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Revision 1

Quality Assurance Project Plan for Closure of the Central Facilities Area Sewage Treatment Plant Lagoon 3 and Land Application Area

October 2016

Idaho National Laboratory

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October 2016

Idaho National Laboratory
Idaho Falls, Idaho 83415

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Quality Assurance Project Plan for Closure of the Central Facilities Area Sewage Treatment Plant Lagoon 3 and Land Application Area

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Approved by:

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Kenton Harwood Responsible Charge Operator and Facility Specialist	10-26-16 Date
Jill Lundell Monitoring Supervisor	10/25/2016 Date
Berta Oates QA/QC Officer	10/25/2016 Date

ABSTRACT

This quality assurance project plan describes the technical requirements and quality assurance activities of the environmental data collection/analyses operations to close Central Facilities Area Sewage treatment Plant Lagoon 3 and the land application area. It describes the organization and persons involved, the data quality objectives, the analytical procedures, and the specific quality control measures to be employed. All quality assurance project plan activities are implemented to determine whether the results of the sampling and monitoring performed are of the right type, quantity, and quality to satisfy the requirements for closing Lagoon 3 and the land application area.

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ACRONYMS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFA	Central Facilities Area
COC	contaminant of concern
DEQ	Department of Environmental Quality
DQO	data quality objective
DS	decision statement
EPA	Environmental Protection Agency
FSS	Facilities and Site Services
INL	Idaho National Laboratory
ISCORS	Interagency Steering Committee on Radiation Standards
LAA	land application area
MCL	maximum contaminant level
MDL	minimum detection level
PRG	preliminary remediation goal
PSQ	principal study question
QA	quality assurance
QAPP	quality assurance project plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RPD	relative percent difference
STP	Sewage Treatment Plant
TCLP	toxicity characteristic leaching procedure

Quality Assurance Project Plan for Closure of the Central Facilities Area Sewage Treatment Plant Lagoon 3 and Land Application Area

1. PROJECT MANAGEMENT

1.1 Distribution List

Names and addresses of personnel receiving copies of this quality assurance project plan (QAPP) are provided in Table 1.

Table 1. Distribution list for this QAPP.

Title	Name and Address
Facilities and Site Services Manager	Bryan Crofts Idaho National Laboratory P.O. Box 1625 Idaho Falls, ID 83415-4131
Central Facilities Area (CFA) Sewage Treatment Plant (STP) Responsible Charge Operator/Facility Specialist	Kenton Harwood Idaho National Laboratory P.O. Box 1625 Idaho Falls, ID 83415-4131
Facility and Site Services (F&SS) Program Environmental Lead	James Graham Idaho National Laboratory P.O. Box 1625 Idaho Falls, ID 83415-3428
Facilities and Site Services CFA Environmental Support	Brad Griffith Idaho National Laboratory P.O. Box 1625 Idaho Falls, ID 83415-4131
Environmental Project Manager and Regulatory and Monitoring Services Manager	Scott Lee Idaho National Laboratory P.O. Box 1625 Idaho Falls, ID 83415-3405
Monitoring Supervisor	Jill Lundell Portage, Inc. 1075 S. Utah Ave., Ste 200 Idaho Falls, ID 83402
Technical Point of Contact for Wastewater	Michael Lewis Idaho National Laboratory P.O. Box 1625 Idaho Falls, ID 83415-3405
DEQ Regional Engineering Manager	Gregory Eager, P.E. Department of Environmental Quality 900 N. Skyline Drive, Suite B Idaho Falls, ID 83402

1.2 Project/Task Organization

Table 2 lists key project personnel and their corresponding responsibilities.

Table 2. Project personnel, titles, and responsibilities.

