INL/EXT-16-39890
Revision 0

Field Sampling Plan for Closure of the Central Facilities Area Sewage Treatment Plant Lagoon 3 and Land Application Area

October 2016

The INL is a U.S. Department of Energy National Laboratory
operated by Battelle Energy Alliance

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October 2016

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Idaho Falls, Idaho 83415

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Prepared for the
U.S. Department of Energy
Office of Nuclear Energy, Science, and Technology
Under DOE Idaho Operations Office
Contract DE-AC07-05ID14517

ABSTRACT

This field sampling plan describes sampling of the soil/liner of Lagoon 3 at the Central Facilities Area Sewage Treatment Plant. The lagoon is to be closed, and samples obtained from the soil/liner will provide information to determine if Lagoon 3 and the land application area can be closed in a manner that renders it safe to human health and the environment. Samples collected under this field sampling plan will be compared to Idaho National Laboratory background soil concentrations. If the concentrations of constituents of concern exceed the background level, they will be compared to Comprehensive Environmental Response, Compensation, and Liability Act preliminary remediation goals and Resource Conservation and Recovery Act levels. If the concentrations of constituents of concern are lower than the background levels, Resource Conservation and Recovery Act levels, or the preliminary remediation goals, then Lagoon 3 and the land application area will be closed. If the Resource Conservation and Recovery Act levels and/or the Comprehensive Environmental Response, Compensation, and Liability Act preliminary remediation goals are exceeded, additional sampling and action may be required.

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ACRONYMS

BEA	Battelle Energy Alliance
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFA	Central Facilities Area
COC	constituent of concern
DEQ	Idaho Department of Environmental Quality
DOE-ID	U.S. Department of Energy Idaho Operations Office
DQO	data quality objectives
EPA	Environmental Protection Agency
FSP	field sampling plan
gpd	gallons/day
INL	Idaho National Laboratory
LAA	land application area
PSQ	principle study question
QAPP	quality assurance project plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
STP	Sewage Treatment Plant
TCLP	toxicity characteristic leaching procedure
WGS	Waste Generator Services

Field Sampling Plan for Closure of the Central Facilities Area Sewage Treatment Plant Lagoon 3 and Land Application Area

1. INTRODUCTION

This field sampling plan (FSP) was prepared for closure of Lagoon 3 and the land application area (LAA) at the Idaho National Laboratory's (INL's) Central Facilities Area (CFA) Sewage Treatment Plant (STP). The STP is approximately 2,200 ft downgradient from the nearest drinking water well and 4,000 ft north of Highway 26. The CFA STP consists of three lagoons and a 73.5-acre LAA. Seepage testing of the three wastewater lagoons was performed between August 26, 2014, and September 22, 2014. Testing showed seepage rates from Lagoons 1 and 2 were below the 0.25 in./day requirement; however, Lagoon 3 was above 0.25 in./day. Lagoon 3 was removed from service based on the seepage test results.

Because of significantly reduced wastewater discharges to the CFA STP, wastewater has not been land applied since 2011. The future need to land apply wastewater was recently evaluated. Based on the current wastewater flows into the CFA STP and expected future missions at CFA, it was determined that the CFA STP is significantly oversized and that Lagoons 1 and 2 could be converted to total evaporation lagoons. Therefore, the decision was made to remove the existing sludge in Lagoon 3 and transfer it to Lagoon 2 for additional treatment, decommission Lagoon 3, close the LAA, and terminate the wastewater reuse permit.[a]

This FSP supports sampling to characterize the soil/liner of Lagoon 3. Together, this FSP and the *Quality Assurance Project Plan for Closure of the Central Facilities Area Sewage Treatment Plant Lagoon 3 and Land Application Area* (INL 2016b) comprise the sampling and analysis plan for this effort. Data collected under this plan will be used to evaluate risk of the lagoon and the LAA associated with the CFA STP. Once the sludge has been removed from Lagoon 3, the soil/liner will be characterized. Because of the diluted nature of the wastewater discharged to the CFA STP, Battelle Energy Alliance (BEA) is not expecting any Resource Conservation and Recovery Act (RCRA) or Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) issues. If that is the case, then no further characterization of Lagoon 3 or the LAA will occur. But, for purposes of conservatism, it is assumed that the Lagoon 3 soil/liner sample results will be worst case. If it is determined that Lagoon 3 is below concern, then the LAA would also be below concern. However, if the Lagoon 3 soil/liner results are above RCRA and/or CERCLA screening values, the results will be evaluated to determine whether samples will need to be collected from the LAA. Samples collected under this FSP may be used to satisfy the closure requirements of Lagoon 3 and the LAA.

