- If the startup soil samples are below the CUL of 0.27 micrograms per kilogram (µg/kg), then the soil within that treatment cell will be removed and used as on-site backfill.
- If the startup soil samples are above the CUL of 0.27 µg/kg, the SVE system will be operated for the duration determined by the pilot test and four discrete soil samples will be collected per cell following additional treatment to confirm that CULs are met. Each soil sample location and depth will be selected separately, randomly, and independently of previously collected location.
- Quality assurance/quality control (QA/QC) samples will also to be collected during the ex-situ SVE remediation process. Data quality objectives (DQOs) will be provided in the Quality Assurance Project Plan (QAPP; HDR 2021c) and will be consistent with those previously submitted.

Additional impacted fill will be placed in the treatment cell, new initial samples will be taken, and the SVE system will be operated as indicated above.

Remediation is deemed complete when soil sample results are below the CUL.

2.4 Confirmational Monitoring

Confirmational monitoring will consist of short-term and long-term monitoring. Short term confirmational monitoring consists of sampling soil that has been treated in the ex-situ SVE system to determine if cleanup levels have been met.

2.4.1 Ex-situ Soil Vapor Extraction

The four random soil samples collected during full scale ex-situ performance will be considered confirmational monitoring when the analytical results are statistically evaluated to determine if EDB CULs have been met. The soil analytical results will be statistically analyzed using the MTCA upper confidence limit (UCL) on the mean. If the following criteria are met, then the treatment pile remediation will be considered complete and the pile will be removed and used as onsite backfill.

- The 95% UCL on the sample mean must be below the EDB CUL, and
- Less than 10% of the samples cannot exceed the EDB CUL (all 4 soil samples below the EDB CUL of 0.27 µg/kg).

The SVE treatment pile remediation will be considered complete when Step (2) above is met.

2.4.2 Groundwater Monitoring

Confirmational groundwater monitoring will be initiated on a well-by-well basis once EDB CULs have been reached. Confirmational monitoring will be conducted on the same frequency and using the same methods as Section 2.3.4. Confirmational monitoring will be considered complete when all wells demonstrate four consecutive monitoring events below the EDB cleanup level.

3 Sampling and Analysis Plan

This section describes the soil sampling strategies and procedures (sample location, collection methods, and laboratory analyses) that will be used during the performance monitoring period for the site.

As described in Section 2.4, a total of 13 wells (MW-1, MW-2, MW-3, MW-5DR, MW-5SR, MW-6S, MW-7D, MW-7S, MW-8S, MW-9S, MW-10S, MW-11S, and MW-12S) will be monitored as part of the groundwater monitoring program. Per the AO, a *Groundwater Monitoring Well Construction and Monitoring Plan* (HDR 2021b) has been developed that describes field sampling and analytical procedures to be used to support groundwater well construction and monitoring. Groundwater sampling is not covered in this SAP.

3.1 Soil Sampling Procedures

3.1.1 Sampling Locations

As described in Section 2.2, three types of soil sampling were conducted during the excavation phase:

- Sampling of soil from the excavation pit sidewalls and bottom to support removal of soils at or above the CUL.
- Sampling of soil stockpiles (overburden, caliche interlayer above the impacted soil zone, and any imported fill material) to determine if they meet the CUL.
- Sampling of soils in the ex-situ SVE pile and sampling of vapors.

3.1.2 Monitoring Frequency

Sampling occurred during active site remedial action involving excavation. Sampling the excavation pit took place over several weeks, while the stockpile (excavated soil) sampling was a one-time event. Sampling of the ex-situ SVE pile will occur over 3 to 6 months.

3.1.3 Soil Sample Collection Methods

For the excavation pit, soil samples were collected by hand directly from the excavator bucket (no personnel entered the pit for sampling). The sampler pushed aside the outer most 6 inches of soils in order to obtain a sample that was within the bucket scoop (avoid soils on the surface). USEPA Method 8011 requires that soils be placed in a laboratory-supplied glass bottle. Sampling personnel wore clean nitrile gloves when transferring soils. The goal was to transfer the soil samples into the jars as quickly as possible to minimize EDB loss by volatilization.

For soils in each ex-situ SVE pile, discrete soil samples will also be collected using a shovel or garden trowel. Samples will be collected at a minimum of 12 inches into the pile (avoiding soils on and near the surface). See Appendix A for standard operating procedure (SOP) 2 regarding soil sampling procedures.

3.1.4 Soil Vapor Collection Methods

For sampling soil vapor associated with the SVE system, Tedlar bags will be used. See Appendix A, SOP 5 for vapor sampling.

3.1.5 Sample Identification Protocol

Soils from the excavation pit were labeled as follows:

- WP or EP for the west or east excavation pit
- N, NE, E, SE, S, SW, W, NW – to identify the quadrant location within the pit
- Wall or Bottom for wall or bottom sample
- X feet (ft) depth below surface in feet
- # sequence of sample from pit

For example, WP-SE-Wall-5ft-8 is a soil sample collected from the west pit, southeast quadrant wall, at a 5-foot depth and is the eighth overall pit sample collected.

Stockpile soil samples were labeled as follows:

- S for stockpile
- 1, 2, …. Stockpile ID number (stockpiles will be numbered in the field (e.g., the overburden stockpile will be number 1)
- # sequence of sample from that stockpile

For example, S-1-3 is a sample from stockpile number 1 and is the third sample collected.

Ex-situ SVE samples will be labeled as follows:

- SVE
- Soil or Vap (Soil Vapor) for type of sample,
- Month and day
- Treatment Pile Number and Pre- (pre-treatment) or Post- (post-treatment)
- Sample number for that day for that media (soil or vapor).

For example, SVE-Vap-May3-2Pre-2 is a soil vapor sample collected on May 3 and is the second vapor sample collected from the second treatment pile prior to treatment for that day.

Field notes and photo documentation will record time, location, and identification of each sample (see SOP 1 in Appendix A). Additional details on field data collection and logs can be found in the Performance Test Plan.

3.1.6 Sample Custody and Documentation

Samples for chemical analysis will be stored in a cooled ice chest pending transportation to a certified analytical laboratory under chain-of-custody protocol as described in SOP 3 in Appendix A. Samples being submitted to Eurofins TestAmerica in Tacoma, Washington, will be packaged in coolers with ice and shipped overnight.

3.1.7 Quality Control (QC) Samples

The overall quality assurance objective for this investigation is to ensure that all laboratory and field data on which decisions are based are technically sound, statistically valid, and properly documented. The two parts to the QA/QC program for this project are field and laboratory. Field QA/QC includes properly documenting field activities and sampling/handling procedures. Field QA/QC soil samples will consist of the following:

- Equipment rinsate blank from decontaminated sampling equipment at a minimum frequency of 1 sample per week of field activities.
- Trip blank per cooler of samples (analysis for EDB).
- Field blank taken from distilled water container, at a minimum frequency of 1 sample per week of field activities.
- Matrix spike/matrix spike duplicate (MS/MSD) at a minimum frequency of 5 percent of soil samples collected. MS/MSD samples will be selected by the field geologist and three times the normal sample volume will be collected to accommodate the extra sample required to perform the MS/MSD analysis.
- Soil duplicate collected from the pit by taking a second grab sample from the same excavator bucket load at a frequency of 10 percent of soil samples collected.

3.1.8 Data Validation and Evaluation

Data evaluation will include checking holding times, method blank results, surrogate recovery results, field and laboratory duplicate results, completeness, detection limits, laboratory control sample results, and chain-of-custody forms. Data management and documentation will include checking all QA/QC parameters, including holding times, method blanks, surrogate recoveries, spike recoveries, field and laboratory duplicates, completeness, detection limits, laboratory control samples, and chain-of-custody forms (see QAPP in Appendix B). After the data has been checked, it will be entered into the project database with any assigned data qualifiers.

3.2 Equipment and Personnel Decontamination

Equipment and personnel decontamination will be performed as described in the site HASP (prepared under separate cover). Sampling equipment decontamination procedures are described in SOP 4 in Appendix A. Heavy excavation equipment (e.g., excavator) will be steam-cleaned prior to coming on the site and will be pressure washed prior to leaving the site. The contractor's HASP will address equipment decontamination. The EDR (HDR 2021a) addresses stormwater controls to ensure that stormwater and sediment remain on site.

For sampling pit soils, stockpiles, and SVE treatment samples, equipment will be decontaminated between each sample location. In general, samples will be collected by hand or using sampling hand tools such as garden trowels, as described in Section 3.1.3 (see SOP 4 in Appendix A). Rinsate blanks (see Section 3.1.7) will be collected as a QA/QC measure for the decontamination procedures when non-disposable equipment is used.

3.2.1 Investigation Derived Waste Handling

Investigation-derived waste (IDW) generated during compliance monitoring activities at the site are anticipated to include equipment decontamination water (IDW associated with groundwater monitoring wells and purge water will be addressed in the *Groundwater Monitoring Well Construction and Monitoring Plan*, HDR 2021b*).* Because the IDW water may be contaminated, IDW will be containerized pending characterization. These materials will be placed in U.S. Department of Transportation (DOT)-approved 55-gallon drums and temporarily stored on site. All drums will be labeled to indicate contents and the date and origin/location of collection. The purge water will be

managed in accordance with the Groundwater Monitoring Well Construction and Monitoring Plan (HDR, 2021b).

Because this is rinsate water, the volume is not expected to be greater than 50 gallons. Most sampling will be by hand using nitrile gloves, with some use of a shovel. Personal protection equipment (PPE) (i.e., gloves, etc.) will be disposed of as municipal waste.

4 Health and Safety Plan

The contractor will prepare a site HASP (under separate cover), which will describe health and safety measures, including any protection monitoring necessary during construction activities. In addition, the HASP will include COVID-19 protocols that are consistent with local and state requirements. The provisions and procedures outlined in the HASP apply to all personnel on site who are conducting work associated with the remedial action. Contractors, subcontractors, other oversight personnel, and all other persons involved with the work activities described herein are required to comply with the HASP and develop and comply with their own HASP that is equal to or more encompassing.

5 Reporting

The cleanup action compliance monitoring program data results will be incorporated into the site's monitoring reports. A summary report will be developed following completion of the soil excavation activities (prior to or during ex-situ SVE startup). Following completion of soil treatment and final backfilling and compaction of the excavated areas, a cleanup action report will be developed that will include all performance monitoring data and interpretation of results.

Sampling reports associated with confirmation sampling (groundwater monitoring) will be addressed in the *Groundwater Monitoring Well Construction and Monitoring Plan* (HDR 2021b).

6 References

Ecology [Washington State Department of Ecology].

2019. *Cleanup Action Plan*. Warden City Water Supply Wells 4 & 5. Warden, WA. FSID 2802409, CSID 1618.

HDR [HDR Engineering, Inc.]

2018. *Final Remedial Investigation and Feasibility Study Report*. Simplot Grower Solutions, 1800 W. 1st Street, Warden, Washington. 98857. September 2018.

2021a. *Engineering Design Report*. Simplot Grower Solutions, Warden, Washington. February 2021.

2021b. *Groundwater Monitoring Well Construction and Groundwater Monitoring Plan*. Simplot Grower Solutions, Warden, Washington. February 2021.

2021c. *Quality Assurance Project Plan*. August 2021.

A

Standard Operating Procedures

STANDARD OPERATING PROCEDURE 1 - GENERAL PROCEDURES FOR FIELD PERSONNEL

1 Purpose

This Standard Operating Procedure (SOP) provides guidance for the general field practices to be followed during field activities at the Simplot Warden facility; review is mandatory prior to the start of each field event. This SOP provides general guidance; see Cleanup Action Implementation Compliance Monitoring Plan (CAICMP) for details.