Name and Title/Responsibility	Contact Information	Responsibility
Robert Boston Responsible Official	U.S. Department of Energy Idaho Operations Office 1955 N. Fremont Ave. Idaho Falls, ID 83415	Responsible official for the reuse permit.
Timothy Miller Authorized Representative	Idaho National Laboratory P.O. Box 1625 Idaho Falls, ID 83415	Authorized representative for the reuse permit.
James Graham F&SS Program Environmental Lead	Idaho National Laboratory P.O. Box 1625 Idaho Falls, ID 83415	Responsible for CFA oversight of Environmental Program.
Brad Griffith F&SS CFA Environmental Support	Idaho National Laboratory P.O. Box 1625 Idaho Falls, ID 83415	Environmental regulatory activities for F&SS. Responsible for environmental oversight CFA Sewage Treatment Plant (STP) environmental compliance. Reports to the Program Environmental Lead.
Scott Lee Environmental Project Manager and Regulatory and Monitoring Services (RMS) Manager	Idaho National Laboratory P.O. Box 1625 Idaho Falls, ID 83415	Responsible for environmental monitoring and reporting at the INL Site. Reports to the Authorized Representative.
Michael Lewis Liquid Effluent Reporting Lead, Technical Point of Contact, Substitute Responsible Charge Operator	Idaho National Laboratory P.O. Box 1625 Idaho Falls, ID 83415	Responsible for wastewater environmental reporting and compliance. Reports to the RMS Manager.
Bryan Crofts Manager, F&SS	Idaho National Laboratory P.O. Box 1625 Idaho Falls, ID 83415	Overall responsibility for CFA STP.
Kenton Harwood CFA STP Responsible Charge Operator/Facility Specialist	Idaho National Laboratory P.O. Box 1625 Idaho Falls, ID 83415	Responsible for operation and maintenance of the CFA STP. Reports to F&SS Manager.
Jill Lundell Monitoring Supervisor	Portage, Inc. 1075 S. Utah Ave., Ste 200 Idaho Falls, ID 83402	Responsible for overseeing the sampling activity, preparing final report summarizing the sampling results, requesting review by the QA/QC officer and the environmental project manager, and finalizing the report.
Justin Carroll Sampling Staff	Portage, Inc. 1075 S. Utah Ave., Ste 200 Idaho Falls, ID 83402	Responsible for collecting and shipping samples from Lagoon 3.

Name and Title/Responsibility	Contact Information	Responsibility
Edith Kent GEL Laboratories	GEL Laboratories, LLC 2040 Savage Road Charleston, SC 29407	Responsible for chemical and physical analyses of environmental samples performed by GEL. Responsible for implementing all laboratory quality assurance/quality control (QA/QC) requirements and ensuring equipment is maintained and calibrated. Responsible for addressing all contract issues and questions.
Jennifer Norman Data Validation	Portage, Inc. 103 N Main Street, Ste. 103 Butte, MT 59701	Responsible for data validation of environmental and biological samples.
Berta Oates QA/QC Officer	Portage, Inc. 1075 S. Utah Ave., Ste 200 Idaho Falls, ID 83402	Responsible for QA/QC documents and oversight of the quality of the project.

1.3 Purpose and Intended Use of Data

1.3.1 Introduction

The Central Facilities Area (CFA) Sewage Treatment Plant (STP) is located at Idaho National Laboratory (INL). 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 land application area (LAA). Seepage testing of the three wastewater lagoons was performed between August 26, 2014, and September 22, 2014. 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 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 scrape up 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. More detail about the CFA STP can be found in the closure plan (INL 2016).

1.3.2 Purpose

The purpose of this QAPP is to describe the technical requirements and quality assurance (QA) activities of the environmental data collection/analyses operations to be performed to close Lagoon 3 and the LAA. It describes the organization and persons involved, the data quality objectives (DQOs), the analytical procedures, and the specific quality control (QC) measures to be employed. All QAPP activities are implemented to determine whether the results of the sampling and monitoring performed are of the right type, quantity, and quality to satisfy the requirements of closing Lagoon 3 and the LAA.

1.3.3 Intended Use of Data

Data collected will be used to characterize the soil/liner material in Lagoon 3 and, if required, the soils in the LAA, so that Lagoon 3 and the LAA may be closed in a manner that is in compliance with applicable regulatory requirements and protective of human health and the environment. The criteria recommended are based on the unique characteristics of INL and of sewage waste in general. The need for sampling the LAA and further sampling of Lagoon 3 will be determined based on screening results. These data may also be used by the facility for management purposes.

1.3.4 General Overview

The soil/liner material from Lagoon 3 will be analyzed and compared to INL Site soil background levels. If the INL Site soil background levels are exceeded the results from the soil/liner material will be compared to Resource Conservation and Recovery Act (RCRA) hazardous waste levels and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) preliminary remediation goals (PRGs). Information obtained during operation of the CFA STP was used to determine appropriate contaminants of concern (COCs). Significant restrictions were placed on discharges to the CFA STP, including no RCRA hazardous wastes and no radiological activity above Environmental Protection Agency (EPA) drinking water maximum contaminant levels (MCLs). All new potential waste streams are reviewed by environmental personnel to determine whether or not they can be discharged.