1.1 Site Description

The CFA STP is located approximately 5 mi north of the INL Site's southern boundary and southeast of the CFA (Figure 1), which is approximately 50 mi west of Idaho Falls in Butte County, Idaho. The STP is approximately 2,200 ft downgradient of the nearest drinking water well and 4,000 ft north of Highway 26. The wastewater LAA is approximately 2,200 ft from the nearest inhabited building. The CFA STP is managed and operated by BEA for U.S. Department of Energy Idaho Operations Office (DOE-ID).

a. More detail about the CFA can be found in the *Closure Plan for the Idaho National Laboratory Site's Central Facilities Area Sewage Treatment Plant Lagoon 3 and Land Application Area* (INL 2016a).

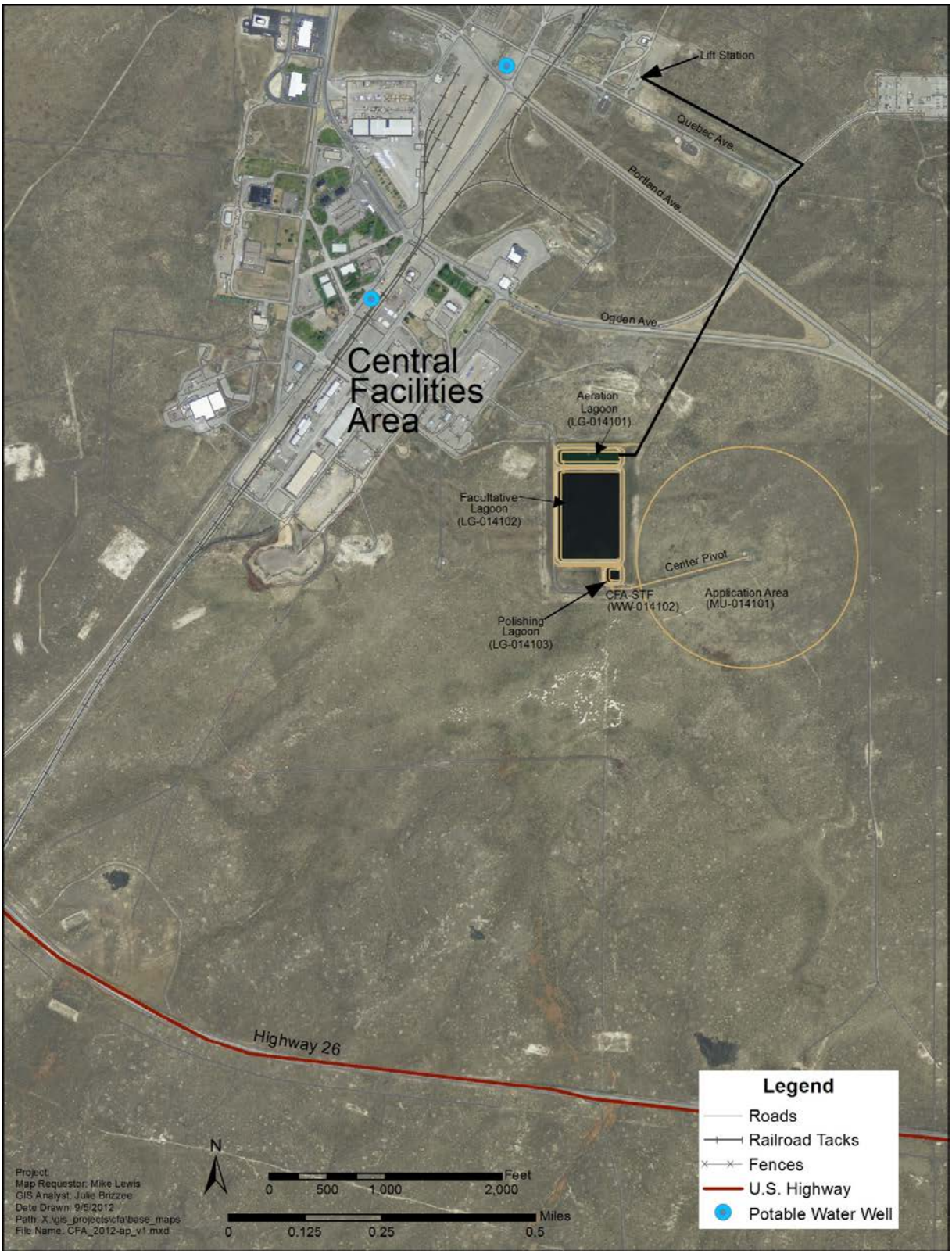

Figure 1. Area map showing the location of the Central Facilities Area Sewage Treatment Plant.

The CFA STP was built in 1994 and put into service on February 6, 1995. The CFA STP began operation under Wastewater Land Application Permit No. LA-000141-01 issued on July 25, 1994 (Green 1994). In 1995, effluent discharged to the CFA STP was derived from restrooms, showers, and the cafeteria, with a significant portion comprised of non-contact cooling water from air conditioners and heating systems. Other contributing discharge sources included bus and vehicle maintenance areas, analytical laboratory operations, a medical dispensary, and a print shop (INEL 1996). Current wastewater discharges consist of bus and vehicle maintenance areas; boiler blowdown; heating, ventilation, and air conditioning systems; employee showers and restrooms; laboratories; craft shops; a fire station; and a medical dispensary. Additional wastewater may be transported from other area comfort stations, septic tanks, and portable toilets. The large volume of non-contact water has produced a dilution affect, creating a weak wastewater.