2 Personnel Qualifications and Responsibilities

Field activities will be directed by the Field Team Leader (FTL), an environmental professional (engineer, geologist or scientist) with experience in performing and directing the planned activities. Field staff will be junior to mid-level environmental professionals or environmental technicians. Field work will be conducted by persons with experience in performing the planned activities.

The FTL will provide direction to field staff to ensure work is performed in accordance with the project documents (Quality Assurance Project Plan [QAPP], CAICMP and SOPs). The field staff will carefully review the project documents, conduct the work as planned, seek direction from the FTL when questions or problems arise, and carefully complete field documentation.

3 Equipment and Supplies

The required equipment and supplies will be identified in the SOPs for the specific field activities to be performed and in the project CAICMP. Field activities should not proceed until the proper tools and equipment are available and in good working order.

Each team will have use of a vehicle during field activities. An initial safety check should be performed at the start of each shift to confirm the vehicle is in good working condition. The vehicle should then be checked daily for damage or required maintenance.

4 Procedure

4.1 Start-Up Activities

4.1.1 Office

Prior to leaving the office for field work, personnel will perform the following actions:

1. The Project Manager (PM) will assign an FTL to direct field activities and coordinate with project personnel. Task specific responsibilities of the FTL will be addressed in the appropriate SOP; general responsibilities include:
    a. Review project CAICMP, Accident Prevention Plan (APP), and QAPP.
    b. Work with PM to properly staff the field activity.
    c. Coordinate sampling activities with the project chemist and analytical laboratory.
    d. Confirm availability and condition of equipment and order additional equipment/supplies for delivery prior to the start of each event.
    e. Prepare field forms and other documentation for the planned event.
    f. If work is to be subcontracted, review the subcontract agreement, CAICMP, and APP.
    g. Confirm that field staff have Driver's License (or other picture identification) prior to leaving the office.

4.1.2 Field

After arrival on site, but prior to commencement of operations, the following activities will be performed:

- Complete equipment and supply checklists and verify that required documentation and equipment for field activities are on site.
- Review condition of equipment; inventory field supplies and laboratory-provided sampling supplies.
- Review locations for planned field activities for hazards, determine requirements for site preparation and clearance, and select location for the storage of purge and decontamination waters.
- Conduct team safety meetings as required by the APP.
- Conduct team review of the project documents including SOPs to be utilized.

4.2 Field Operations

Field staff responsibilities are project specific. At a minimum, field personnel will perform the following activities:

1. Document field activities in a log book for each team and/or field records as required by the CAICMP or SOPs.
2. Record the following additional information for field measurements:
    a. The identification number and calibration results for each field instrument
    b. The numerical value and units of each measurement

c. A description of any unexpected delays or problems observed during sampling activities

3. Complete required data collection/sample control forms (e.g., Chain-of-Custody, Field Sampling Report, etc.).
4. Communicate with the PM regarding site conditions and variances that might be required due to site conditions.
5. Perform following activities daily before leaving the site:
   a. Decontaminate and check condition of field equipment.
   b. Provide log books and other field documentation to FTL for review and scanning.
   c. Properly dispose of trash, debris and used personal protective equipment (PPE).
   d. Make arrangements for shipment of samples (if applicable) and follow-up with the analytical laboratory to confirm samples arrived in good condition.
   e. Complete activity-specific field reports as required by applicable SOPs.
   f. Complete the Daily Field Report and submit to PM.

4.3 Field Log Books and Documentation

Log books will be used by each field team in addition to documentation required by activity-specific SOPs.

- The first entry for each field event will list the following information:
  - Project Name and Number
  - FTL (full name) and initials
  - Sample team leader and members (full names) and initials
- At minimum, the log book will describe general activities performed, samples collected, date and time, personnel and weather conditions. Field equipment calibration and maintenance records will be documented in the logbook. Communications with the FTL, PM or project chemist regarding field activities will be documented. Additional field data will be recorded in the log book if other field records are not used.
- Any deviations from the QAPP or CAICMP will be noted in the log books.
- Errors will be crossed out with a single line, the correction added and the entry initialed.
- Each page will be numbered and dated. A diagonal line will be drawn through any unused portion of a page containing an entry. To indicate the end of an entry, personnel are required to initial and date the page at the conclusion of each day.

4.4 Closeout

Upon the completion of field activities, the FTL will view each site to verify the area has been cleared and restored as closely as possible to its prior condition. Trash will be removed from the site, and surface damage, including ruts caused by vehicles, will be repaired.

Confirm all equipment is accounted for and properly decontaminated and in good working condition. Notify PM if repairs are needed. Properly package and ship rental equipment to the vendor. When shipping equipment, use the proper HDR FedEx number and insure the package for the cost of the equipment. Rental vehicles should be fueled and returned to the rental company as soon as possible. Work areas should be cleaned with tools and equipment properly stored.

The FTL will make a final check of all logbooks and other field records to ensure there are no blanks or missing data and the entries are legible. FTL will organize scanned forms in proper order and transmit to PM.

The FTL will complete Field Event Closeout Report and submit to PM.

5 Data and Records Management

Field forms and log book entries will be scanned and copied to the project folder on the HDR network file share drive within one week of the field event completion. Photographs taken during the field event will be uploaded along with a typed photograph log (date, project and subject) to the HDR network file share drive. The photographs will then be erased from the camera. The PM be sent a link for the data.

6 Quality Control and Quality Assurance

Work will be performed in accordance with the QAPP, the specific CAICMP, and applicable SOPs. Field activities will be recorded in the log books in sufficient detail to reconstruct the events. No erasures or mark outs will be made on field forms or log books. A single line will be used to strike out errors and will be annotated with the initials and date of the editor.

Field Event Startup Report

Prepared by: Date:

Event Name:

Project-Activity Number:

Summary of Planned Event:

Planned Performance Period: _____to_____

Project Documents - Title, Date

CAICMP:

Health and Safety Plan:

Other SOPs – List number/revision and title:

Field Event Staffing

Position	Name	OSHA Cert. (Y/N)	First Aid/ CPR (Y/N)	Driver's License (Y/N)	Proj. Plans reviewed (Y/N)	Experience (Hi-Med-Low-None)
Field Team Leader						

Field Equipment

Name/Use	Mfr./Model No.	Condition	Calibration Req'd.(Y/N)	Calibration supplies	Other supplies (batteries, etc.)

Rental Equipment

Name/Use	Mfr./Model No.	Condition	Calibration Req'd.(Y/N)	Calibration supplies	Other supplies (batteries, etc.)

Lab-provided Sampling Supplies

Sample Type	Number	Supplies

Additional Tools/Supplies

Camera
Field forms (list):
Sample supplies (list):
Water/Ice cooler
Sample cooler

Final Check

1. All required equipment/tools received and condition checked

Yes ___ No ___ Comment:

2. Initial equipment calibration completed

Yes ___ No ___ Comment:

3. Vehicles inspected

Yes ___ No ___ Comment:

4. Field locations reviewed

Yes ___ No ___ Comment:

5. Weather forecast checked

Yes ___ No ___ Comment:

6. Staff documents (OSHA, DL) checked

Yes ___ No ___ Comment:

7. Review of project plans confirmed and activities discussed

Yes ___ No ___ Comment:

8. Initial Safety Meeting held and SSHP signed

Yes ___ No ___ Comment:

Daily Field Report

Project Number/Activity:	**Date:**
Project Name:	**Field Team Leader:**
Brief Work Description:	

Weather:	**Temp:**

Previous Day's Samples received at laboratory – Y / N Comment:

Time	Description

Name/Organization of Field Staff, Subcontractors and Site Visitors	

Samples Collected

Problems or Deviations from CAICMP

Tasks to be completed next workday

_____ _____ _____

Name **Signature** **Date**

Field Event Close-Out Report

Prepared by: Date:

Event Name:

Project-Activity Number:

Performance Period: _____to_____

Field Team Leader:

Field Staff:

Summary of Completed Event:

Field problems and/or changes from planned activities:

Change in number/type of samples collected:

Health and Safety problems/Injuries:

Close-out Checklist

1. Log book and field forms scanned and originals placed in project file

Yes ___ No ___ Comment:

2. Equipment/tools decontaminated

Yes ___ No ___ Comment:

3. Rental equipment shipped to supplier

Yes ___ No ___ Comment:

4. Rental vehicles returned

Yes ___ No ___ Comment:

5. DDMT equipment and tools properly stored

Yes ___ No ___ Comment:

6. List damaged equipment

Yes ___ No ___ Comment:

7. Replacement supplies ordered

Yes ___ No ___ Comment:

8. Field locations inspected and trash/debris removed

Yes ___ No ___ Comment:

9. Field shop/office cleaned

Yes ___ No ___ Comment:

STANDARD OPERATING PROCEDURE 2 – SURFACE AND SUBSURFACE SOIL SAMPLING

1 Purpose and Summary

The purpose of this Standard Operating Procedure (SOP) is to describe procedures for the collection of representative soil samples. Sampling is assumed to be either from a backhoe bucket or soil stockpile. Analysis of soil samples may define the extent of contamination, determine whether concentrations of specific contaminants exceed established action levels, or if the concentrations of contaminants present a risk to public health, welfare, or the environment.

These are standard (i.e., typically applicable) operating procedures which may be varied or changed as required, dependent upon site conditions, equipment limitations, or limitations imposed by the procedure. In all instances, the ultimate procedures employed should be documented and associated with a final report.

2 Personnel Qualifications and Responsibilities

Field activities will be directed by the Field Team Leader (FTL) and a qualified junior to mid-level scientist or geologist. The FTL will provide direction to field staff to ensure work is performed in accordance with the project documents (Quality Assurance Project Plan [QAPP], Accident Prevention Plan [APP], Site Safety and Health Plan [SSHP], and SOPs). The field staff will carefully review the project documents, conduct the work as planned, seek direction from the FTL when questions or problems arise, and carefully complete field documentation.

3 Equipment and Supplies

Field activities should not proceed until the proper tools and equipment are available and in good working order. Usual equipment/supplies for soil sampling will include: site maps, safety equipment, tape measure, GPS, survey stakes/flags, camera, ziptop bags, labels, sample containers, cooler, ice, chain of custody, tape measure, hand auger, shovel/trowel, slide hammer, and decontamination equipment

The team will have use of a vehicle during field activities. An initial safety check should be performed at the start of each shift to confirm the vehicle is in good working condition. The vehicle should then be checked daily for damage or required maintenance.

4 Procedure

Procedures for conducting a surface or subsurface soil sampling event are below.

4.1 Preparation

1. Determine the extent of the sampling effort, the analytes to be determined, the sampling methods to be employed, and the types and amounts of equipment and supplies required to accomplish the assignment.
2. Obtain the necessary sampling equipment.
3. Prepare schedules and coordinate with staff, client, and regulatory agencies, as appropriate.
4. Perform a general site reconnaissance survey prior to site entry in accordance with the site specific APP.
5. Use stakes or flags to identify and mark all sampling locations. Specific site factors, including extent and nature of contamination, should be considered when selecting sample locations. If required, the proposed locations may be adjusted based on site access, property boundaries, and surface obstructions. All staked locations should be utility-cleared prior to soil sampling; utility clearances must be confirmed before beginning intrusive work.
6. Pre-clean and decontaminate equipment in accordance with the QAPP and ensure that it is in working order.