Influent discharged into the CFA STP was sampled and analyzed in 1995 and 1996 for organics, inorganics, metals, and radionuclides. Effluent samples were collected and analyzed for organics in 1995 and 1996. Effluent samples for metals, inorganics, and radionuclides were collected and analyzed from 1995 through 2011. No wastewater has been discharged to the LAA since August 2011. Sample results for organics, inorganics, and metals were typically below the Idaho Groundwater Quality Standards (IDAPA 58.01.11.200) or the laboratory instruments' minimum detection level (MDL), or both. Radiological sample results were below the EPA MCLs and typically below the MDL.

Historical discharges, influent and effluent data, and potential discharges were evaluated to identify the following COCs:

- Metals – Arsenic, barium, beryllium, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, and thallium
- Radionuclides – Cesium (Cs)-137, iodine (I)-129, strontium (Sr)-90, and tritium (H-3)
- Organics – 1,4 dichlorobenzene (used in toilet deodorant), benzene, ethylbenzene, methylene chloride, toluene, and xylene.

Metal, organic, and radionuclide concentrations/activity levels in the CFA STP sludge and the soil/liner are expected to be similar to those found in sewage sludge from a publicly owned treatment works. Criteria that will be used to determine if closure criteria have been met for the measured constituents are listed in Section 1.4.2.5.

1.4 Data Quality Objectives

This section presents the DQOs that constitute criteria to determine whether data meet acceptable standards of quality. Also discussed are the associated data quality indicators and how these are employed to analyze data in order to determine whether DQOs are achieved. DQOs discussed include those for the quantitative indicators of precision and accuracy, data representativeness, and data comparability. More information about DQOs can be found in the *Guidance on Systematic Planning Using the Data Quality Objectives Process* (EPA 2006).

1.4.1 Quantitative Data Quality Indicators

This section discusses DQOs associated with the quantitative indicators of precision and accuracy. Discussed here are action levels and actions necessary for assessing data quality for the sampled media. Parameters (i.e., either constituents to be analyzed or other measurements to be taken) having direct regulatory implications for compliance are required to meet numerical DQOs.

1.4.1.1 Precision

The relative percent difference (RPD) measures the difference between a sample result and the result of a corresponding duplicate, divided by the mean of the two results. The RPD is used in this QAPP as an indicator of precision. The RPD is calculated as shown in Equation 1.

Equation 1

$$RPD\ (\%) = \frac{\left[Sample\ (mg/L) - Duplicate\ (mg/L)\right]}{\left[\left(Sample\ (mg/L) + Duplicate\ (mg/L)\right)/2\right]} * 100$$

The RPD criteria are waived in cases where the analytical result is ± 1 MDL (minimum detection level). This is because RPDs typically increase dramatically as the result approaches the MDL.

For data that do not meet RPD criteria, the QA/QC officer initiates an inquiry as to the cause of substandard data and makes recommendations for mitigating the cause(s).

1.4.1.2 Accuracy

Accuracy is the agreement between the measured value of something and the accepted “true” value for the same thing. Accuracy is estimated based on measurements of samples of known composition and comparing measurements to those known values. The difference between the known values and measured values determines the degree of accuracy. For laboratory procedures, accuracy is estimated based on analysis of calibration check standards, laboratory-fortified blanks, surrogates, internal standards, and/or matrix spikes.

Contract laboratories have their respective laboratory QC checks, as specified in the analytical method used for the specific media, to validate their results. These procedures are performed at frequencies recommended by the analytical method and instrumentation operating manuals. If results from any QC check for either in-house or contract laboratory are not within the range established in the analytical method accuracy goal, the laboratory will make a thorough review of laboratory procedures to identify and correct the problem. The laboratory will make a case-by-case determination regarding data usability and the need to qualify data.

1.4.2 Data Quality Objectives

The DQO process was developed by EPA to ensure that data are of the right type, quality, and quantity to ensure that project goals are met (EPA 2006). This section outlines the DQOs affiliated with the sampling of CFA Lagoon 3 soil/liner material. The DQO process consists of seven steps that are defined in the following seven subsections.

