INL/EXT-15-34919
Revision 1

Reuse Permit I-161-02 Quality Assurance Project Plan (QAPP) for Required Environmental and Process Monitoring

Idaho National Laboratory
Advanced Test Reactor (ATR) Complex
Cold Waste Ponds

June 2018

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June 2018

Idaho National Laboratory
Idaho Falls, Idaho 83415

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

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Idaho National Laboratory
Advanced Test Reactor (ATR) Complex
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Revision Number: 1

Date: June 2018

Approvals

ATR Environmental Lead

Name	Signature	Date
JOHN D. GRIFFIN	John D. Griffin	6-13-18

Manager, Regulatory and Monitoring Services

Name	Signature	Date
Scott Lee	Scott Lee	6-7-18

Liquid Effluent Sampling Lead

Name	Signature	Date
Kara Cafferty	Kara Cafferty	6-7-18

Liquid Effluent Reporting Lead

Name	Signature	Date
Mike Lewis	Mike Lewis	6/7/18

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ACRONYMS, ABBREVIATIONS, AND DEFINITIONS

ATR	Advanced Test Reactor
CA	prefix for compliance activity number
CFR	U.S. Code of Federal Regulations
COC	chain of custody
CWP	Cold Waste Pond(s)
DEQ	Idaho Department of Environmental Quality
DQO	data quality objective
DRSC	Document and Records Service Center
EDMS	Electronic Document Management System
EDW	Environmental Data Warehouse
EPA	U.S. Environmental Protection Agency
FI	prefix for flow indicator/instrument number
FM	prefix for flow measurement or monitoring description or identifier number
FR	prefix for flow recorder number
GDE	prefix for guide number
GW	prefix for ground water reporting serial number
HMU	hydraulic management unit
INL	Idaho National Laboratory
ISRC	INL Site Records Center
LI	prefix for laboratory instruction number
L&V	Limitations and Validation
LWP	prefix for laboratory wide procedure number
MCP	prefix for management control procedure number
MU	prefix for management unit reporting environmental serial number
NA	not applicable
PLN	prefix for plan number
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
SFL	satellite file location
RMS	Regulatory and Monitoring Services
TRA	prefix for ground water reporting (well) common designation number
USGS	prefix for ground water reporting (well) common designation number

WCAC	Work Control Administration Center
WW	prefix for wastewater reporting serial number

NOMENCLATURE

Al	aluminum
Cl^-	chloride
Cr	chromium
°C	degrees Celsius
EC	electrical conductivity
Fe	iron
gal/day	gallons per day
HNO3	nitric acid
H2SO4	sulfuric acid
µS/cm	microseimens per centimeter
Mn	manganese
mg/L	milligrams per liter
MG/day	million gallons per day
N	nitrogen
NNN	nitrate and nitrite (as N)
pH	negative logarithm of the hydrogen ion concentration
s.u.	standard units for pH
SO4	sulfate
SWL	static water level
TDS	total dissolved solids or total filterable residue
TKN	total Kjeldahl Nitrogen (as N)

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1. PROJECT MANAGEMENT

1.1. Introduction

The Department of Environmental Quality (DEQ) issued Reuse Permit No. I-161-02 (hereafter permit) for the Idaho National Laboratory (INL) Advanced Test Reactor (ATR) Complex Cold Waste Ponds (CWP) on November 20, 2014, with minor Modification 1 effective March 7, 2017. Permit Section 3 compliance activity (CA), CA-161-02, requires the permittee to prepare and implement a Quality Assurance Project Plan (QAPP) within 6 months of permit issuance. This QAPP is prepared in accordance with CA-161-02 using a template provided by DEQ.

1.2. Distribution List

Names and addresses of those receiving copies of this QAPP are provided in Table 1.

Table 1. Distribution list for this QAPP.