4.2 Soil Sampling

The collection of samples from a backhoe bucket or stockpiled soils soil can be accomplished by hand (sampler using clean nitrile gloves) or with tools such as trowels, and scoops. The over-burden or over-lying surface material is removed to the required depth to expose fresh soil and a stainless steel or plastic scoop or by hand is used to collect the sample. This method can be used in most soil types. Accurate, representative samples can be collected by this procedure depending on the care and precision demonstrated by the sample team member. A flat, pointed mason trowel to cut a block of the desired soil is helpful when undisturbed profiles are required and if desired not to sample soil on surface. Tools plated with chrome or other materials must not be used. The following procedure is used to collect surface soil samples:

1. Using a pre-cleaned, stainless steel scoop, plastic spoon, or trowel, remove and discard sticks, rocks, vegetation and other debris from the sampling area.
2. Accumulate an adequate volume of soil, based on the type(s) of analyses to be performed, in a stainless, plastic or other appropriate container.
3. If not for VOCs, thoroughly mix the soil to obtain a sample that is representative of the entire sampling interval. If for VOCs, then discrete samples should be collected. Also, for VOC it may be possible to collect sample using Terra Core sampling method (see SOP). Then, either 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.

5 Quality Control and Quality Assurance

For this project, the following Field QA/QC procedures will occur:

- Equipment rinsate blank from decontaminated sampling equipment at a minimum frequency of 1 sample per week of field activities.
- Trip blank per cooler of samples (analysis for EDB).
- Field blank, taken from distilled water container, at a minimum frequency of 1 sample per week of field activities.
- Matrix spike/matrix spike duplicate (MS/MSD) at a minimum frequency of 5 percent of soil samples collected. MS/MSD samples will be selected by the field geologist and three times the normal sample volume will be collected to accommodate the extra sample required to perform the MS/MSD analysis.
- Soil duplicate collected from the pit by taking a second grab sample from the same excavator bucket load at a frequency of 10 percent of soil samples collected.

In addition, the following general QA procedures apply:

- Data must be documented in site logbooks or on field data sheets. The following data is typically recorded: Sampler's name, sample number, sample location, sample depth, type of analyses to be performed, sample description, date and time of sample collection, weather conditions at time of sampling, method of sample collection, sketch of sample location.
- Refer to SOP-4 for decon and rinsate blanks used for QA/QC.

STANDARD OPERATING PROCEDURE 3 – SAMPLE CONTROL AND DOCUMENTATION

1 Purpose and Summary

This Standard Operating Procedure (SOP) provides guidance for sample control and identification, data recording, and proper completion of Chain-of-Custody (COC) forms.

2 Personnel Qualifications and Responsibilities

Sample control activities will be directed by the Field Team Leader (FTL), an environmental professional (engineer, geologist or scientist) with experience in sampling activities. The field staff, environmental professionals or technicians, are responsible for proper sample handling and documentation of the sample collection.

3 Equipment and Supplies

The field staff will use a pen with blue or black waterproof ink to record field activities and document sample handling in a field logbook and on field data sheets. A laptop computer with laboratory-provided software may also be used for sample documentation.

4 Procedure

Proper field sampling and documentation help ensure sample authenticity and data integrity. These procedures describe sample collection documentation and sample handling, tracking, and custody procedures to ensure that sample integrity and custody are maintained.

If the computer is being used to scan the samples as they are collected the data recorded by the computer should be checked for correctness. The date and time on the computer should be checked prior to scanning of any samples. The sample label should be completed when the sample is collected. If a hand written COC will be used, all information should be recorded in a log book as to the type of sample, date and time collected and number of sample containers. The COC can then be filled out back at the field office in a quiet environment without disturbances to avoid errors.

Corrections to the COC, field logbook or field data forms will be made by a single line to strike out errors annotated with the initials and date of the editor; the correct information will be inserted as appropriate.

The number of sample containers on the COC should be physically checked against the number of containers collected. Once this is confirmed the sample crew can properly store the samples for shipment.

4.1 Start-Up Activities

4.1.1 Office

The FTL will work with the project chemist (PC) to:

- See Compliance Monitoring Plan (CMP).
- Coordinate with the analytical laboratory and ensure that sample forms including chain of custody forms are shipped to the site.

4.1.2 Field

After arrival on site, but prior to commencement of operations, the FTL will confirm that required documentation and equipment for field activities are on site.

4.2 Field Operations

4.2.1 Sample Identification

Individual samples will be identified by a unique alphanumeric code (also referred to as a sample ID number or field number) which will be written on the sample label and recorded on the COC form. See Cleanup Action & Compliance Monitoring Plan for details on sample ID. Additional information to be written on the label includes sample ID, time and date of sample, sampler's initials, and the analytical methods to be performed, as described in Section 4.2.3 of this SOP.

The location of field duplicates will be recorded in the field notebook. At the end of the sampling event, the FTL will send the PM and PC the final field notes and include notes on any changes from the Cleanup Action & Compliance Monitoring Plan and SOPs .

4.2.2 Field Documentation

4.2.2.1 Logbook

The logbook is a written record of sampling activities to be completed in the field during sampling. The purpose is to document field conditions or procedural exceptions that may aid in the analysis of data generated from sampling activities. The log book will have with sequentially numbered pages and information will be recorded in blue or black waterproof ink. The recorder will sign and date each entry.

Information pertaining to environmental conditions at the site during the field investigation will be noted in the field log book for each day. The following information will be recorded for each activity:

1. Activity
2. Location

3. Date and time
4. Weather conditions
5. Field Team members present

For field sampling activities, the following information will be recorded, if a sampling form is not used:

1. Sample type and sampling method
2. The identity of each sample and the depth(s) from which it was collected
3. Sample description (e.g., color, odor, clarity)
4. Identification of sampling devices used
5. Identification of sampling conditions that might affect the representativeness of a sample (i.e., refueling operations, damaged casings)

4.2.2.2 Daily Field Reports

Each day the FTL will prepare a Daily Field Report. The report will include daily weather, time and description of field activities, samples collected, and any problems or changes in scope that occurred that day. The report also lists field staff, subcontractors and site visitors.

4.2.2.3 Photographs

Photographs taken for the purpose of project documentation will be noted in the field logbook. The sequential number of the photograph, photographer, date, time, location, description, and orientation of the photograph will be recorded in the logbook as the photographs are taken. The photographs and documentation will be loaded on the HDR network project file.

4.2.3 Sample Labels/Tags

Sample labels will be filled out for each sample with an indelible pen. The label will be protected from water and solvents with clear label protection tape. Any change in the pre-prepared label information will be initialed by the sampler.

4.2.4 Sample Custody

Sample custody is a part of a quality field or laboratory operation. Custody of a sample is defined as:

1. Having physical possession
2. Being in view, after being in possession
3. Having possession, then being placed in a secure area
4. Being maintained in a secure area by the person who had possession last

These custody practices will be observed in the field. They will be performed according to the procedures described in the following subsections.

4.2.4.1 COC Records

A hand-written three-part COC will be completed, in triplicate. The first two pages will accompany the cooler to the laboratory, and the bottom copy will be retained in the files at the field office after it is scanned into the computer file.

The information specified on the COC record will contain the same level of detail found in the site log book, with the exception that on-site measurement data will not be recorded. The custody record will include at least the following information:

- Name of person collecting the samples
- Date samples were collected
- Type of sampling conducted (composite/grab)
- Location of sampling station (including the site location)
- Number and type of containers used
- Signature of the HDR person relinquishing samples to a non-HDR person (such as a FedEx agent), with the date and time of transfer noted, and the cooler designation

If samples will require rapid turnaround in the laboratory because of project time constraints or analytical concerns such as extraction time or sample retention period limitations, these constraints will be noted in the remarks section of the custody record. The FTL or designee will contact the laboratory to confirm the turnaround time can be achieved.

It is not practicable to seal the sample coolers or cartons at a FedEx office; they will be sealed beforehand. The custody record will, therefore, have the signature of the relinquishing field technician with the date and time, but the “relinquished to” box will not be completed.

The duplicate custody record will then be placed in a plastic bag, taped to the underside of the cooler lid, and the cooler closed. COCs for air samples will be included in the carton. The container will be tightly bound with filament tape. Finally, custody seals will be signed by the individual relinquishing custody and affixed in such a way that the cooler or carton cannot be opened without breaking the seals.

The original and duplicate custody records and the airway bill or delivery note together constitute a complete record. The FTL will email a copy of the airbill and the COC to the PC, who will maintain the custody records as part of the analytical data file.

4.3 Closeout

Before leaving the site daily, the following procedures will be performed by on-site personnel:

- Maintain custody of samples, maintaining them as specified for the analyses to be performed.
- Prepare samples for shipment to the laboratory.
- Complete the COC forms.

- Contact the laboratory to inform them that samples will be shipped and also remind them of any special requirements for the sample analyses.
- Verify completion of logbook, ensuring that required information has been recorded.

Upon the completion of sample collection and shipment, copies of the COCs will be scanned and sent to interested parties to include the PM. The FedEx tracking numbers will be checked each day to confirm the samples were delivered and the laboratory will be contacted to check on problems with the samples or COCs.

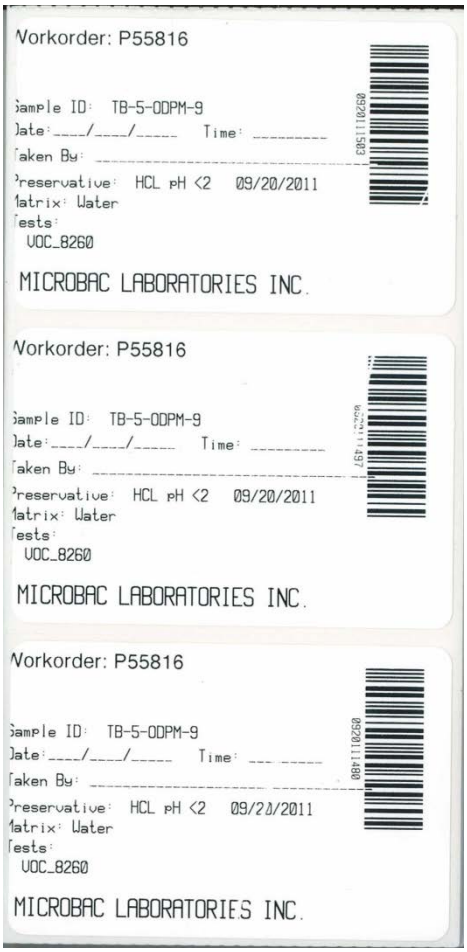
5 Data and Records Management

All field forms, COCs, and log book entries will be scanned and copied project folder on the HDR network project file within one week of the field event completion. All original forms will be stored in the HDR project files. The PM will be sent a link for the data.