Although the system was put into operation on February 6, 1995, the flow meter was not functioning properly. Flow recording began on March 4, 1995 (INEL 1996). For the period of March 4, 1995, through November 30, 1995, the flow into the CFA STP averaged 173,594 gallons/day (gpd). Current (2016) recorded influent flow ranges from approximately 4,000 gpd to 30,000 gpd.

Historically, the application season at the STP LAA was from April 1 through October 31 each year. Wastewater was typically applied during a work week and as needed, to ensure that the operational level in Lagoons 2 and 3 was maintained at the 4-ft level going into the winter. The actual annual volume of wastewater that was land applied was significantly less than the annual volume allowed by the wastewater reuse permit (Neher 2010).

Before Lagoon 3 was removed from service, the CFA STP wastewater lagoons operated in series. Wastewater entered Lagoon 1, flowed into Lagoon 2, and then finally flowed into Lagoon 3. Lagoons 1 and 2 still operate in this fashion.

As shown above in Figure 1, the CFA STP consists of a:

- 1.7-acre partial-mix, aeration lagoon (Lagoon 1, LG-014101)
- 10.3-acre facultative lagoon (Lagoon 2, LG-014102)
- 0.5-acre polishing lagoon (Lagoon 3, LG-014103)
- 73.5-acre wastewater LAA consisting of desert steppe and crested wheatgrass vegetative communities
- Computerized center-pivot, sprinkler irrigation system.

A 350-gal/minute pump was used to move wastewater from the polishing lagoon to the center-pivot sprinkler system, which waters the LAA at low pressures (approximately 30 lb/in.^{2}) to minimize aerosols and spray drift.

Influent wastewater discharged into the CFA STP was classified as “low-strength” wastewater. Table 1 shows the 2005 through 2009 permit year (November 1–October 31) influent averages for the wastewater reuse permit-required parameters and compares those with the concentrations for a “low-strength wastewater (Metcalf and Eddy 2003).

Table 1. Central Facilities Area Sewage Treatment Plant permit year averages for wastewater reuse permit-required influent parameters compared to the low-strength criteria for sanitary wastewater.

Permit Year	2005	2006	2007	2008	2009	Low Strength[a]
Total nitrogen (mg/L)	23.8	24.4	21.52	19.73	19.49	<40
Biochemical oxygen demand (mg/L)	66.84	98.9	165.6	89.3	62.5	<190
Chemical oxygen demand (mg/L)	118.1	119.3	154.4	120.6	113.3	<430
Total suspended solids (mg/L)	82.96	81.3	80	92.8	95.2	<720

a. Metcalf and Eddy (2003).

1.2 Sampling Scope and Assumptions

Key provisions that define or limit the scope of this FSP are:

- The concentrations of constituents of concern (COCs) in the soil/liner are comparable to the concentrations of COCs in the LAA. If the concentration of COCs in the soil/liner are less than INL background soil concentrations and CERCLA and RCRA preliminary remediation goals, then it is assumed that the concentrations of COCs in the LAA are also less than the screening levels.
- A residential scenario will be evaluated. Although land within the INL Site boundary will be under government control and not released for residential use at least until 2095, DOE prefers to qualify as much land as practicable for unlimited use and to minimize the level of restrictions.

1.3 Lagoon 3 Closure

Lagoon 3 was seepage tested at the 4.75-ft depth from September 16, 2014, through September 21, 2014. Results of the Lagoon 3 seepage test showed the average seepage rate was 0.455 in./day and exceeded the allowable seepage rate of 0.25 in./day. Lagoon 3 was then taken out of service based on the results of the seepage test. A lock was placed on the control valve so that it cannot be opened. During closure activities, a cap will be permanently installed on the inlet piping to Lagoon 3 to prevent any future flow into the lagoon.

Lagoon 3 was allowed to dry out. Figure 2, taken on October 1, 2014, shows large cracks between the clumps of sludge on the bottom of Lagoon 3. The bottom of Lagoon 3 is approximately 100 ft. × 100 ft. with an estimated 1 to 2 in. of sludge depth.

Figure 2. View of sewage sludge on the bottom of Lagoon 3.

Because of the minimal amount of sludge in Lagoon 3, it was determined that the best approach would be to scrape up the sludge and transfer it to Lagoon 2 (10.3 acres of surface area) for additional treatment. Negative impacts to the treatment process in Lagoon 2 are not expected by the addition of this relatively small amount of sludge.