Title	Name and Address
ATR Complex Program Environmental Lead	John Griffin Idaho National Laboratory P.O. Box 1625 Idaho Falls, ID 83415-7128
Manager, Regulatory and Monitoring Services	Scott Lee Idaho National Laboratory P.O. Box 1625 Idaho Falls, ID 83415-3405
Liquid Effluent Reporting Lead	Michael Lewis Idaho National Laboratory P.O. Box 1625 Idaho Falls, ID 83415-3405
Liquid Effluent Sampling Lead	Kara Cafferty Idaho National Laboratory P.O. Box 1625 Idaho Falls, ID 83415-3405
Project Manager, GEL Laboratories LLC	Edith Kent GEL Laboratories LLC P.O. Box 30712 Charleston, SC 29417
DEQ Wastewater Engineering Manager	Larry Waters Department of Environmental Quality 1410 N. Hilton Boise, ID 83706
DEQ Regional Engineering Manager	Gregory Eager, P.E. Department of Environmental Quality 900 N. Skyline Drive, Suite B Idaho Falls, ID 83402

1.3. Project/Task Organization

Table 2 lists key project personnel and their corresponding responsibilities.

Table 2. Project personnel, titles, and responsibilities.

Name and Title	Contact Information	Responsibility
Robert Boston Responsible Official	U.S. Department of Energy Idaho Operations Office 1955 N. Fremont Ave. Idaho Falls, ID 83415 Bostonrd@id.doe.gov	Responsible official for the reuse permit.
Timothy Miller Authorized Representative	Idaho National Laboratory P.O. Box 1625 Idaho Falls, ID 83415 Timothy.Miller@iln.gov	Authorized representative for the reuse permit.
John Griffin Program Environmental Lead	Idaho National Laboratory P.O. Box 1625 Idaho Falls, ID 83415 John.Griffin@inl.gov	Responsible for oversight of environmental regulatory activities for the ATR Complex Cold Waste Ponds.
Scott Lee Manager, Regulatory and Monitoring Services (RMS)	Idaho National Laboratory P.O. Box 1625 Idaho Falls, ID 83415 Tel: 208-526-8163 Scott.Lee@inl.gov	Responsible for all environmental monitoring and reporting at the INL Site. Completes final review and sign-off on annual report. Reports to the **Authorized Representative**.
Michael Lewis Liquid Effluent Reporting Lead	Idaho National Laboratory P.O. Box 1625 Idaho Falls, ID 83415 Tel: 208-526-0623 Michael.Lewis@inl.gov	Wastewater reporting lead for INL. Responsible for preparing annual reports for reuse permits at INL. Reports to the **RMS Manager**.
Kara Cafferty Liquid Effluent Sampling Lead	Idaho National Laboratory P.O. Box 1625 Idaho Falls, ID 83415 Tel: 208-526-6852 Kara.Cafferty@inl.gov	Responsible for conducting all permit-required wastewater sampling at INL. Creates and maintains monitoring documentation and compiles documentation for preparation of the annual report. Ensures implementation of applicable QA/QC elements of permit required sampling. Reviews and approves laboratory data and requests data validation. Reports to the **RMS Manager**.
Edith Kent Project Manager, GEL Laboratories LLC	GEL Laboratories 2040 Savage Road Charleston, SC 29407 Tel: 843-556-8171 Fax:843-766-1178	Responsible for chemical and physical analyses of environmental samples performed by GEL Laboratories LLC. Responsible for implementing all laboratory QA/QC requirements and ensuring equipment is maintained and calibrated. Responsible for addressing all contract issues and questions.

1.4. Purpose and Intended Use of Data

1.4.1. Purpose

This QAPP describes the technical requirements and quality assurance (QA) activities of the environmental data collection/analyses operations to be performed under the permit. The scope of monitoring, the organization and individuals involved, data quality objectives, monitoring procedures, and the specific quality control (QC) measures to be employed are described. All QAPP activities are implemented to determine whether the results of the sampling and monitoring performed are the right type, quantity, and quality to satisfy the requirements of Section 5 of the permit.

This QAPP will be updated as necessary to reflect significant changes.

1.4.2. Intended Use of Data

The data collected as required in the permit, Section 5, are compared to threshold criteria in either the permit or applicable regulations to determine compliance. Data are also collected to perform required calculations as specified in the permit, Section 6.1.2, such as loading rate calculations. Data and derivative calculations are used both by DEQ and the permittee to determine whether the facility is in compliance with the permit and applicable rules and regulations pertaining to environmental quality, public health, and safety. These data are also used by the facility for management purposes. Submittal of required monitoring data and calculations is specified in the permit, Section 6.