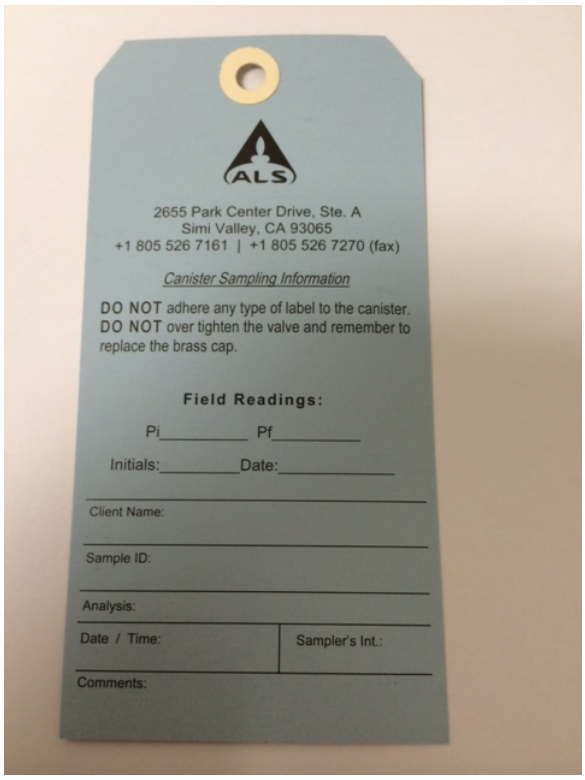
6 Quality Control and Quality Assurance

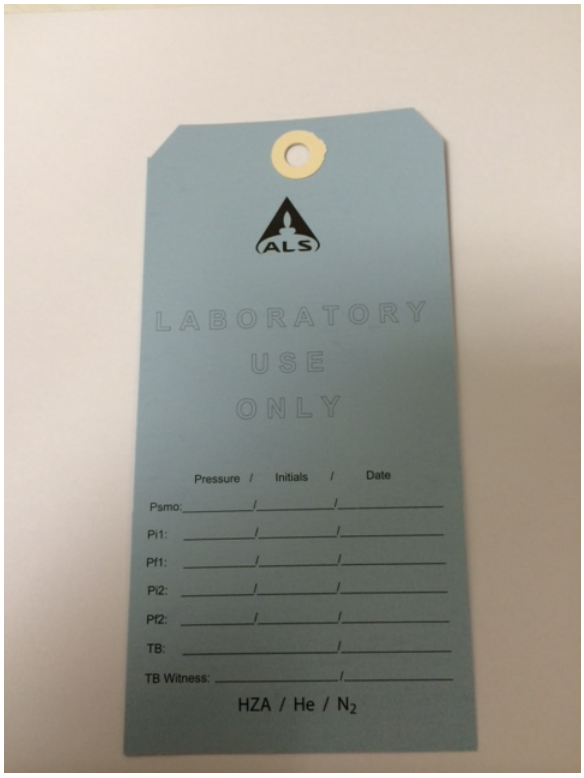
Work will be performed in accordance with the QAPP, the specific work plan, and applicable SOPs. Field activities will be recorded in the log books in sufficient detail to reconstruct the events and forms provided with the SOP will be completed. No erasures or mark outs will be made on field forms or log books. A single line will be used to strike out errors and will be annotated with the initials and date of the editor; the correct information will be inserted as appropriate.

EXAMPLE: Sample Labels

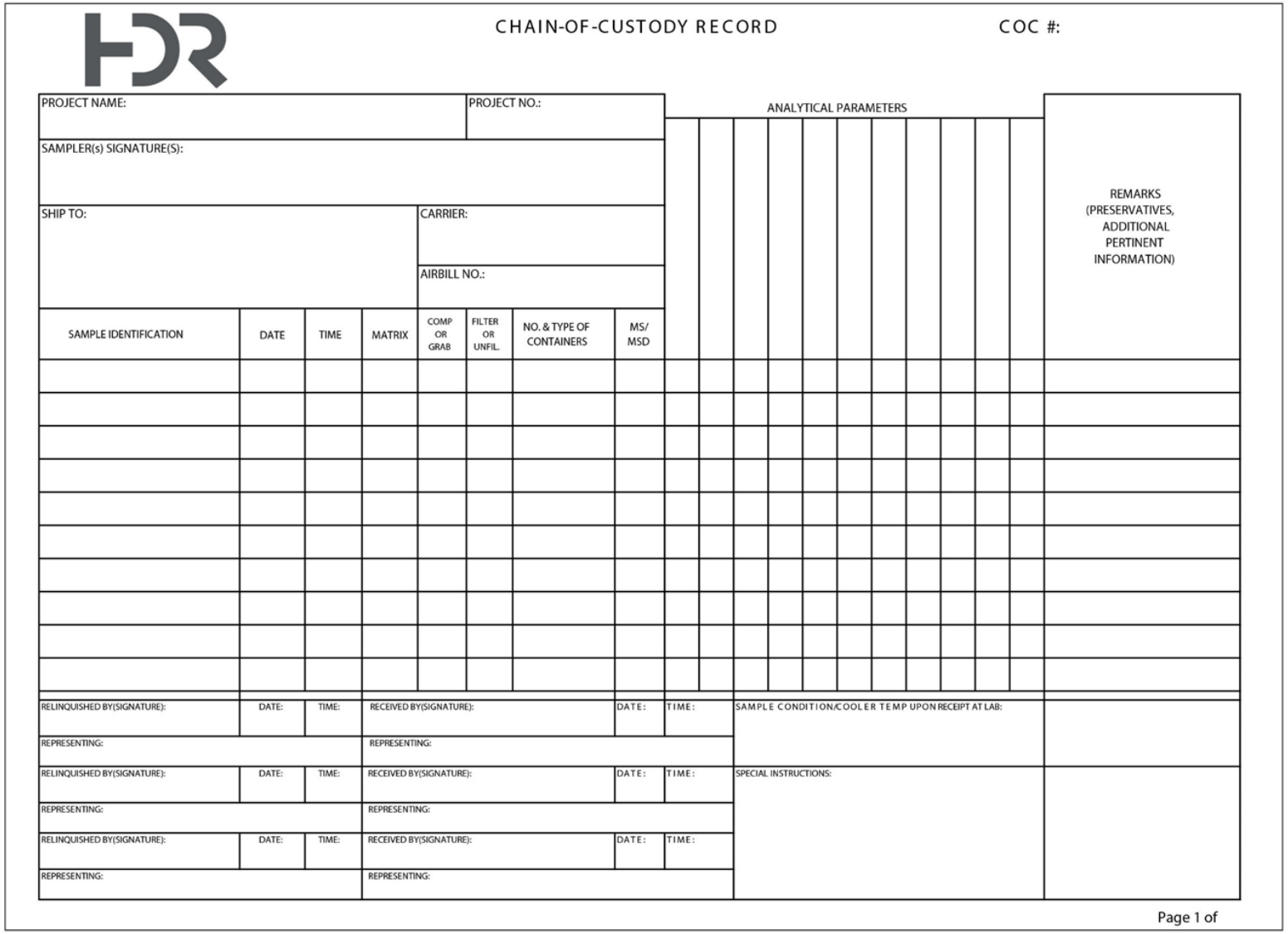


EXAMPLE: Sample Labels for Air Samples





EXAMPLE: HDR Chain-of-Custody Form (Hand)



CHAIN-OF-CUSTODY RECORD

COC #:

PROJECT NAME:	PROJECT NO.:
SAMPLER(s) SIGNATURE(S):	
SHIP TO:	CARRIER:
	AIRBILL NO.:

ANALYTICAL PARAMETERS

SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	COMP OR GRAB	FILTER OR UNFIL.	NO. & TYPE OF CONTAINERS	MS/ MSD											REMARKS (PRESERVATIVES, ADDITIONAL PERTINENT INFORMATION)

RELINQUISHED BY(SIGNATURE):	DATE:	TIME:	RECEIVED BY(SIGNATURE):	DATE:	TIME:	SAMPLE CONDITION/COOLER TEMP UPON RECEIPT AT LAB:	
REPRESENTING:			REPRESENTING:				
RELINQUISHED BY(SIGNATURE):	DATE:	TIME:	RECEIVED BY(SIGNATURE):	DATE:	TIME:	SPECIAL INSTRUCTIONS:	
REPRESENTING:			REPRESENTING:				
RELINQUISHED BY(SIGNATURE):	DATE:	TIME:	RECEIVED BY(SIGNATURE):	DATE:	TIME:		
REPRESENTING:			REPRESENTING:				

Page 1 of

STANDARD OPERATING PROCEDURE 4 –EQUIPMENT DECONTAMINATION

1 Purpose and Summary

This Standard Operation Procedure (SOP) provides guidance for proper decontamination of equipment used in sampling and collection of equipment rinsates to evaluate effectiveness of decontamination procedures.

2 Personnel Qualifications and Responsibilities

Sampling equipment decontamination and rinsate sample collection will be directed by the Field Team Leader (FTL), an environmental professional (engineer, geologist or scientist) with experience in equipment decontamination and sampling activities. The field staff, environmental professionals or technicians, are responsible for following these procedures and seeking direction from the FTL when questions or problems arise.

3 Equipment and Supplies

The required equipment and supplies will consist of Alconox soap, deionized water (DI), tap water, paper towels, foil, and sample containers.

4 Procedure

Proper equipment decontamination will prevent cross-contamination of samples due to residual contamination from previous sample locations and spread of contamination via sampling equipment. Proper decontamination also supports the legal defensibility of data generated during site activities.

Decontamination procedures will be evaluated by the collection of equipment rinsate samples. These samples consist of reagent water collected from final rinse of sampling equipment after the decontamination procedure has been performed. The samples are analyzed with the environmental sample to assess the adequacy of the decontamination performed.

4.1 Start-Up Activities

4.1.1 Office

The FTL will confirm that sufficient equipment and supplies are available at the site based on the number of samples and estimated field days.

4.1.2 Field

After arrival on site, but prior to commencement of operations, the FTL will confirm that decontamination supplies and equipment are available on site and review procedures with field staff.

4.2 Field Operations

4.2.1 Decontamination Water Source

Potable water from the municipal water system will be used as a rinse in the decontamination procedure. The FTL will be responsible for coordinating with the site personnel to secure an adequate supply of potable water for decontamination procedures.

4.2.2 Decontamination Procedures

The required decontamination procedure for sampling equipment is:

1. Wash and scrub with Alconox solution (or equivalent) and nylon brushes.
2. Double tap water rinse.
3. Air dry.
4. Collect all decontamination rinse water in 5 gallon buckets. Rinse water will be combined with any other wastewater generated during sampling activities and disposed of according to the work plan.

4.2.3 Blanks

For this project, a laboratory supplied trip blank will be placed in each cooler, not opened by the sampler, and analyzed by the laboratory.

In addition, a field blank will be created by taking distilled water used for decontamination and pouring the water directly from the container to the laboratory supplied sample jar. This will occur at a frequency of once per week.

4.2.4 Equipment Rinsate Collection

When non-dedicated sampling equipment is used, the equipment will be decontaminated before initial use and after each sample is collected. An equipment rinsate sample will be collected for equipment type (bladder pump or bailer). At least one equipment rinsate will be collected for each sampling protocol (i.e. soil sampling) during each week of sampling. Equipment rinsate samples will be collected to be representative of field decontamination procedures.

Sampling Equipment: Equipment rinsate samples will be obtained from decontaminated stainless steel split-spoons, hand tools, and stainless steel bowls with distilled water or better.

The equipment rinsate protocol will be as follows:

a. Label Sample Container - Label the sample container.

b. Collect Sample - After sample collection and equipment has been decontaminated as described above, an equipment rinsate will be collected. Distilled water will be poured over and through the sampling equipment into the laboratory supplied sample containers.

c. Custody, Handling and Shipping - Complete the procedures as outlined in SOP 3 – Sample Control and Documentation.

4.3 Closeout

Before leaving the site daily, the following procedures will be performed by the FTL or designated field staff:

- Confirm all equipment is decontaminated and properly stored all equipment.
- Note equipment decontamination activities and rinsate sample collection on the Daily Field Report.

5 Data and Records Management

Field forms and log book entries will be scanned and copied to the HDR server within one week of field activity completion.

6 Quality Control and Quality Assurance

Work will be performed in accordance with the Quality Assurance Project Plan (QAPP), the specific work plan, and applicable SOPs.

STANDARD OPERATING PROCEDURE 5 – SOIL VAPOR SAMPLING (SOIL VAPOR EXTRACTION REMEDIATION SYSTEM)

1 Purpose and Summary

This Standard Operating Procedure (SOP) provides guidance for the general field practices to be followed during field activities at the Simplot Warden facility; review is mandatory prior to the start of each field event. This SOP provides general guidance; see Cleanup Action Implementation Compliance Monitoring Plan (CAICMP) for details.