The CFA STP Lagoon 3 contains approximately 50 yd^3 of dried sludge that will be removed and placed into Lagoon 2. This will be accomplished by bringing in compactable fill material and placing it over the rip-rap to construct an access ramp down into Lagoon 3 where the rip-rap was removed. Personnel operating a front-end loader will use the ramp to gain access to the bottom of Lagoon 3. The front-end loader will then be used to scrape the bottom of the lagoon and remove the dried sludge. Once the bucket on the front-end loader is full, the loader will exit Lagoon 3 via the access ramp and discharge the dried sludge into Lagoon 2. The dried sludge will be discharged into Lagoon 2 at different locations to prevent buildup at one location of the lagoon. If necessary, a trackhoe may be used in place of the front-end loader.

A water truck will be staged in the area on hand to control any fugitive dust that may be generated. Personnel accessing the bottom of Lagoon 3 who are outside the equipment cab will be required to wear personal protective equipment as directed by BEA Industrial Hygiene and Safety (shoe covers, gloves, Tyvek, safety glasses, etc.). The Lagoon 3 soil/liner will be pierced in approximately four locations using the front-end loader or trackhoe so that water pooling in the bottom of the lagoon will be minimized.

The CFA STP lagoons are lined with bentonite-treated soil. Once the sludge has been removed, samples will be collected from the soil/bentonite liner in Lagoon 3 in accordance with a separate quality assurance project plan (QAPP) and this FSP. Samples of the soil/liner will be analyzed and compared to INL Site soil background levels. If the sample results exceed the soil background levels, they will be compared to RCRA regulatory levels and CERCLA preliminary remediation goals.

If sample results for the soil/bentonite liner indicate values below the INL Site soil background levels and RCRA and CERCLA screening levels (provided in Section 2.3), then no additional characterization or evaluation of Lagoon 3 and the LAA will be performed.

If either the screening RCRA or CERCLA levels are exceeded, Lagoon 3 will be placed under CERCLA for further evaluation and closure.

1.4 Land Application Area Closure

The LAA will not be sampled for the contaminants identified in Section 2.3 unless the results from the soil/liner sampling event show that some or all of the COCs are above the screening levels. The soil/liner sample results will be evaluated to determine whether samples should be collected from the LAA for all COCs identified in Section 2.3 or from a group of specific COCs that were above the RCRA or CERCLA screening levels. Samples from the LAA will be collected in accordance with the QAPP and FSP.

If RCRA or CERCLA screening levels are exceeded, the LAA will be placed under CERCLA for further evaluation and closure.

2. SAMPLE COLLECTION

Sample collection will be performed according to the data quality objectives (DQOs) outlined in the QAPP (INL 2016b). Before any sampling activities begin, a pre-job briefing will be held to review the requirements of this FSP, associated work control documents, and the "Environmental Restoration Project Health and Safety Plan" (PLN-2128), to ensure that all documentation has been completed and all hazards have been identified and mitigated accordingly. Project personnel also will ensure that all necessary equipment and documentation are present and all personnel understand the project scope, objectives, hazards, and hazard controls.

Samples will be collected in accordance with company-approved procedures developed under the requirements of the QAPP (INL 2016b) and this FSP. Sampling will satisfy the goal of the study for the principal study question (PSQ) outlined in the DQOs, which is

> Are concentrations of COCs in the soil/liner from Lagoon 3 sufficiently low to allow for safe closure of Lagoon 3 and the LAA?

Systematic random sampling will be performed to determine whether COC concentrations exceed the screening levels. Composite or multi-increment sampling is inappropriate because the soil/clay liner cannot be effectively homogenized. Figure 3 shows the sampling locations in the soil/liner. The sample locations are determined based on the location of the southwest corner of the pond. Specifically, the grid rows and columns are 25 ft apart. Every other row is offset by 12.5 ft. The sample location in the most southern row on the west side is 26.5 ft east of the southwest corner and 4 ft north of the corner. The rest of the sample locations can be determined from the location of that point.