1.4.2.1 State the Problem

Lagoon 3 failed the seepage test conducted in September 2014 and wastewater has not been land applied since 2011. Therefore, it was determined that the best approach would be to close Lagoon 3 and the LAA and terminate the wastewater reuse permit. Sampling is required to characterize the soil/liner in Lagoon 3 to ensure Lagoon 3 and the LAA are closed in a manner that is safe for the environment and human health and in compliance with applicable regulatory requirements.

1.4.2.2 Identify the Decision

Step 2 in the DQO process is to identify the principal study questions (PSQs) and the decision statements (DSs) associated with the questions.

The PSQ for this sampling effort 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?*

The DS is:

> *Determine if the soil/liner meets the criteria for safe closure of the soil/liner and LAA. If it does not meet the requirements, then use the information obtained from sampling and analysis to determine an appropriate course of action.*

1.4.2.3 Identify Inputs to the Decision

In Step 3, inputs needed to resolve the DS are identified. The following inputs are needed:

- Quantification and identification of COCs in the soil/liner
- A list of screening levels to determine if the soil/liner for Lagoon 3 and the LAA can be closed without further action

Historical information related to the sludge and the CFA STP.

1.4.2.4 Define the Study Boundaries

Step 4 is the defining of the study boundaries. This includes both physical and temporal boundaries. The physical boundaries for the soil/liner sampling are the soil/liner for Lagoon 3. The temporal boundaries are from the time it was decided to close Lagoon 3 until the receipt and analysis of the data, which is anticipated to be fall of 2016. It is possible that the temporal boundary may exceed that time frame, depending on sample results or other extenuating circumstances.

1.4.2.5 Develop the Analytical Approach

Step 5 is the defining of parameters of interest and action levels. The parameter of interest is the concentration of COCs in the soil/liner.

The action levels for this sampling effort are a series of screening levels. The maximum measured concentration for each COC will be compared to the INL Site soil background level (Table 3). This was selected as the initial screening criterion because if the concentrations of COCs are below INL background levels there is no benefit to human health or the environment in removing the contaminants.

If a COC is less than the INL background level for all samples, it will be considered sufficient for determining that COC is within safe levels and further screening will not be done. The only exception is when the INL background level is more than twenty times the RCRA hazardous screening level. However, this is not the case for any of the COCs in this report.

If the INL background level is exceeded for a measured COC concentration or if there is not an INL background concentration for that COC, the results for the COC will be compared to the RCRA hazardous waste screening value and the CERCLA screening levels (Table 3). The RCRA hazardous waste screening levels are generated for a toxicity characteristic leaching procedure (TCLP) analysis. However, a total metals analysis will be done on the samples. It is possible to compare total solids results to the TCLP action levels by comparing the measured total metals results to 20 times the TCLP limits. Because of the TCLP methodology, this is a conservative comparison. If the total metals result is less than 20 times the TCLP limit, it can be confidently concluded that the samples meet the requirement. However, if the total metals result is greater than 20 times the TCLP result, it is still possible that the material does not actually exceed the action level. Thus, if the RCRA Screening Level is exceeded, the material will be analyzed using the TCLP method to verify the actual TCLP metals concentrations. The action levels listed in Table 3 have been scaled for direct comparison with total metals results. As with the INL background soil levels, the comparison will be made for each individual sample concentration.

Table 3. Screening levels and associated with the closure of Lagoon 3.

Analyte	**RCRA TCLP Screening Levels**	**CERCLA Residential Soil Cleanup Level[a]**	**CERCLA Ecological Screening Level[a]**	**INL Site Soil Background Level[b] (95%/95% UTL)**
Metals	**(mg/L)**	**(mg/kg)**	**(mg/kg)**	**(mg/kg)**
Arsenic	100[c]	21.6	18	5.8
Barium	2000[c]	15000	330	300
Beryllium	NA	160[d]	NA	1.8
Cadmium	20[c]	70	0.36	2.2
Chromium	100[c]	28000	26	33
Copper	NA	3100	28	22
Lead	100[c]	400	11	17
Manganese	NA	1800	220	490
Mercury	4[c]	4.3	8.4	0.05
Nickel	NA	1500	38	35
Selenium	20[c]	390	0.52	0.22
Silver	100[c]	390	4.2	ND[e]