This procedure outlines the technical requirements and operational use for soil vapor sampling from a soil vapor extraction (SVE) remediation unit. The requirements of this procedure are applicable to all project activities that include the need to sample vapors for laboratory quantifications of pollutants from an SVE unit.

These are standard (i.e., typically applicable) operation procedures which may be varied or changed as required, dependent upon site conditions, equipment limitations or limitations imposed by the procedure. In all instances, the actual procedures used should be documented and described in an appropriate site report.

2 Personnel Qualifications and Responsibilities

Sampling equipment decontamination and rinsate sample collection will be directed by the Field Team Leader (FTL), an environmental professional (engineer, geologist or scientist) with experience in equipment decontamination and sampling activities. The field staff, environmental professionals or technicians, are responsible for following these procedures and seeking direction from the FTL when questions or problems arise.

2.1 References

1. Engineering Report
2. Compliance Monitoring Plan and Quality Assurance Project Plan
3. Site Health and Safety Plan

3 Equipment and Supplies

For collecting air samples from an SVE unit, Tedlar bags will be used. Tedlar bags generally come 10 to a box in 1.0-liter (L) size. Teflon tubing to connect the bag to the valve stem.

4 Procedure

4.1 Tedlar Bag Sampling

Bagged samples are best stored in dark plastic bags place in coolers to protect the bags from any damage that may occur in the field or transit. In addition, coolers ensure the integrity of the samples by keeping them at a cool temperature and out of direct sunlight. Samples generally are required to be analyzed within 24 to 72 hours of sample collection (check with laboratory on holding times). This SOP addresses sampling on the exhaust end only.

1. For vapor sampling of SVE unit, check system design for sampling ports. Generally, two options exist for sampling, the vacuum side and the exhaust side. The vacuum side is the piping that enters the SVE blower (suction end of the blower). The exhaust end is the exhaust stack after the blower and is positive pressure. Generally, SVE units will have sampling ports on both the vacuum and exhaust ends of the unit. The exhaust unit may have sampling ports both prior and after vapor treatment in order to assess treatment efficiently. The choice of which side to sample is dependent upon sampling objectives.

2. The valve on the Tedlar bag is in the open position when stored. Pull out to close the valve stem. If the valve stem is difficult to pull, it helps to spin the valve stem while pulling it.

3. For sampling, attach the Tedlar bag to the SVE sampling port via Teflon tubing connected to the valve stem (some bags will have “quick connect” fitting). When the sampling port valve is open, vapors fill the bag. Once the bag is inflated, shut off (pull the valve stem) the Tedlar bag valve and then shut the SVE port valve.

4. Do not paste labels directly onto the bags, nor label bags directly using a maker or pen. Inks and adhesive may diffuse through the bag material, contaminating the sample. Place labels on the edge of the bags or tie the labels to the metal eyelets on the bags. Do not use markers with inks containing volatile organics.

5. Document all data on field data sheets or site logbooks.

4.2 Blanks and Duplicates

1. Each cooler containing samples should also contain one Tedlar bag of ultra-zero grade air provided by the laboratory, acting as a field blank. The field blank should accompany the samples in the field and when they are delivered for analysis.

2. Collect a minimum of 5 percent of all samples in duplicate.

5 Data and Records Management

Field forms and log book entries will be scanned and copied to the HDR server within one week of field activity completion.

6 Quality Control and Quality Assurance

Work will be performed in accordance with the Quality Assurance Project Plan (QAPP), the specific work plan, and applicable SOPs.

B

Quality Assurance Project Plan

Quality Assurance Project Plan (QAPP)

Simplot Grower Solutions
J.R. Simplot Company

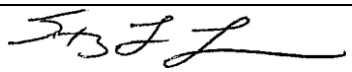
Warden, Washington
August 6, 2021

Prepared by:
HDR Engineering, Inc.
412 E. Parkcenter Blvd., Ste 100
Boise, Idaho 83706-6659

Prepared for:
J.R. Simplot Company

Quality Assurance Project Plan
for Simplot Grower Solutions, 1800 W. 1st St. Warden, WA

The *Quality Assurance Project Plan* for Simplot Warden facility provides direction for implementing the Compliance Monitoring Plan as part of the remedial actions at the above listed site. Preparation of these plans incorporates contributions and feedback from project managers and technical staff from Simplot, HDR Engineering, Inc., Washington Department of Ecology, and Eurofins TestAmerica. This signature page indicates agreement on the plan content among those individuals assigned to implement the study, conduct the field sampling, and perform the analytical analyses.

Signature: 	Date: 08/06/2021
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Acronyms

Acronym	Definition
µg/Kg	micrograms per kilogram
AO	agreed order
CAP	cleanup action plan
CAICMP	cleanup action implementation compliance monitoring plan
COC	chain-of-custody form
CUL	cleanup level
CY	cubic yard
DQO	data quality objectives
HDR	HDR Engineering, Inc.
Ecology	Washington Department of Ecology
EDB	ethylene dibromide
LCS	laboratory control sample
MS	matrix spike
MSD	matrix spike duplicate
MTCA	Model Toxics Control Act
QA/QC	quality assurance/quality control
QAPP	quality assurance project plan
RAO	remedial action objectives
RI/FS	remedial investigation/feasibility study
RPD	relative percent difference
SGS	Simplot Grower Solutions
Simplot	J.R. Simplot Company
SOP	standard operating procedure
SVE	soil vapor extraction
USEPA	U.S. Environmental Protection Agency
WAC	Washington Administrative Code

Introduction

This *Quality Assurance Project Plan* (QAPP) describes the sampling plan, quality standards, and procedures for conducting soil sampling as outlined in the *Cleanup Action Implementation Compliance Monitoring Plan* (CAICMP; HDR 2021a). The CAICMP describes the procedures that the J.R. Simplot Company (Simplot) will perform during the cleanup action at the site, Simplot Grower Solutions (SGS) facility in Warden, Washington. The cleanup action is being conducted pursuant to Agreed Order (AO) DE 16890 and the Model Toxics Control Act (MTCA) regulations (Chapter 173-340 Washington Administrative Code [WAC]) to implement the remedies specified in the *Cleanup Action Plan* (CAP; Ecology 2019). The CAICMP is consistent with the requirements of WAC 173-340-410. Simplot entered into AO DE 16890 with the Washington Department of Ecology (Ecology) on May 7, 2020, to implement the CAP in accordance with the scope of work and schedule attached to the AO DE 16890.

1 Project Management

1.1 Distribution List

This QAPP will be distributed to the following organizations. The roles, responsibilities, key personnel, and contact information for each organization are detailed in Section 1.2.

- Simplot
- HDR Engineering, Inc. (HDR)
- Eurofins TestAmerica
- Ecology

1.2 Project Organization

Under contract with Simplot, HDR is responsible for monitoring and sampling to support remedial actions at the SGS site. A remedial contractor will implement the CAP, which includes soil excavation, soil stockpiling, and construction and operation of an ex-situ soil vapor extraction system (SVE). HDR, as consultant for Simplot, will collect performance soil samples, soil vapor samples, and conduct groundwater confirmation monitoring. This QAPP provides the quality assurance/quality control (QA/QC) requirements for the soil sampling described in the CAICMP. The plan is applicable to the QA/QC aspects of field sampling and laboratory chemical analysis and outlines the specifics of the field sampling program. Groundwater monitoring is addressed in the *Groundwater Monitoring Well Construction and Groundwater Monitoring Plan* (HDR 2021c).

HDR has prepared and is responsible for maintaining this QAPP, which was developed according to the corresponding U.S. Environmental Protection Agency (USEPA) guidance, *Guidance for Quality Assurance Project Plans* (2002), and Ecology guidance. Field teams are responsible for collecting all proposed field samples, including the QC samples, and for shipping and transferring custody of the samples to the laboratory (Eurofins TestAmerica). Eurofins TestAmerica is responsible for QA/QC within their laboratory operations. HDR is responsible for laboratory coordination. Key personnel and their roles are described in **Table 1**.

Table 1. Summary of Key Personnel and Roles

Personnel	Contact Information	Responsibilities
Simplot	PO Box 912 1130 W. Hwy 30 Pocatello, ID 83204	
Molly Dimick	Molly.dimick@simplot.com	Project Lead, responsible for overall project investigation for Simplot
HDR Engineering, Inc.	412 E. Parkcenter Blvd., Suite 100 Boise, ID 83706-6659	
Stacey Lamer, Project Manager	stacey.lamer@hdrinc.com 208-387-7034	Responsible for developing and executing overall project scope, oversight, deliverables, and schedule.
Adam Kessler, Licensed Geologist	Adam.Kessler@hdrinc.com (763) 278-5902	Responsible for overseeing and reviewing monitoring well construction plan, well construction, and well construction report.
Internal QA/QC Manager	Corrie.Hugaboom@hdrinc.com 208-387-7032	Responsible for overseeing HDR internal QA/QC review.
Katie Krajicek, Field and Data Manager	katie.krajicek@hdrinc.com 208-387-7134 (office) 208-340-3854 (cell)	Responsible for logging soil cuttings, overseeing drilling and installation of monitoring wells, groundwater, soil vapor, and soil sampling, data management and analysis, and reporting.
Eurofins TestAmerica	Eurofins TestAmerica, Seattle 5755 8th Street East Tacoma, WA 98424	
Elaine Walker Project Manager	elaine.walker@testamericainc.com (253)248-4972	Responsible for executing and reporting laboratory work (soil and water) and associated QA/QC protocols.
Eurofins Air Toxics, LLC	Eurofins Air Toxics, LLC 180 Blue Ravine Road, Suite B FOLSOM, CA 95630	
Monica Tran	Monica.tran@eurofinset.com	Responsible for executing and reporting laboratory work (vapors) and associated QA/QC protocols.

1.3 Project Background and Objectives

Simplot entered into AO 8241 with Ecology, on May 27, 2011, to address the presence of ethylene dibromide (EDB), a fumigant in soil and groundwater at the SGS site at 1800 W. 1st Street, Warden, Washington. As part of AO 8241, Simplot completed a remedial investigation/feasibility study (RI/FS) (HDR 2018). The RI/FS recommended a remedial approach that included removing and treating EDB-impacted soils and confirmation groundwater monitoring.

After completing the RI/FS, and in cooperation with Simplot, Ecology completed a CAP (2019). The CAP is Ecology's decision document for the site and provides the rationale for selecting the cleanup alternative. In summary, Ecology concluded:

> *Ecology completed an evaluation of the alternatives and has determined that Alternative 3 is Ecology's selected remedy. The remedial action consists of excavation and treatment of EDB-contaminated soil using an applied vacuum to the soil and collection of the EDB vapors from the soil. The vapors will be captured using a filter and treated.*

> *Clean soils will be removed and stockpiled so that contaminated soils can be excavated, treated, and returned to the excavation. Treated soils with EDB concentrations less than the soil cleanup level (CUL) of 0.27 micrograms per kilogram (µg/kg) will be returned to the excavation and the ground restored to its original condition. Upon completion of the soil cleanup action, compliance groundwater monitoring will take place in order to evaluate the effectiveness of the cleanup action with regards to groundwater protection.*

Simplot entered into another AO (DE 16890) with Ecology on May 7, 2020, to address EDB remedial actions, which requires Simplot to implement the CAP in accordance with the scope of work and schedule attached to AO DE 16890. (AO 8241 was for activities through the completion of the RI/FS report.)

Soil samples from excavation bottoms and sidewalls were collected and analyzed to verify that soils remaining are less than the EDB cleanup level (CUL) of 0.27 µg/Kg.