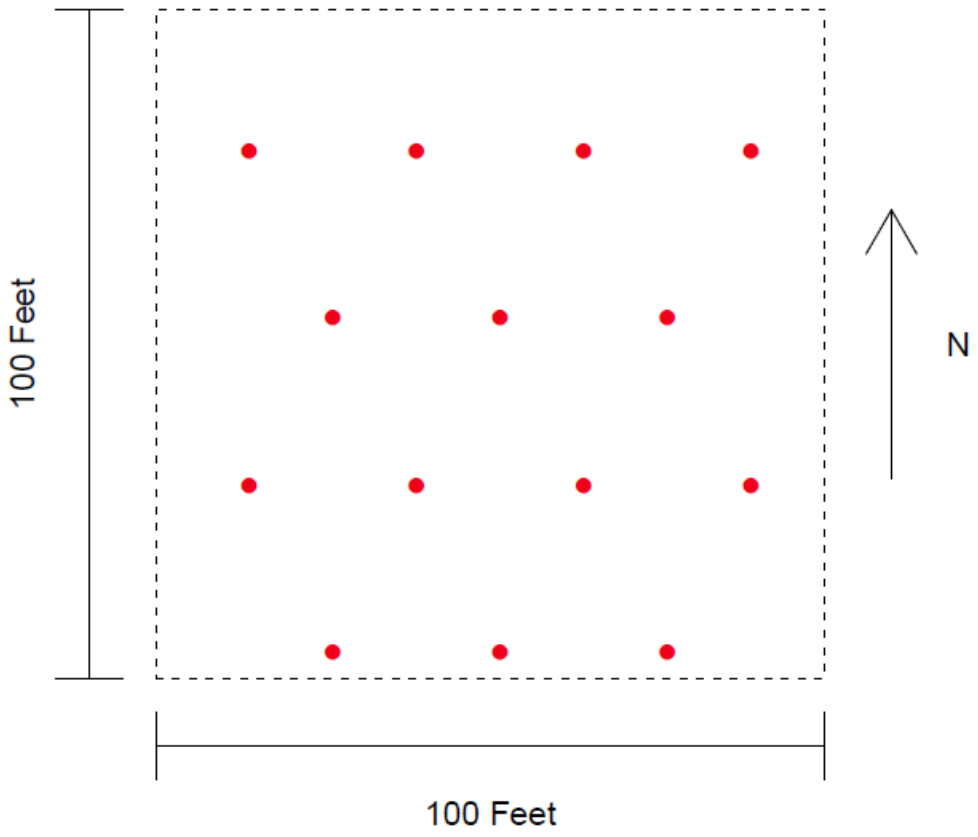

Figure 3. Sampling locations.

2.1 Sampling Procedure

Project personnel will mark the position of each sampling location. Personnel may make small adjustments to ensure that obstructions are avoided. Changes to sample locations will be recorded in the field logbook and Geographical Information System database. Then, using a scoop or soil probe with a lined sampler or equivalent (hand-operated or power-driven), a sample will be collected from the bentonite layer at the marked location. Project personnel will then transfer the sample to a clean, labeled sample container. Project personnel will move to the next selected location, repeating the process until all grab samples are collected from the soil/liner.

Cleaning of the sampling tool is not required between increments, but it will be replaced or cleaned between the grab samples. Reused sampling equipment will be decontaminated as described in Section 2.2.

Once sampling is complete, labeled sample containers will be prepared for shipment. Sections 2.7, 2.8, and 2.9 describe requirements to prepare samples for off-Site shipment.

2.2 Decontamination Procedure

Equipment will be inspected and cleaned before use to prevent cross-contamination from another site. Preliminary inspection and cleaning—performed away from the sampling site—consist of removing rust,

oil, grease, or any other buildup by scrubbing with a wire brush or sandblasting. Equipment then will be cleaned with a solution of water and detergent, rinsed, and dried.

Decontaminating reusable sampling equipment between replicate samples will include the following steps:

- Clean with a solution of water and detergent by lightly spraying the equipment and using a brush or saturated wipe to remove particulate matter and surface films
- Rinse thoroughly with water
- Dry with clean wipe or let air-dry on clean surface before next use.

An equipment rinsate blank will be collected in accordance with the QAPP (INL 2016b) to evaluate decontamination procedures. Equipment rinsate blanks are not required if dedicated or disposable equipment is used.

2.3 Sampling and Analysis Requirement

Non-Routine sampling services will coordinate analyses with a laboratory that can achieve programmatic requirements. Analysis requirements are summarized in a sampling and analysis plan system created by non-routine sampling personnel. The technical lead representative will coordinate with the analytical laboratory to ensure that samples arrive at the laboratory to meet holding time requirements. Preservation requirements and maximum sample holding times will be obtained from the laboratory; holding times will be defined from the date of sample collection to the date of sample preparation or analysis, unless otherwise specified.

Samples will be analyzed for the analytes identified in Table 2. Any changes to number of samples, expected approach, or analytical or quality control (QC) requirements will be noted in the project-specific log notes, since these types of changes are inherent to sampling activities. If scope does not change, such as redefining the population or significantly changing the strategy, incidental changes that occur throughout the planning process may be documented in the sample log notes and do not require a document revision form or field change form. However, a field change form called an “Electronic Change Request (eCR)” (Form 412.45) can be initiated, as needed, to address unexpected conditions encountered in the field and allow work to proceed. A sampling logbook will be maintained in accordance with company procedures for logbooks.

Table 2. Resource Conservation and Recovery Act screening levels, Operable Unit 10-08 Comprehensive Environmental Response, Compensation and Liability Act Preliminary Remediation Goal screening levels, and INL Site soil background levels.