Analyte	RCRA TCLP Screening Levels	CERCLA Residential Soil Cleanup Level[a]	CERCLA Ecological Screening Level[a]	INL Site Soil Background Level[b] (95%/95% UTL)
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[c]	2.6[d]	NA	NA
Benzene	10[c]	1.2[d]	NA	NA
Ethylbenzene	NA	5.8[d]	NA	NA
Methylene chloride	NA	57[d]	NA	NA
Toluene	NA	4900[d]	NA	NA
Xylene	NA	580[d]	NA	NA
Radionuclides	pCi/g	pCi/g	pCi/g	pCi/g
Cesium-137	NA	6	4950	0.82
Iodine-129	NA	3.3[d]	NA	NA
Tritium	NA	23[d]	NA	NA
Strontium-90	NA	23.1	3340	0.49

mg/L = milligrams per liter

mg/kg = milligrams per kilogram

pCi/g = picocuries per gram

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act

NA = not applicable

RCRA = Resource Conservation and Recovery Act

TCLP = toxicity characteristic leaching procedure

UTL = upper tolerance limit

a. 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 2010), unless footnoted otherwise.

b. Background Dose Equivalent Rates and Surficial Soil Metal and Radionuclide Concentrations for the Idaho National Engineering Laboratory (Rood, Harris, and White 1996).

c. 20 times the value listed in 40 CFR 261.24, Table 1. "Maximum Concentration of Contaminants for the Toxicity Characteristics."

d. EPA Regional Screening Level for 10^{-6} risk-based level or hazard quotient of 1, whichever is more restrictive, November 2015.

e. Any detection of silver is considered to be above background.

Soil cleanup levels for residential soil and ecological screening levels from *OU 10-08 Remedial Design/Remedial Action Work Plan* (DOE 2010) will be used for the CERCLA screening. Soil screening and cleanup levels, generally referred to as PRGs, are chemical-specific concentration goals for specific media (e.g., soil, sediment, water, and air) and land use combinations at CERCLA sites.

If the samples are below the screening levels, no additional characterization will be needed and the LAA will not be sampled for contaminants listed in Table 3. However, if the samples exceed the screening levels, the soil/liner and LAA will be placed under CERCLA for further evaluation and closure.

1.4.2.6 Specify the Performance Acceptance Criteria

Under Step 6, decision rules and estimation uncertainty are defined. The purpose of the soil/liner sampling is to determine if the soil/liner and LAA are safe for closure. Although every sampling effort carries a chance of making a decision error, there is a minimal amount of risk because of process knowledge and previous sampling events. The sampling methodology that is identified in the following subsection is designed to minimize the potential for any decision error.

1.4.2.7 Develop a Detailed Plan for Obtaining the Data

Under Step 7, the number of samples that are to be collected is determined, as well as the methodology that will be used to determine sampling locations. It is necessary that data are representative, in order to ensure that the sample mirrors the population that is being sampled. Thus, a random sampling method must be employed. Many random sampling designs exist, and the selection of the optimal method is based on the needs of the study and the constraints associated with it.

Because of the nature of Lagoon 3 and the requirements for determining if the soil/liner meets the necessary requirements, a systematic random sampling method will be used to collect samples. Composite or multi-increment sampling is inappropriate because the soil/clay liner cannot be effectively homogenized. The systematic random sampling method is done by selecting a diamond-shaped grid to identify sample locations. A random-number generator is used to determine the location of the first sample point, which dictates the location of the grid on the pond. The sampling method is illustrated in Figure 1.

Because the sample locations are compared to the screening levels on a point-by-point basis, there is not a statistical formula to determine how many samples are required for the comparison. However, a minimum of 10–15 samples is recommended to attain proper coverage of the soil/liner. The grid shown in Figure 1 has 14 sample locations.

1.4.3 Data Comparability

Comparability is a qualitative measure of the confidence with which one data set can be compared to another. GEL is the lab that has been selected to perform the analysis to ensure consistency with QA/QC procedures.