Sampling of the excavation pit followed Ecology's *Guidance for Remediation of Petroleum Contaminated Sites* (Pub. No. 10-09-057):

- One sample every 20 feet horizontally along the side walls.
- One sample every 400 square feet of exposed bottom.
- Multiple samples were taken vertically along the side walls for deeper excavations. If the vertical profile exceeds 20 feet, then two samples along the wall (upper and lower sample to be determined in the field), every 20 feet horizontally.

Samples were submitted for EDB analysis per USEPA Method 8011. Laboratory analysis was performed on an accelerated turnaround basis as needed to minimize delays. If a confirmation sample equaled or exceeded the EDB CUL, further excavation was performed to remove the affected soil and additional confirmation samples will be collected.

1.3.1 Soil Stockpiles

A series of lined stockpiled areas were established:

- Overburden stockpile area (this is surface soil to just above the caliche).
- Caliche material above the impacted soil zone (see EDR [HDR 2021b] for explanation).
- EDB-impacted soils as identified from previous sampling (see EDR for explanation) and any additional soils excavated based on in-situ pit bottom and wall confirmation samples.

Overburden above the impact zone was reused as excavation backfill. Soil stockpiles were placed on plastic (20-mil or greater) and then covered with plastic (6-mil or greater) and secured from the wind and rain to prevent dust and stormwater runoff.

The overburden stockpile soil will be sampled. Sampling procedures generally follow Ecology's *Guidance for Remediation of Petroleum Contaminated Sites* (Pub. No. 10-09-057):

- Discrete grab samples will be collected (no compositing of soils).
- Samples collected by hand tools 6 to 12 inches beneath the surface of the pile.
- Piles will be divided into sections and each section sampled.

- Number of samples will be based on the volume of soil and will follow Table 6.9 in the above referenced guidance (see CAICMP for more details).

If a sample result exceeds the CUL for EDB, then that section of the pile was considered contaminated and appropriate remediation required. Simplot may also choose to sample that section in greater detail to further separate clean versus contaminated soil.

1.3.2 Remedial Action Activities Conducted to Date

Using standard earth moving equipment, clean surface material to caliche and EDB-impacted soil have been excavated from the west and east excavation areas. The amount excavated exceeded the extent proposed in the February 2021 Final Engineering Design Report (HDR 2021a) based on confirmation sampling conducted during excavation activities. To date, a total of approximately 3,000 cubic yards (CY) of EDB-impacted soil have been excavated and stockpiled along the northern perimeter of the site in an approximately 7,500-square-foot area (150 feet x 50 feet). The clean soil above the EBD-impacted soil was excavated, stockpiled separately, tested, and used to backfill the excavated pits, mainly the east pit, to permit ongoing use of the space-constrained site

A technical memorandum (tech memo) summarizing the remedial action work plan for treating EDB-impacted soils using ex-situ soil vapor extraction (SVE) system was submitted to the Ecology on May 24, 2021. Based on a review of the May 2021 tech memo, additional information regarding the SVE treatment was requested by Ecology on June 15, 2021. Another tech memo (submitted to Ecology on June 30, 2021) summarizing the additional information requested by Ecology was prepared along with responses to comments raised by Ecology during review of the May 2021 tech memo.

1.3.3 Ex-situ Soil Vapor Extraction

Approximately 3,000 CY of EBD-impacted soil will be treated with ex-situ SVE, in which excavated soil will be placed in a treatment pile (cell) containing a network of perforated PVC aboveground piping, to which a vacuum is applied to encourage volatilization of EDB. Soils with EDB CUL exceedances will be placed on top of and covered with an HDPE liner to prevent volatile emissions and to prevent the soil from becoming saturated by precipitation. The process may include granular activated carbon (GAC) to treat off gases from the system. A pilot study will be performed first to gather performance data necessary for full-scale remediation at the site in lieu of preparing a remedial design. Performance monitoring, sampling and testing will be implemented during the pilot study and full-scale remediation in accordance with a *Performance Test Plan* (PTP; HDR 2021d) prepared for the SVE remediation. See the PTP for further details.

For soils placed in the lined ex-situ SVE treatment cell, discrete pre-treatment and post-treatment soil samples will be collected following the same procedures described above for the stockpiles in Section 1.3.1. Soil sampling procedures are further detailed in the CAICMP. SVE treatment soil sample results will be used to assess SVE effectiveness and determine when the CUL is met. If pre-treatment or post-treatment sampling indicates that soil proposed for treatment does not contain EDB at concentrations above 0.27 micrograms per kilogram (µg/kg), the soil will be removed from the treatment cell and be placed in the excavation as clean fill. Additional impacted fill will be placed in the treatment cell, new initial samples will be taken, and the SVE system will be operated as indicated above. Remediation is deemed complete when soil sample results are below the CUL.

In addition to soil sampling, soil vapor samples will be collected during the SVE pilot test before and after the vapors enter the GAC treatment system. Soil vapors will only be monitored using a photoionization detector (PID) meter during the full-scale implementation.

1.4 Project Task Description and Schedule

To meet project objectives, the tasks for implementing site cleanup activities are as follows.

- **Prepare for field activities**

  Preparations for field activities include coordinating with the laboratory to obtain supplies, coordinating activities with the remediation contractor, coordinating activities with Simplot and Ecology, arranging for utilities to be located, and organizing and prepping field equipment. The contractor will be responsible for actual soil excavation activities and setting up the ex-situ SVE system. Activities are described in the *Engineering Design Report* (HDR 2021b) and in the CAICMP.

- **Field sampling**

  The sampling approach is described in CAICMP and briefly described above.

- **Laboratory analysis and reporting**

  Samples are analyzed for EDB (Error! Reference source not found.**)**. The laboratory provides results and associated QA/QC data in electronic format to the data manager.

- **Review, verification and validation of data**

  The analytical QA/QC manager reviews, verifies, and validates the analytical data according to the appropriate USEPA data validation guidelines.

- **Data entry into database**

  Reviewed, verified, and validated analytical and field data is uploaded into the database for access by data users.

- **Data usability assessment**

  The analytical QA/QC manager produces data usability assessments, which discuss the analytical QC results and potential impacts to project objectives based on the results of the data validation.

The constituent of concern for this project, which the remedial action is based on, is EDB. Error! Reference source not found. summarizes the analytical method and method performance criteria.

Table 2. Method and Performance Criteria for Ethylene Dibromide (EDB) in Soils and Groundwater

Criteria	EDB Soil	EDB Groundwater	Soil Vapor
Cleanup Level for Project[1]	0.27 µg/Kg	0.05 µg/L	Not Applicable
Method	USEPA 8011	USEPA 8011	TO-15 Scan
Reporting Limit[2]	0.055 µg/Kg	0.0099 µg/L	0.5 ppbv/3.8 ug/m3
Method Detection Limit	0.013 µg/Kg	0.0020 µg/L	0.042 ppbv/0.323 ug/m3

Criteria	EDB Soil	EDB Groundwater	Soil Vapor
Surrogate Spike – 1,2-Dibromoethane	60 to 140% recovery	60 to 140% recovery	70 to 130% recovery
Laboratory matrix spike (MS) and matrix spike duplicate (MSD)	60 to 140% recovery and RPD limit 20%	60 to 140% recovery and RDP limit 20%	70 to 130% recovery and RDP limit <=25%
Laboratory Control Sample (LCS) and duplicate	60 to 140% recovery and RPD limit 20%	60 to 140% recovery and RPD limit 20%	70 to 130% recovery and RPD limit <=25%
Laboratory Method Blank	Non-detect	Non-detect	Non-detect

[1]See *Cleanup Action Plan* for details on cleanup level (CUL).

[2] Eurofins TestAmerica provided QC criteria for EDB.

RPD = relative percent difference; µg/L = micrograms per liter; µg/Kg = micrograms per kilogram; ppbv = parts per billion volume; ug/m3 = micrograms per cubic meter

A generalized schedule of the tasks associated with each sampling event is provided in **Table 2**. While the QAPP is generally adaptable to modification, including the schedule, it is recommended that a regular task schedule be established and followed.

Table 2. Generalized Schedule of Activities Associated with Remedial Activities

Activities	Time Period
Prepare for field activities	Winter 2020.2021
Field sampling (excavation activities)	Through April 2021
Ex-situ soil vapor extraction (SVE) setup and operations	August 2021 through October 2021
Laboratory analysis and reporting	2 weeks after field sampling
Review, verification, and validation of data	4 weeks after laboratory reporting
Data entry into database	1 week after data validation
Data usability assessment	1 weeks after data validation

1.5 Quality Objectives and Criteria

The cleanup action objective is to reduce potential EDB risks to human health and the environment. The remedial action objectives (RAOs) are developed to prevent unacceptable risk to current and future receptors.

The RAO for soil is as follows:

- For protection of human health, prevent EDB exposure to future on-site receptors through trenching activities (dermal contact and ingestion through direct soil contact). The MTCA Method B, unrestricted land use, CUL is 500 µg/Kg, which exceeds the highest detected soil value of 218 µg/Kg. Thus, the current EDB soil concentrations are below the risk-based standards and this scenario is not further considered.
- For protection of human health, reduce EDB concentrations in soil to protect groundwater, where the soil CUL for protection of groundwater is 0.27 µg/Kg EDB.

The QC requirements set forth in this QAPP support the project objectives by identifying the correct type, quantity, and quality of data needed, and by establishing appropriate processes and

procedures to support the collection and management of this data. Specific quality objectives are described in Sections 1.5.1 and 1.5.2 as data and measurement quality objectives.

1.5.1 Data Quality Objectives

Data quality objectives (DQOs) refer to quality objectives at the decision level. They specify how good a decision must be, but do not directly set criteria for the quality of the data or express data quality characteristics. DQOs for the remedial activities are to describe and implement field and laboratory procedures that ensure: 1) data will be representative of actual environmental conditions, and 2) data are of known and acceptable quality. Measurements will be made to yield accurate and precise results representative of the media and conditions measured. Data will be calculated and reported in units consistent with those used by regulatory agencies to allow for comparability of data. In summary, the principle objective is to collect soil samples of sufficient quality to support the determination if site remedial actions (excavation and treatment of soils) have met the RAOs (listed in Section 1.5).

1.5.2 Measurement Quality Objectives

Measurement quality objectives specify the criteria that data must meet in order to support the program data quality objectives. The measurement quality objectives describe the expected performance or acceptance criteria for individual data quality indicators, such as precision, bias, lower reporting limit, and completeness. Therefore, the measurement quality objectives serve two critical functions. First, they provide the basis for determining the procedures that should be used for sampling and analysis because they specify the level of quality that generated data must achieve. Second, they establish benchmarks against which collected data are compared to determine whether the data are of sufficient quality to be used in the program.

1.5.2.1 PRECISION

Precision is the degree of agreement between replicate analyses of a sample under identical conditions. It is a measure of the random error associated with the analysis, usually expressed as relative percent difference (RPD). Precision will be determined on both field data and laboratory analysis by analyzing field duplicates, laboratory replicates, and matrix spikes duplicates (MSDs). Calculation of RPD between these paired measurements will evaluate precision. Duplicate laboratory sample error values include laboratory and field variability. In general, higher errors are expected for point source effluent and storm event samples. The data quality indicators for laboratory parameters were developed in consultation with the contracted laboratory and are shown in Error! Reference source not found..

1.5.2.2 ACCURACY AND BIAS

Accuracy is the measure of the difference between an analytical result and the true value, usually expressed as percent. The accuracy of a result is affected by both systematic errors (bias) and random errors (imprecision). Bias is a systematic error in one direction. Accuracy and bias will be assessed by using laboratory blanks, matrix spikes (MS), and check standards (Error! Reference source not found.**)**.