Analyte	RCRA TCLP[a] Screening Levels	CERCLA Residential Soil Cleanup Level[b]	CERCLA Ecological Screening Level[b]	INL Site Soil Background Level[c] (95%/95% UTL[d])
Metals	**(mg/L)**	**(mg/kg)**	**(mg/kg)**	**(mg/kg)**
Arsenic	100[e]	21.6	18	5.8
Barium	2000[e]	15000	330	300
Beryllium	NA[f]	160[g]	NA	1.8
Cadmium	20[e]	70	0.36	2.2
Chromium	100[e]	28000	26	33
Copper	NA	3100	28	22
Lead	100[e]	400	11	17
Manganese	NA	1800	220	490
Mercury	4[e]	4.3	8.4	0.05
Nickel	NA	1500	38	35
Selenium	20[e]	390	0.52	0.22
Silver	100[e]	390	4.2	ND[h]
Thallium	NA	6.3	0.1	0.43
Organics	**(mg/kg)**	**(mg/kg)**	**(mg/kg)**	**(mg/kg)**
1,4 dichlorobenzene (used in toilet deodorant)	150[e]	2.6[g]	NA	NA
Benzene	10[e]	1.2[g]	NA	NA
Ethylbenzene	NA	5.8[g]	NA	NA
Methylene chloride	NA	57[g]	NA	NA
Toluene	NA	4900[g]	NA	NA
Xylene	NA	580[g]	NA	NA
Radionuclides	**pCi/g**	**pCi/g**	**pCi/g**	**pCi/g**
Cesium-137	NA	6	4950	0.82

Table 2. (continued.)

Iodine-129	NA	3.3[g]	NA	NA
Tritium	NA	23[g]	NA	NA
Strontium-90	NA	23.1	3340	0.49

a. TCLP = toxicity characteristic leaching procedure.
b. Residential and ecological screening levels are 10^{-4} risk-based levels or hazard quotient of 1 taken from *Operable Unit 10-08 Remedial Design/Remedial Action Work Plan* (DOE-ID 2010), unless footnoted otherwise.
c. Background Dose Equivalent Rates and Surface Soil Metal and Radionuclide Concentrations for the Idaho National Engineering Laboratory (Rood, Harris, and White 1996).
d. UTL = upper tolerance limit.
e. 20 times the value listed in 40 CFR 261.24, Table 1, "Maximum Concentration of Contaminants for the Toxicity Characteristics."
f. NA = not applicable.
g. U.S. Environmental Protection Agency (EPA) EPA regional screening level (EPA 2015) for 10^{-6} risk-based level or hazard quotient of 1, whichever is more restrictive.
h. Any detection of silver is considered to be above background.

2.4 Sampling Equipment

Before sampling, new or decontaminated equipment will be obtained to support sampling activities. The following equipment, documentation, and supplies will be used for sampling, as needed:

- Soil probe with a lined sampler or equivalent (hand-operated or power-driven)
- Hand tools (e.g., disposable spades, spoons, scoops, or soil auger)
- Aluminum pans or equivalent
- Personal protective equipment designated in work control documents authorized by facility management or as identified by the project safety representative
- Survey paint, pin flags, or stakes to mark sample locations
- Chain-of-custody forms
- Sample logbook
- Wipes or absorbent towels
- Sample containers and labels
- Authorized work control documents to direct fieldwork (e.g., this FSP, job safety analysis, and technical procedure or work order)
- Container to stage samples and ice if samples are not immediately shipped off-Site for analysis
- Adhesive tape
- Individual sample bags and waste bags
- Aluminum foil
- Measuring tape
- Pens and markers
- Custody seals.

2.5 Sampling Documentation and Management

The field team lead will be responsible for controlling and maintaining all field documents and records and for verifying that all documents submitted to the non-routine group are maintained in good

condition. All entries will be made in indelible black ink. Errors will be corrected by drawing a single line through the error and entering the correct information. All corrections will be initialed and dated.

Any deviations from this FSP will be brought to the attention of project management and the technical lead. Any changes (e.g., to the number of samples, the expected approach, or the analytical or QC requirements) will be noted in the project-specific log notes and may require an "Electronic Change Request (eCR)" (Form 412.45). As noted above, the form may be initiated (usually for a procedure), to allow work to continue, in the case of unexpected conditions encountered in the field. Incidental changes that occur throughout the planning process may be documented in the sample log notes and do not require an "Electronic Change Request (eCR)."

2.6 Sample Logbook

This sampling event will only require the use of a sample logbook, in which case all pertinent information will be recorded in the sample logbook, and no other logbooks are necessary. The sample logbook will be used to record information necessary to interpret the analytical data, including the following:

- Sample collection method (e.g., which tools were used) and location (e.g., sample number and depth)
- Shipping information; samples will be relinquished to off-Site laboratory for analysis
- All team activities
- Problems encountered
- Names of visitors
- List of site contacts
- Corrective actions taken as a result of field audits
- Discrepancies or changes from the description in this FSP, with regard to the approach, depth, location, analyses, number of samples, presence of moisture, or physical limitations.