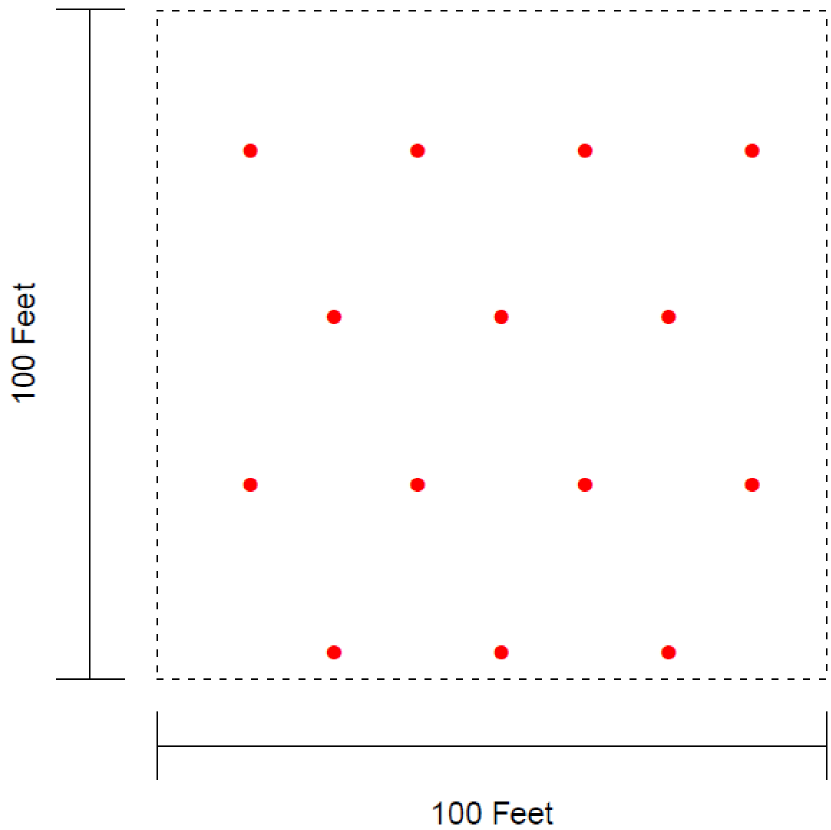

Figure 1. Illustration of the sampling design for Lagoon 3. A grid with sample locations spaced 25 ft apart was randomly placed on the pond. This results in approximately 14 samples.

1.5 Training Requirements and Certification

Training and certification requirements for various staff positions and laboratories are shown in Table 4.

Table 4. Project staff and training/certification requirements.

Position Title/ Responsibility	Training and Certification Requirements
Environmental project manager	Trained by education and on the job in the design and implementation of environmental monitoring programs, QA/QC, project management, environmental regulatory requirements, and permit requirements.
Monitoring supervisor	Trained in-house by previously trained staff on all monitoring and sampling protocols, use and calibration of sampling equipment, environmental regulatory requirements, and permit requirements.
QA/QC officer	Trained by education and on the job in the design and implementation of environmental monitoring programs, QA/QC, environmental regulatory requirements, and permit requirements.
Sampling staff	Trained in-house by previously trained staff on all sampling protocols, use and calibration of sampling equipment, and regulatory and permit requirements.

Position Title/ Responsibility	Training and Certification Requirements
Contract laboratories	Contract laboratory (GEL) participates in the North American Proficiency Testing Program for soil, plant tissue, and water analyses.
Data validator	Trained by education and on the job to assess the quality and usability of data obtained from the laboratory.

1.6 Documentation and Records

Documentation generated by activities addressed in this QAPP consists of field notes, chain-of-custody records, laboratory analyses reports, vendor certifications, daily log sheets, and a report summarizing the sampling events and results. This documentation is available to, and reviewed by, project personnel for QC. An example chain-of-custody form is provided in Appendix A.

2. DATA GENERATION AND ACQUISITION

2.1 Sampling Locations

Sampling locations, sample handling and custody procedures, and other sampling specifications are outlined in the field sampling plan associated with this closure.

3. ASSESSMENT AND OVERSIGHT

3.1 Assessment and Response Actions

The QA/QC officer assesses the effectiveness of QAPP implementation by reviewing all associated documentation. Any errors or inconsistencies identified in the documentation are addressed and corrected to ensure the integrity of this plan. For more about validation and use of the data, see Section 4.

3.2 Reports

Once sampling has been completed and all sample results have been received, the monitoring supervisor prepares a final report summarizing the sampling results according to this QAPP and then requests review by the QA/QC officer and the environmental project manager. The monitoring supervisor then finalizes the report and submits it to Battelle Energy Alliance, LLC.

4. DATA VALIDATION AND USABILITY

4.1 Data Review, Verification, and Validation

The data will be validated for quality by a data validator, who performs the tasks listed in Table 5.

Table 5. Data review, verification, and validation tasks.

Program Activity	Review Tasks
Sampling protocol	1. Verify that the sampling strategy conforms to the reuse permit and QAPP. 2. Verify that the selection of sampling locations matches the reuse permit.