1.5.2.3 REPRESENTATIVENESS

Representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at the sampling point, or an environmental

condition. Samples for analysis will consistently be collected from pre-determined sampling sites following pre-determined sampling methods.

Standard operating procedures (SOPs) for sample collection, included in the CAICMP, are designed to minimize variations, potential contamination, and other types of degradation in the chemical and physical composition of the soil. Field staff will follow SOPs for collecting representative samples. Laboratory representativeness is achieved by proper preservation and storage of samples along with appropriate sub-sampling and preparation for analysis.

1.5.2.4 COMPLETENESS

Completeness is defined as the total number of samples analyzed for which acceptable analytical data are generated, compared to the total number of samples collected. Sampling at existing, active wells with known position coordinates in favorable conditions and at the appropriate time points, along with adherence to standardized sampling and testing protocols set out by the QAPP will aid in providing a complete data set. The goal for completeness is 90 percent.

1.5.2.5 COMPARABILITY

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. This goal is achieved through using standardized techniques to collect and analyze representative samples, along with using standardized data validation and reporting procedures. All data should be reported and calculated in units consistent with standard reporting procedures to enable comparison.

1.5.2.6 SENSITIVITY

Sensitivity is the ability of the method or instrument to detect the target analytes at the level of interest. Data will be compared to regulatory limits as shown in Error! Reference source not found., and the laboratory's method reporting limits (MRLs) will be less than these limits where possible.

1.6 Special Training and Certifications

The contracted laboratory maintains the appropriate certifications and participates in periodic auditing programs that establish its level of performance.

1.7 Documentation and Records

HDR will maintain the following program quality records in their Boise, Idaho office in electronic format:

- QAPP, including any approved modifications, updates, and addendums
- Project work plans, including any approved modifications, updates and addendums
- Field documentation
- Chain-of-custody records
- Laboratory documentation
- Data validation and usability reports
- Project database
- Final project reports/deliverables

Electronic documents are maintained on a secure HDR server with a routine backup schedule.

2 Data Generation and Acquisition

This section of the QAPP outlines specific QA/QC procedures related to generating, compiling, reporting, and archiving data. The consistent use of SOPs in these areas is critical to the overall project objective to generate data of known and acceptable quality.

2.1 Sampling Process Design, Locations, and Frequency

The CAICMP includes a sampling and analysis plan (SAP). Field and analytical data will undergo data review, verification, and validation procedures to establish their usability for supporting project objectives. Sampling plan components are described in the CAICMP.

2.2 Sampling Methods

Data will be collected in accordance with the requirements of this QAPP and the SOPs documented in this CAICMP. The reader is referred to those documents for soil sampling method details.

2.2.1 Soil, Water, and Vapor Samples

See the CAICMP for details on soil sampling approach and SOPs.

Standard sample volumes, preservatives, filtration needs, and hold times are summarized in **Table 3**.

Table 3. Standard Sample Volumes, Preservatives, Filtration, and Hold Times

Bottle Type	Analysis	Lab Method	Preservative	Temperature	Hold Time[1]	Comments
Water						
40 mL VOA (3)	EDB	USEPA 8011	Sodium thiosulfate	4° C	14 days	Unfiltered
Soils						
(1) 8 oz jar	EDB	USEPA 8011	None	4° C	14 days (extraction), 40 days (analysis)	Unfiltered
Vapor						
Tedlar Bags (opaque)	EDB	USEPA TO-15	Keep out of sunlight	-	30 days	-

[1]Holding times for soil taken from the 2017 Ecology *Fact Sheet: How DEQ Evaluates Sample Collection and Data Analysis for UST closures and Release Investigation* and from information provided by Eurofins TestAmerica (both soil and groundwater).

mL = milliliters; oz = ounce; VOA = volatile organic analyte; USEPA = U.S. Environmental Protection Agency; °C – degrees Celsius

2.2.2 Sample Handling

Upon request from HDR, the laboratory will be responsible for shipping the necessary coolers and sample bottles – of appropriate size, number, labels, and preservative content – to HDR for each sample event. The laboratory will also send chain-of-custody (COC) forms, custody tape, gel ice, and deionized water as appropriate. Sample preservation will be achieved by using sample bottles with preservative (as appropriate) from the laboratory and immediately placing the sample bottles into a cooler(s) with gel or wet ice to achieve a holding temperature of 4 degrees Celsius (°C). If multi-day sampling events are required, samples will be stored in a locked storage room and kept on

fresh gel or wet ice to ensure sample holding temperatures will be maintained. The samples will be shipped from Boise to the laboratory within the allowable standard holding times, and with a laboratory-provided temperature blank to check compliance with the holding temperature. Sample containers will be packed to prevent breakage or contamination via spillage.

Each sample container will have a waterproof label of sufficient size to make each sample easily identifiable. Sample labels will include the following information:

- Project name
- Date and time (24-hour clock)
- Sample identification codes
- Personnel – initials of sampling personnel

Samples to be used for MS and MSD will be labeled identically to the parent sample and designated as MS/MSD on the COC form. Field duplicates will be noted in the field notes as such, but will be labeled with unique sample numbers so that laboratory staff are unable to tell that these samples are QC samples. Field blanks and trip blanks will be labeled as such. QC samples are labeled according the protocol shown in **Table 4**.

Table 4. Quality Control Sample Labeling System

QC Sample Type	Naming Convention	Numbering Convention	Time Stamp	Description
Matrix spike and matrix spike duplicate	Same as parent sample	Not applicable	Same as parent sample	Water sample to which a known concentration of certain target analytes have been added. Matrix spike duplicates are replicated of the matrix spike sample.
Field (sample) duplicate	Different name than original sample	Named as a separate sample that does not exist in order to distinguish it from the parent sample.	Sampled at same time as parent, but time stamp should be offset from that of the parent sample by at least 15 minutes	Duplicate is collected using the same sampling technique as the original sample.
Trip blank	Trip Blank	Mark this sample as a trip blank	At time taken	Water sample in sample bottle provided by laboratory and accompanies sample. bottles
Field Blank	Field Blank	Labeled as a field blank	At time taken	Pour distilled water directly into appropriate sample bottles.
Rinsate blank	Rinsate Blank	Labeled as a rinsate blank	At time taken	After decontamination of sample equipment, distilled water is poured over the equipment and water collected into a sample bottle.

2.2.3 Chain of Custody

A COC form will be filled out as the samples are collected in chronological order. The COC form will accompany the sample until delivery to the laboratory. If the samples are left unattended, chain-of-custody protocols will be followed with samples held in a secure location with tamper-proof, chain-of-

custody tape to secure the cooler lids in place. Field staff and laboratory staff will sign and date the COC form provided by the analytical laboratory. Field staff will copy the original COC form before sending it to the laboratory with the samples. See CAICMP for SOP for COC. The collected samples will be shipped to the contracted analytical laboratory and analyzed for the surface water quality sampling parameters.

2.3 Analytical Methods

Laboratories will document the following conditions in which samples are received:

- Cooler temperature
- Condition of sample bottles
- Completeness of chain-of-custody documentation
- Record of custody seal presence.

Laboratory analytical methods, method detection limits (MDLs), and screening levels are shown in Error! Reference source not found.. These procedures are standard methods for water sample analysis and detect analytes at the level necessary to compare to regulatory criteria (Error! Reference source not found.).

2.4 Quality Control

QC samples will be collected and analyzed as part of the data validation process to evaluate compliance with the measurement quality objectives. These samples provide a means to evaluate the performance of field and laboratory SOPs by measuring the effect of inherent variability. Refer to **Table 4** for a summary of the QC samples to be collected.

2.4.1 Field QC Samples

The following field QC samples will be collected:

- Equipment rinsate blank from decontaminated sampling equipment at a minimum frequency of 1 sample per week of field activities.
- Trip blank per cooler of samples (analysis for EDB).
- Field blank, taken from distilled water container, at a minimum frequency of 1 sample per week of field activities.
- Matrix spike/matrix spike duplicate (MS/MSD) at a minimum frequency of 5 percent of soil samples collected. MS/MSD samples will be selected by the field geologist and three times the normal sample volume will be collected to accommodate the extra sample required to perform the MS/MSD analysis.
- Soil duplicate collected from the pit by taking a second grab sample from the same excavator bucket load at a frequency of 10 percent of soil samples collected.

2.4.2 Laboratory QC Samples

An MS is prepared by the laboratory (for the samples explicitly collected for this purpose by field staff) by adding a solution of analytes with known concentrations to a field sample. The MS/MSD samples are used to determine the accuracy of analysis for a given matrix. The contracted

laboratory will split field samples (producing a laboratory duplicate) to determine laboratory precision. The difference between total variability and laboratory variability provides an estimate of the field variability. The laboratory will also run deionized water through the entire sample preparation and analysis procedure; therefore, this method blank is used to assess laboratory practices. Finally, the laboratory will run one laboratory control sample (LCS), a sample of known concentration, to evaluate laboratory processes. These QC samples comprise the standard USEPA QA/QC protocol consisting of a laboratory blank, one laboratory duplicate, one LCS, and one MS for each applicable analysis. However, the laboratory is ultimately responsible for determining the proper type and frequency of QA/QC samples for its analyses. The contracted laboratory will inform the project manager or principal investigator as soon as possible if any sample is lost, damaged, has a lost tag, or gives an unusual result.

2.5 Instrument and Equipment Testing, Inspection, Maintenance, and Calibration

Field managers are responsible for field equipment maintenance decisions. As appropriate, field meters (e.g., pH and conductivity) will be calibrated against known standards prior to each day's field activities. Calibration events will be documented in field notebooks and/or field forms. Additional accuracy checks will be conducted as determined appropriate by field managers; for example, checks may occur when measurements are outside of expected ranges or when measurements are not stabilizing. Equipment will be inspected in full prior to leaving for the field to help prevent in-field equipment problems, including changing dissolved oxygen (DO) membranes or pH salts, if needed.

The contracted laboratory is responsible for laboratory equipment maintenance and calibration decisions and documentation. Should an equipment maintenance event or failure affect the analytical schedule, the laboratory will be responsible for notifying HDR of the delay.

2.6 Inspection/Acceptance of Supplies and Consumables

The field manager from HDR is responsible for obtaining and maintaining supplies and consumables for each sampling event. Equipment lists, as well as a safety gear list, are included in SOPs presented in the CAICMP. **Table 5** shows vendors that provide the most commonly used supplies.