Sampling logbooks will be maintained in accordance with company procedures. The logbook will be signed and dated at the end of each day's sampling activities.

2.7 Sample Designation and Labeling

Each sample bottle will contain a label identifying the unique field sample number. Uniqueness is required for maintaining consistency and preventing the same identification code from being assigned to more than one sample. A systematic character code will be used to uniquely identify all samples. Non-routine personnel will generate sample numbers and labels that correlate directly to characterization sampling. The label is completed and placed on the bottle in accordance with company procedures.

2.8 Chain of Custody

All samples collected will be managed by chain of custody methods in accordance with company procedures. Chain-of-custody methods/procedures will begin immediately after the first sample is collected. At the time of sample collection, the sampling team will initiate a chain-of-custody form for each sample. All samples will remain in the custody of a sampling team member until custody is transferred to the analytical laboratory sample custodian. Upon receipt at the laboratory, the sample custodian will review the sample labels and the chain-of-custody form to ensure completeness and accuracy. If discrepancies are noted during this review, then immediate corrective action will be sought, and the sampling team member(s) will relinquish custody, as identified on the chain-of-custody form. Upon completion of the corrective action, the laboratory sample custodian will sign and date the chain-of-custody form, signifying acceptance of delivery and custody of the samples.

2.9 Sample Transport

Once sampling is complete, samples will be prepared for shipment, and the applicable shipping papers will be completed in accordance with company procedures. Samples will be packaged and properly preserved, and packages will be provided to the Packaging and Transportation shipper for transport.

2.10 Waste Management

Wastes generated during the characterization project will include sampling equipment, such as used disposable pans, scoops, wipes, and personal protective equipment. Waste Generator Services (WGS) personnel will coordinate waste disposal activities in accordance with company procedures. Waste will be bagged, placed in containers, labeled, and stored in an approved storage area pending disposition. "Waste Determination and Disposition Forms" (Form 435.39) will be prepared when determining the disposition routes for all waste generated during sampling and analysis.

The analytical laboratory will dispose of samples submitted to them for analyses or return them to the requester as stated in the applicable task order statement. Samples returned from the laboratory will be accepted only if the original label is intact and legible. If the samples are returned, Waste Management personnel are responsible for properly dispositioning the samples with the assistance of project management. All waste must be characterized, and preapproval for disposal must be obtained from WGS personnel.

2.10.1 Waste Minimization

Throughout the sampling activity, emphasis will be placed on waste-reduction methods. Practices to be implemented to support waste minimization include, but are not limited to, the following:

- Restrict materials (especially hazardous materials) to those needed to perform work
- Substitute recyclable items for disposable items
- Reuse items, when practical
- Segregate contaminated from uncontaminated waste
- Segregate reusable items (e.g., personal protective equipment and tools).

3. SAMPLE ANALYSIS

Laboratories on the company Qualified Suppliers List will be used to analyze samples in accordance with project requirements, such as those given in the applicable statement of work for laboratory services. Project-specific request-for-analyses forms or task order statements identify additional requirements for laboratory analysis. The following subsections identify analysis requirements for this sampling project.

3.1 Analytical Methods

To ensure that data of acceptable quality are obtained from the sampling project, standard EPA laboratory methods or technically appropriate methods for analytical determinations will be used to obtain sample data. The non-routine personnel is responsible for obtaining laboratory analytical services for the required analyses listed in Table 2, in accordance with company procedures. The non-routine personnel will prepare statements of work for laboratory services that include the analytical methods and the project-required detection limits for each analysis type. Any deviations from this information will be fully documented, and the laboratory will inform the project manager and technical lead of the deviations.

3.2 Instrumentation Calibration Procedure

Laboratory instruments will be calibrated in accordance with each specified analytical method. The laboratory quality assurance plan must include requirements for calibrations when specifications are not listed in analytical methods. Calibrations that typically are not called out in analytical methods include ancillary laboratory equipment and verification of reference standards used for calibration and standard preparation. Laboratory documentation includes calibration techniques and sequential calibration actions, performance tolerances provided by the specific analytical method, and dates and frequencies of the calibrations. All analytical methods have specifications for equipment checks and instrument calibrations. The laboratory will comply with all method-specific calibration requirements for all requested parameters. If failure of instrument calibration or equipment is detected, the instrument will be recalibrated, and all affected samples will be analyzed using an acceptable calibration.

3.3 Laboratory Records

Laboratory records are required to be maintained in accordance with the specific laboratory quality assurance plan. The non-routine laboratory authorization processes provide assurance that the analytical laboratories authorized to perform analysis maintain an appropriate laboratory quality assurance plan that addresses laboratory records.

4. DATA MANAGEMENT AND DOCUMENT CONTROL

The following subsections describe data management and document control for this sampling effort.