1.5. Environmental/Process Monitoring and Sample Analyses Description

1.5.1. General Overview

The permit, Section 5, requires specific media to be monitored and identifies requisite frequencies. These requirements are summarized in Table 3. Specific parameters, equipment, and procedures are provided in Section 5 for the different media being monitored.

Table 3. Permit I-161-02 required media to be monitored.

Monitored Media	Frequency	See the Following QAPP Reference
Recycled Water Chemistry	Monthly	Section 5.1
Recycled Water Flow	Record Daily; Compile Monthly; Each HMU[1]	Section 5.1
Ground Water Chemistry (monitoring wells)	Semi-annual; April/May and September/October	Section 5.2
Notes: 1. HMU – hydraulic management unit.		

1.5.2. Monitoring and Reporting Timetable

Monitoring, sampling, and analyses are required at prescribed frequencies according to the parameter and media. All monitoring, sampling, and analyses are required by the permit,

Section 5, to be completed, compiled, and submitted to DEQ in an annual report. See further discussion of annual reporting in Section 3.2. The required timetable is shown in Table 4.

Table 4. Reporting timetable.

Activity	Date
Beginning of Reporting Year	November 1
End of Reporting Year	October 31 of the calendar year following the beginning of the reporting year
Annual Report Submittal Date	March 1 of the calendar year following the end of the reporting year

1.6. Data Quality Objectives (DQOs)

Data quality objectives (DQOs) and procedures to assess data precision, accuracy, and completeness are in PLN-8540, "Idaho National Laboratory Liquid Effluent Monitoring Plan."

1.7. Training Requirements and Certification

Training requirements for different staff positions are shown in Table 5. Table 6 shows the location of documentation for required staff training.

Table 5. Project staff and training requirements.

Position Title / Responsibility	Training and Training Requirements
Manager, Regulatory and Monitoring Services	Trained by education and on-the-job in the design and implementation of environmental monitoring programs, quality control and quality assurance, project management, and environmental regulatory requirements and permit requirements.
Program Environmental Lead	Trained by education and on-the-job in the design and implementation of environmental monitoring programs, quality control and quality assurance, and environmental regulatory requirements and permit requirements.
Liquid Effluent Sampling Lead	Trained by education and on-the-job on monitoring and sampling protocols, use and calibration of sampling equipment, and environmental regulatory requirements and permit requirements.
Liquid Effluent Reporting Lead	Trained by education and on-the-job in environmental reporting, and environmental regulatory requirements and permit requirements.
Sampling and Monitoring Staff	Trained in-house by previously trained staff on all monitoring and sampling protocols, use and calibration of sampling equipment, and regulatory and permit requirements.
Contract Laboratories	Contract laboratories participate in the Department of Energy Consolidated Audit Program and are typically certified through the National Environmental Laboratory Accreditation Program and the International Organization for Standardization.

1.8. Documentation and Records

Documentation for all permit-required monitoring, sampling, and analyses conducted according to this QAPP is summarized in Table 6. The generated documentation consists of field notes, chain of custody records (COCs), laboratory analyses reports, vendor certifications, daily log sheets, an annual report summarizing the sampling events and results, and this QAPP (which includes sampling procedures in Section 5). This documentation is available to, and reviewed by, project personnel for quality control.

Permit related documents are managed and maintained in approved storage locations following the guidelines in LWP-8101, "Environmental Correspondence" and PLN-4653, "INL Records Management Plan." In-process working documents or files are located in the field, the ATR Complex Utility Area Supervisor Office in TRA-609, TRA-608, and/or the Work Control Administrative Center (WCAC). Completed in-process documents (active documents that are referenced often and/or used for daily activities, but not archived) are maintained in one or more of the following locations; the Electronic Document Management System (EDMS), ATR Complex satellite file locations (SFLs), and/or the ATR Complex Document and Records Service Center (DRSC). The EDMS is a searchable document database available to all INL employees. Electronic versions of documents, typically as Adobe Acrobat pdf files, are stored in EDMS. Inactive documents (archived documents) are maintained in EDMS and/or the INL Site Records Center (ISRC).