Table 5. Consumable Supplies and Vendors

Consumable	Product Description	Item Number	Vendor
pH standards (4.0, 7.0, 10.0)	KTO: pH Buffer Solution Kit, 4 liters each	2507200	Hach Company 1-800-227-4224
Conductivity standard	Conductivity standard, 1.412 mS/cm, 1 liter	013620HY	Hach Company 1-800-227-4224
Silicone for Hydrolab O-rings	Silicone compound, net weight ¼ oz, 2 packets	000298HY	Hach Company 1-800-227-4224
Dissolved oxygen (DO) membranes	DO standard membrane	002589HY	Hach Company 1-800-227-4224
pH junction	Teflon pH junction	003883HY	Hach Company 1-800-227-4224
DO electrolyte	Electrolyte, DO, 59 mL	000537HY	Hach Company 1-800-227-4224

Table 5. Consumable Supplies and Vendors

Consumable	Product Description	Item Number	Vendor
pH electrolyte	pH reference electrode saturated KCl and AgCl, 100 mL	005308HY	Hach Company 1-800-227-4224
Hydrolab rubber replacement cap	Hydrolab rubber replacement cap	000465	Hach Company 1-800-227-4224
0.45 µm filters	GWE high capacity filters, 50 per pack	ET-GF-50	Enviro-Tech Services Company 1-800-468-8921
Silicone tubing	3/16 x 3/8 inch silicone tubing size 15…T16, sold by the foot	RYN-0575-054	Enviro-Tech Services Company 1-800-468-8921
Polyethylene tubing	0.17 x ¼ inch polyethylene tubing T5, sold by the foot	RYN-0525-016	Enviro-Tech Services Company 1-800-468-8921
Blue sharpies	Sharpie permanent ultra-fine point markers, blue, 12 per pack	451880	Office Depot www.officedepot.com
Rite-in-the-Rain copier paper	Rite in the Rain All Weather Copier Paper, 8 ½ x 11, 200 sheets per pack	3XFR7	Grainger www.grainger.com
Strapping tape	Cantech 0179 48 mm x 55 mm, 24 rolls per case	Cantech 0179 48 mm x 55 mm	Keystone Tape & Supply of Texas, Inc. 817-439-8898
2-gallon zip lock bags	13” x 15” heavy weight 2-gallon zip lock freezer bags, 100 per pack	130F41315 100	The WEBstaurant Store http://www.webstaurantstore.com/

mS/cm = microSiemens per centimeter; oz = ounce; mL = milliliter; µm = micrometer

The contracted laboratory is responsible for inspecting and checking supplies and consumables (sample reference materials and reagents) associated with the analytical procedures. This includes any standards needed for laboratory QC (described in Section 2.4.2).

2.6.1 Existing Data

Extensive data exist for the site; see CAICMP.

2.7 Data Management

HDR will maintain the following program data in their Boise, Idaho office.

- QAPP
- Work plans
- Addendums
- Field notes
- Chain-of-custody records
- Laboratory documentation
- Data validation records
- Summary reports
- Deliverables

Hardcopies of field notes, COC forms, and laboratory reports will be filed and maintained for the duration of the project. Likewise, electronic documents, such as laboratory reports, will be filed in the project directory. The project directory is hosted on a secure server with regular on-site and off-site backup procedures.

2.7.1 Data Collected in the Field

Field staff will record site information in a field notebook and/or field form at the time of sample collection. This information will include documentation of the sample method (i.e., intermediate equipment used or individual sample containers) and observations of conditions that could affect the quality of the samples (e.g., clarity, weather). Field staff will use standardized field forms to record field parameter measurements (i.e., conductivity, pH, temperature). See SOPs in the CAICMP. Notes and data will be recorded in indelible ink, weather permitting; in adverse weather conditions (i.e., very cold or very wet), pencil may be used. Any written mistakes will be crossed out once (not erased) and initialed, and the correct information will be written in. Field notebook and datasheet entries will include the following information at minimum:

- Project name
- Monitoring well/sample location
- Personnel – names and affiliation of sampling personnel
- Date and time of sample collection
- Samples collected
- Field measurements and observations

Field staff will fill out a COC form at the conclusion of the sampling day. A sample COC form and SOP are outlined in the CAICMP. The COC form will include the following information at minimum:

- Project name
- Monitoring well/sample name
- Personnel - initials of sampling personnel
- Date and time of sample collection
- Type of media samples and requested analysis

Data recorded in field notebooks, field forms, and on COC forms will be backed up at the end of each field day (i.e., by scanning or photocopying). Field data will be archived in original form upon return to the office.

2.7.2 Laboratory Data

Laboratory data will be delivered in an electronic format (called the electronic data deliverable in this QAPP) to minimize the chances of transcription error. The laboratory will provide a USEPA Level 2 data validation package and includes the following information:

- Case narrative
- Field and laboratory sample identification
- Sample collection, receipt, preparation and analysis date/time
- Sample conditions upon receipt and chain-of-custody
- Preparation and analysis methods and batch number/identification
- Sample result, method detection limits and reporting limits

- Laboratory data qualifiers and data qualifier definitions
- Dilution factors and sample volumes
- QC data, acceptance criteria, and frequency for the following QC samples:
  - Field and laboratory MS/MSD
  - Laboratory duplicates
  - Laboratory method and instrument blanks
  - Laboratory calibration check standards

Both the electronic data deliverable and validation package associated with each sampling event will be archived in original form on the project directory. The laboratory sample data will then be uploaded to the project database. QC results will also be uploaded to the database and used to evaluate data accuracy and determine whether the measurement quality objectives were met.

2.7.3 Database Development

HDR will develop an Excel database to efficiently store soil, vapor, and groundwater quality data. The database stores sampling site information, static water level and water level elevation information, analytical laboratory results and qualifiers, quality control sample results, regulatory limits, and other associated data.

Prior to incorporation in the database, all data will be subject to review as described in this QAPP to verify accuracy and completeness.

3 Assessment and Oversight

3.1 Assessments and Reports to Management

Field and laboratory systems and performances will undergo regular QC review. HDR will perform internal reviews as appropriate. Review procedures will be consistent with those described by USEPA in *Guidance on Technical Audits and Related Assessments for Environmental Data Operations* (2000).

HDR internal reviews of field activities verify that the procedures established by this QAPP are being followed. Internal field reviews may include evaluation of field and instrument records, sample collection and handling, and documentation procedures. The findings of internal reviews will be shared with the field team to facilitate corrective actions being taken (if needed).

If HDR suspects any issues affecting the quality of the laboratory analytical data, HDR will request a QA/QC report from the laboratory as conducted by laboratory personnel in accordance their QA manual regarding laboratory performance. The request will include documentation of the laboratory's review of sample receiving and handling, chain-of-custody procedures, sample preparation and analysis, and instrument operating records.

3.2 Corrective Actions

Corrective actions refer to the process of implementing measures to counter QC problems identified through the assessments outlined above. Corrective actions may occur during field or laboratory activities or during data validation and assessment. If QC results indicate problems with data, the

prescribed procedures will be followed to resolve the problems. Corrective steps may include the following:

- Modifying sampling or measurement procedures
- Re-calibrating instruments
- Re-analyzing samples (within holding time requirements)
- Modifying analytical procedures
- Re-collecting samples (if time and resources allow)

If none of these measures can be taken within practical time and budget constraints, then the data will be qualified appropriately in the analysis and report. Even if qualified data are eventually unacceptable for use in the project (i.e., rejected), these data are archived throughout the project life. No data are discarded.

Corrective actions or other modifications to the QAPP will be tracked and produced quarterly. Modifications constitute minor changes made in the implementation of the QAPP according to staff discretion. For example, a site that was not visited or sampled during a sampling event due to lack of water or unsafe field conditions would constitute a modification. Corrective actions and modifications taken will be documented when implemented and produced quarterly.

4 Data Review, Verification, and Validation

Data review, verification, and validation procedures are established to confirm that the data obtained are complete, accurate, and of appropriate quality. These steps are critical to verifying that the collected data meets project objectives. Data review, verification, and validation will be completed for data produced by the quarterly groundwater sampling events.

4.1 Data Review, Verification, and Validation

4.1.1 Data Review

Data review refers to the process of examining data for correct and complete recording, transmission and processing (USEPA 2002). Both field and laboratory data undergo review processes.

Raw field data are entered directly into field notebooks/and or sample forms at the time of the site visit. The field crew will check their field notebooks for missing or improbable measurements before leaving each site. In addition, spot checks for transcription errors will occur as data are recorded in the field. Following field activities, recorded field data are archived in original form and entered into the project database. One hundred percent of the field data entry will be checked against the original sample forms for errors and omissions. Missing or unusual data will be brought to the attention of the field manager for consultation and resolution.

Internal laboratory data review procedures will be according to laboratory SOPs. Upon receipt of lab results, HDR will check for missing and improbable data. A standard case narrative of laboratory QA/QC results will be sent to the project manager for each set of samples.

4.1.2 Data Verification and Validation

Data verification refers to the process of evaluating a data set for completeness – that data requested from the laboratory has been received and complies with specified requirements. Data validation describes an analyte- and sample-specific process of evaluating that a data set meets method, procedure, and contract requirements. Procedural criteria are documented throughout this QAPP.

Generally, verification and validation procedures are conducted together by the QA/QC manager according to established procedures. For this project, 100 percent of laboratory data will undergo Stage 2B validation. Briefly, Stage 2B validation comprises completeness and compliance checks of sample receipt conditions, and sample- and instrument-related QC checks.

Data compliance with acceptance criteria established by this QAPP is determined through the process of data verification and validation. Data beyond acceptance criterion will be evaluated and qualified appropriately. The data qualification flags used in this project are shown in **Table 6**. Once verification and validation is complete, the appropriate data qualification flags are attached to the corresponding data in the "validated" version of the electronic data deliverable. This electronic data deliverable is uploaded to the project database, and the validation flags follow the corresponding data throughout the life of the project. Although data may be rejected for use, no data are deleted in this process. Problems identified through this process will be addressed according to the corrective actions outlined in Section 3.2. The results of the data validation process for each sampling event are presented in a data validation report.

Table 6. Data Qualification Flags

Data Qualification Flag	Definition
U	The analyte was analyzed for but was not detected above the level of the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting the QC criteria. The analyte may or may not be present in the sample.
UJ	The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

4.2 Reconciliation with User Requirements (Data Usability)

The data usability assessment takes the results of data review, verification, and validation processes and determines whether the qualified data meet the overall project DQOs. In the usability assessment, data and measurement quality objectives are verified for meeting the standards set forth in this QAPP. A sample usability assessment is given in Appendix A. A data summary and data usability assessment will be produced quarterly.

Additionally, the project objectives will be reviewed annually to identify any changes. The QAPP will accordingly be reviewed and updated annually, subject to approval, to reflect any changes and to maintain alignment of data collection and QA/QC procedures to the overall project goals.

5 References

Ecology [Washington State Department of Ecology]

2019. *Cleanup Action Plan*. Warden City Water Supply Wells 4 & 5. Warden, WA. FSID 2802409, CSID 1618.

HDR [HDR Engineering, Inc.]

2018. *Final Remedial Investigation and Feasibility Study Report*. Simplot Grower Solutions. Warden Washington. September 2018.

2021a *Cleanup Action Implementation Compliance Monitoring Plan*. Simplot Grower Solutions, Warden, Washington. January 2021.

2021b *Engineering Design Report*. Simplot Grower Solutions, Warden, Washington. July 2021.

2021c *Groundwater Monitoring Well Construction and Groundwater Monitoring Plan*. Simplot Grower Solutions, Warden, Washington. February 2021.

2021d *Performance Test Plan*. Simplot Grower Solutions, Warden, Washington. July 2021.

USEPA [United States Environmental Protection Agency]

2000 Guidance on Technical Audits and Related Assessments for Environmental Data Operations. EPA QA/G-7. USEPA Office of Environmental Information, Washington, DC. http://www.epa.gov/quality/qa_docs.html. Accessed March 2012.

2002 Guidance for Quality Assurance Project Plans. EPA QA/G-5. USEPA Office of Environmental Information, Washington, DC. http://www.epa.gov/quality/qa_docs.html. Accessed March 2012.

A

Data Usability Assessments

Data Usability Assessment

Name of Data Set:
Prepared By:
Date:

Data or Measurement Quality Objective	Yes	No	Comments
Planning documents available?			
Project objectives identified?			
Sample design described?			
QA/QC procedures defined?			
Field documents available for review?			
Sample site locations/description provided?			
Sample types and numbers defined?			
Field SOPs defined?			
Field calibrations recorded?			
QC samples documented?			
COC record documents?			
Complete data packages available?			
Specified methods used and detection limits met?			
Accuracy of data appropriate?			
Precision of data appropriate?			
Representativeness of data appropriate?			
Completeness of data appropriate?			
Comparability of data appropriate?			
Sensitivity of methods appropriate?			
Do the data satisfy the project goals and meet the quality objectives?			