Program Activity	Review Tasks
Field sampling	1. Verify that prescribed procedures and equipment were used. 2. Verify that proper containers and preservatives (including proper pH adjustment) were used. 3. Verify that all samples were properly stored and at appropriate temperatures.
Field documentation	1. Verify that proper data entry procedures were used for any field data sheets or notebooks. 2. Chain-of-custody forms: Verify that forms are properly completed, signed, and dated during transfer. Confirm that all samples were assigned identification numbers and accounted for. 3. Verify that all samples were properly packaged.
Field analytical testing data	1. Verify that field instruments were properly calibrated. 2. Verify calculations, transcriptions, and reporting units for field measurements recorded on any data sheets or notebooks.
Laboratory	1. Verify that all requested data are reported and are in compliance with contract analytical specifications and methods. 2. Verify that COC documentation from laboratory is correct. 3. Verify that sample temperatures were <10°C upon receipt at laboratory and that the samples were refrigerated. 4. Verify that holding times were not exceeded from time of collection to time of analysis. 5. Verify that QC samples (e.g., duplicate samples) were analyzed.
Record storage	Verify that the operations office files contain all field and laboratory data and other records pertinent to this QAPP.

4.2 Data Validation and Verification Methods

The data validator reviews all data for completeness, errors, and inconsistencies, which includes conducting a statistical analysis of the data, as described in Section 1.4.1; calculating RPDs of duplicate samples taken; and comparing these RPDs to criteria specified in Table 3.

The QA/QC officer also examines data, taking into consideration historic data for trends and performing outlier checks as necessary. The data are considered valid if the QA checks on the data do not indicate any significant deviations from the data quality criteria in Section 1.4.1.

The QA/QC officer is responsible for advising the environmental project manager about any appropriate actions that may be needed, such as re-sampling. If data do not meet DQOs specified in Section 1.5, the QA/QC officer prepares a report detailing which objectives are not met and which data are involved. The QA/QC officer also provides to the environmental project manager recommendations for correcting the deficiencies and obtaining valid data. The QA/QC officer is responsible for acting on the recommendations provided.

4.3 Reconciliation with Data Quality Objectives

The environmental project manager is responsible for reconciling the results from the monitoring program described in this QAPP with the DQOs and other requirements specified in both this QAPP and the reuse permit. The environmental project manager:

- Reviews the data verification and validation reports from the data validator
- Considers how well the data represent actual conditions at the sampling location.

Once the data validation is completed, the environmental project manager reviews the data to determine if there is a need for re-sampling or confirmatory sampling.

5. REFERENCES

40 CFR 261, "Identification and Listing of Hazardous Waste," *Code of Federal Regulations*, Office of the Federal Register, October 21, 2015.

DOE, 2010, *Operable Unit 10-08 Remedial Design/Remedial Action Work Plan*, DOE/ID-11418, August 2010.

EPA, 2006, *Guidance on Systematic Planning Using the Data Quality Objectives Process*, United States Environmental Protection Agency, February 2006.

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Appendix A – Chain-of-Custody Record

Chain of Custody Record

PORTAGE

Client	Contact	Chain of Custody ID#
Portage Inc.	Name: Project Lead	42
1075 S. Utah Ave. Ste 200	Tel: 2085286608	**Date**
Idaho Falls, ID 83402		1/1/2015

Project Title

Example COC

Location

CFA

Sample / Description	Date/Time	Container(s)	Matrix	Containers	Preservatives	Analysis
Sample 1 - Sample 1	1/1/2016 /	1	Matrix	(1) - 125 mL Amber Glass Jar		(1) - Cyanide - SW 9012B
Sample 2 - Sample 2	1/1/2016 /	1	Matrix	(1) - 125 mL Amber Glass Jar		(1) - Cyanide - SW 9012B
Sample 3 - Sample 3	1/1/2016 /	1	Matrix	(1) - 125 mL Amber Glass Jar		(1) - Cyanide - SW 9012B

Cooler	Possible Hazard Identification	Sample Disposal
☑ Yes ☐ No Cooler Temp:	☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown	Not Specified

Turn Around Time	QC Requirements
28 Days	

Signatures

1. Relinquished By (sign/print)	Date	Time	1. Received By (sign/print)	Date	Time
2. Relinquished By (sign/print)	Date	Time	2. Received By (sign/print)	Date	Time
3. Relinquished By (sign/print)	Date	Time	3. Received By (sign/print)	Date	Time

Report - Generated 11/5/2015