Analytical data generated at INL is also maintained in the Environmental Data Warehouse (EDW), a searchable database accessible via the intranet at INL.

Table 6. Document management.

Monitoring and/or Sample Analyses/ Other	Documentation	Disposition of Documentation
Recycled Water Chemistry	COC for each sampling event. Analytical results. Sampling field notes.	In-process documents in the field. Active documents to EDMS; data to EDW. Inactive documents to EDMS and/or ISRC.
Recycled Water Flow – Daily	Flow totalizer records; FM-16101 V-notch weir flow meter in TRA-764 (instrument FI-22-7) is recorded daily on a log sheet RP-1710 by operator. Flow chart records; FM-16101 V-notch weir flow meter in TRA-764 (instrument FR-22-6) continuously records instantaneous flow on a weekly circle chart.	In-process RP-1710 to TRA-608 and/or ATR Complex utility area supervisor office. Active RP-1710 to SLF, DRSC, and/or EDMS. Inactive RP-1710 to EDMS and/or ISRC. RP-1710 copied to Liquid Effluent Reporting Lead annually for inclusion in annual report. In-process circle chart TRA-764, TRA-608, and/or ATR Complex utility area supervisor office. Active circle charts to SLF, DRSC, and/or EDMS. Inactive charts to EDMS and/or ISRC.
Recycled Water Flow – Monthly	RP-1710 log sheet data is compiled monthly in utility report RP-2234 Excel workbook file by Utility Area Supervisor.	Monthly RP-2234 Excel workbook file on ATR Complex Utility Area Supervisor Computer, copy to Liquid Effluent Reporting Lead for inclusion in annual report. Active RP-2234 to SLF, DRSC, and/or EDMS. Inactive RP-2234 to EDMS and/or ISRC.

Table 6. (continued).

Monitoring and/or Sample Analyses/ Other	Documentation	Disposition of Documentation
Flow Meter Calibration	ATR Complex maintenance organization calibration of FI-22-7.	In-process work order in the field and/or WCAC. Active work order to SLF, DRSC, and/or EDMS. Inactive work order to EDMS and/or ISRC.
Backflow Testing (if applicable)	Report of testing date(s) and results of the test (pass or fail). For failed tests, report the date of repair or replacement of backflow prevention device, and if the repaired/replaced device is operating correctly.	In-process work order in the field and/or WCAC. Active documents to EDMS. Inactive documents to EDMS and/or ISRC.
Ground Water Chemistry (monitoring wells)	COC record for each sampling event. Analytical results. Sampling field notes.	In-process documents in the field. Active documents to EDMS; data to EDW. Inactive documents to EDMS and/or ISRC.
Data Validation	Limitations and Validation (L&V) Reports.	In-process documents at work location of assigned validator. Active documents to EDMS; data qualifiers uploaded to EDW. Inactive documents to EDMS and/or ISRC.
Field Equipment Calibration, Inspection, and Maintenance	Records person and date of field equipment calibration.	In-process documents in the field. Active documents to EDMS. Inactive documents to EDMS and/or ISRC.
Staff Training	Documentation of necessary training.	Training records maintained by INL Training Services and accessible on the intranet.
Other	Unit process log book (Utility Area Operator narrative log book).	In-process log book in TRA-608. Active log book to SLF and/or DRSC. Inactive log book to ISRC.

2. DATA GENERATION AND ACQUISITION

2.1. Sampling Locations

Sampling locations are listed in Table 10 for recycled water and Table 12 for ground water. Locations were chosen (in coordination with DEQ) to reflect practical and logical points for monitoring and sampling for the recycled water land treatment process. For selected environmental media, accessibility and likelihood of yielding representative samples were also considerations when choosing locations.

2.2. Sampling Methods

Sample collection procedures and parameter requirements are in Table 10 (Section 5.1) for recycled water; and Table 13 (Section 5.2) for ground water.