4.1 Data Reporting

The final data package documentation will conform to the criteria specified in the applicable statement of work for laboratory services. The statement of work prepared by non-routine personnel is the standard means by which company projects define analytical data deliverable requirements to laboratories. All laboratories used by this project will adhere to documents that establish technical and reporting standards.

4.2 Data Validation

Analytical data validation is the comparison of analytical results versus the requirements established by the analytical method. Validation involves evaluation of all sample-specific information generated from sample collection to receipt of the final data package. Data validation is used to determine whether analytical data are technically and legally defensible and reliable. The final product of the validation process is the validation report. The validation report communicates the quality and usability of the data to the decision makers.

Data generated for this project will undergo external validation, which non-routine personnel will arrange. Standard plus raw data and Level B validation will be requested for all sample data reports generated during this project. The validation report will contain an itemized discussion of the validation process and results. Copies of the data forms annotated for qualification will be attached to the report.

4.3 Data Quality Assessment

The project data quality assessment and validation process is used to determine whether the data meet the project DQOs. DQOs for this sampling event are defined in the QAPP (INL 2016b). Additional steps of the data quality assessment process may involve data plotting, testing for outlying data points, and other statistical analyses relative to the characterization project DQOs. Quality assessment objectives for this project will meet the minimum requirements as established in the QAPP (INL 2016b) and will be performed as follows:

- Precision is the measure of the reproducibility of measurements under a given set of conditions and can be evaluated by the use of duplicate samples collected in the field. To meet the QAPP goals for measurements of precision, duplicates will be collected at a minimum frequency of 1/20 environmental samples or 1/day/matrix, whichever is less.
- Accuracy is a measure of the closeness of an individual measurement or the average of a number of measurements to the true value. Accuracy is demonstrated by using control samples, blind QC samples, or matrix spikes.
- Representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population parameter at a sampling point or environmental condition. The representativeness criterion is best satisfied by confirming that sampling locations are selected properly and a sufficient number of samples is collected to meet the confidence level required by the intended use of the data. The DQOs defined in the QAPP (INL 2016b) describe the basis for the sample design and procedure to satisfy this requirement.
- Completeness is a measure of the number of samples collected and analyzed and is expressed as a percentage of the number of samples planned to be collected and analyzed. The completeness goal for sampling activities is 90% for non-critical samples and 100% for critical samples. Samples collected under this FSP are considered non-critical with a completeness goal of 90%.
- Comparability is the qualitative term that expresses confidence that two data sets can contribute to a common analysis and interpolation. Two data sets will not be collected for this sampling project; thus, requirements for comparability are not applicable

5. HEALTH AND SAFETY REQUIREMENTS

Personnel who sample, transport, and analyze the soil must work under PLN-2128 and project-specific work control that contains hazard identification and mitigation. Project-specific work control must comply with the Integrated Safety Management System in accordance with company policies and procedures.

6. PROJECT ORGANIZATION AND RESPONSIBILITIES

This section describes the positions associated with this sampling event. These responsibilities may change throughout the sampling effort. An organization chart will be prepared to show the name of the individual performing the function and will be retained in work control documentation. Most of the position descriptions are provided in PLN-2128. Descriptions of those positions not included in PLN-2128 are provided in Sections 6.1 through 6.3. The following lists key positions or support areas:

- BEA manager, Regulatory and Monitoring Services
- BEA Facility and Site Services Program environmental lead
- BEA CFA STP responsible charge operator/facility specialist
- BEA CERCLA and RCRA technical point of contact
- BEA technical point of contact for wastewater
- Portage technical lead
- BEA Environment, Safety, and Health
- Portage Quality Assurance
- Waste Generator Services

- Waste Generator Services waste technical specialist
- Portage Non-Routine Sampling Program
- Portage field team personnel.

6.1 Technical Lead

The technical lead is responsible for field activities and for all personnel, including craft personnel, assigned to work at the project location. The technical lead is the interface between operations and project personnel and works to ensure that the sampling team achieves project objectives in a safe and efficient manner. The technical lead coordinates all document preparation, field and laboratory activities, data evaluation, risk assessment, dose assessment, and design activities.

6.2 Waste Generator Services Waste Technical Specialist

The INL Site WGS waste technical specialist ensures that waste disposal complies with approved INL Site waste management procedures. WGS personnel help solve waste management issues at the task site. In addition, WGS personnel prepare appropriate documentation for waste disposal and make the proper notifications, as required.

6.3 Sample and Analysis Management

Non-routine personnel are responsible for helping to define analyses that will meet project requirements, generating the sampling and analysis plan table and field guidance form, and generating and issuing sample labels. Non-routine personnel determine the laboratory that will provide analytical services, based on established policies and contracts; ensure that the analytical laboratory uses acceptable methods; and prepare the statement of work. Non-routine personnel also track analytical progress and perform a cursory review of the final data packages. Non-routine personnel obtain data validation, as directed by the project.

7. REFERENCES

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