2.3. Sample Handling and Custody Procedures

Samples are collected by monitoring staff under the supervision of the Liquid Effluent Sampling Lead or Designee. Samples are properly labeled, preserved, and packed as specified in LI-8540, "Liquid Effluent Sampling" and MCP-8523, "Managing Hazardous and Non-Hazardous Samples."

The field logbook (Appendix C) is used to document information pertaining to sampling events for each media monitored. The packing of samples prior to shipment to the laboratory is described in MCP-8523.

1. Transport time is minimized to ensure that samples reach the laboratory without exceeding holding times and to reduce the chances of being exposed to temperature variations. Samples are typically shipped to contract laboratories on the same day as the sampling event.
2. Sample delivery is coordinated in advance with the laboratory. Samples are delivered to the laboratory at the time(s) specified on scheduled days. All instructions provided by the laboratory are followed.

When samples are shipped, a COC form (Appendix D) for each sample is completed. The COC form:

- Accompanies the sample throughout the duration of the shipping process. Custody control procedures are in MCP-8523
- Is checked for a signature at the receiving laboratory.

2.4. Analytical Methods Requirements

Analytical method requirements are listed in Table 11 for wastewater and Table 14 for ground water.

2.5. Instrument/Equipment Testing, Inspection, and Maintenance Requirements

Requirements for instrument and equipment testing, inspection, and maintenance are listed in Table 7.

Table 7. Instrument/equipment testing, inspection, and maintenance requirements.

Equipment Type	Inspection Frequency	Type of Inspection
Composite Sampler for Recycled Water Sampling	Before each use	Visual inspection to check for leaks and cracks. Ensure pump is operational and sampler is in communication with the flow meter.
Field pH/Conductivity Meters	Before each use	Check for adequate charge on batteries. Replace probes as necessary.
Water Level Sensor (etape) for Monitoring Wells	Before each use	Check batteries.

2.6. Instrument Calibration and Frequency

Requirements for instrument calibration, including calibration frequencies, are listed in Table 8.

Table 8. Instrument calibration and frequency.

Equipment Type	Calibration Frequency	Standard or Calibration Instrument Used
Laboratory Analytical Equipment	Determined by laboratory personnel	Determined by laboratory personnel.
Composite Sampler for Recycled Water Sampling	Determined by manufacturer and sampling personnel (see manual)	Determined by manufacturer and sampling personnel (see manual).
Field Parameter Meters	Determined by manufacturer and sampling personnel (see manual)	Determined by manufacturer and sampling personnel (see manual).
Flow Meter	Annually	Determined by manufacturer and engineering personnel (see manual).

2.7. Inspection/Acceptance Requirements for Supplies and Consumables

The equipment and supplies generally used for sampling are listed in LI-8540 and LI-330, "Groundwater Monitoring for the Advanced Test Reactor Complex Cold Waste Pond Industrial Wastewater Reuse Permit." Sample containers are obtained through approved vendors. Necessary reagents and calibration standards of appropriate grade and unexpired shelf-life are used.

2.8. Data Acquisition Requirements

Pre-existing data, both active and inactive, related to this facility are stored in one or more of the following approved storage locations; SFLs, the ATR Complex DRSC, EDMS, EDW, and/or the ISRC. These data serve generally to compare with recently collected data, to determine trends, confirm general acceptable ranges of data, and corroborate possible instances of outliers and otherwise spurious data. See further discussion on data evaluation in Section 4.

2.9. Data Management

The Liquid Effluent Sampling Lead reviews the data before it is loaded into EDW and EDMS for permanent storage. EDW and EDMS are backed up periodically.

3. ASSESSMENT AND OVERSIGHT

3.1. Assessment and Response Actions

Project staff assesses the effectiveness of QAPP implementation by reviewing all associated documentation (see Table 6). Any errors or inconsistencies identified in documentation are addressed and corrected to ensure the integrity of this plan. For more about validation and use of the data, see Section 4. Environmental monitoring at INL is subject to periodic internal and external assessments.

3.2. Reports

Once sampling is complete and sample results received, project personnel (typically the Liquid Effluent Reporting Lead) prepare the final annual report summarizing the sampling results according to the permit (Section 6), then request review by the project and facility personnel. The reports are certified and signed prior to submittal to DEQ as specified in Section 6 of the permit.

4. DATA VALIDATION AND USABILITY

4.1. Data Review, Verification, and Validation

The data are reviewed for quality by the Liquid Effluent Sampling Lead, project personnel, and/or data validators, who periodically perform the tasks listed in Table 9.

Table 9. Data review, verification, and validation tasks.

Program Activity	Review Tasks
Sampling Protocol	Verify[1] sampling strategy conforms to the reuse permit and QAPP. Verify[1] selection of sampling locations matches the reuse permit.
Field Sampling	Verify[1] prescribed procedures and equipment are used. Verify[1] proper containers and preservatives (including proper pH adjustment) are used. Verify[1] all samples are properly stored and at appropriate temperatures.
Field Documentation	Verify[1] proper data entry procedures are used for any field data sheets or notebooks. COC forms: Verify[1] Forms are properly completed, signed, and dated during transfer. Verify[1] samples are assigned identification numbers and accounted for. Verify[1] samples are properly packaged.
Field Analytical Testing Data	Verify[1] field instruments are properly calibrated. Verify[1] calculations, transcriptions, and reporting units for field measurements recorded on any data sheets or notebooks.
Laboratory	Verify[1] requested data is reported, and is in compliance with contract analytical specifications and methods. Verify[1] COC documentation from laboratory is correct. Verify[1] sample temperatures are <10°C upon receipt at laboratory and refrigerated. Verify[1] holding times are not exceeded from time of collection to time of analysis. Verify[1] QC samples (e.g., spikes) are analyzed.
Record Storage	Verify the EDMS and/or EDW contain all field and laboratory data, and other records, pertinent to this QAPP. Verify active records as identified in Table 6 are maintained at an approved storage location in a SFL, DRCS, and/or EDMS.
Notes: 1. Verify in this context means to ensure the respective task(s) is performed.	

4.2. Data Validation and Verification Methods

The Liquid Effluent Sampling Lead and data validation personnel review respective data for completeness, errors, and inconsistencies per MCP-8540 and PLN-8540. The Liquid Effluent Sampling Lead also examines data in light of historic data for trends, and performs outlier checks as necessary. The data validators apply data qualifiers as necessary per criteria in GDE-8511, “Inorganic Analyses Data Validation for INL.”

The Liquid Effluent Sampling Lead is responsible for advising project personnel of any appropriate actions that may be needed, such as re-sampling. If data do not meet data quality objectives (DQOs) specified in PLN-8540 project personnel (typically the Liquid Effluent Sampling Lead) document objectives that are not met with the respective data. Project personnel develop recommendations for correcting the deficiencies and work with management to implement the recommendations.

4.3. Reconciliation with Data Quality Objectives

The Liquid Effluent Sampling Lead is responsible for reconciling the results from the monitoring program described in this QAPP with the DQOs and other requirements per PLN-8540 and the reuse permit. The Liquid Effluent Sampling Lead:

- Reviews the L&V reports from the data validators
- Considers how well the data represent conditions at the sampling location.

The Liquid Effluent Sampling Lead reviews the data to determine if there are permit or regulatory exceedances, and if re-sampling is necessary for any permit required constituent, confirmatory sampling, or mandated reporting to DEQ, and resolves those needs.

5. MEDIA-SPECIFIC MONITORING

5.1. Recycled Water Monitoring

This section discusses recycled water monitoring, analytical methods used, sampling equipment used, sampling procedures, sample collection, and decontamination procedures.

5.1.1. Monitoring

Recycled water monitoring including identification, description, and location of monitoring points, assigned serial numbers, sample types and frequencies, and parameters are shown in Table 10. Recycled water monitoring, excluding flow measurement, is discussed in more detail in LI-8540.

Table 10. Recycled water monitoring requirements.

Monitoring Point Serial No./Location	Sample Description	Sample Type/ Frequency	Parameters
WW-16101 Cold waste sample pit (TRA-764)	Recycled water to MU-16101 and MU-16102	Composite/monthly	- pH (s.u.) - Aluminum, filtered - Chloride - Chromium, total - Chromium, filtered - Electrical Conductivity - Iron, filtered - Manganese, filtered - Nitrate+Nitrite Nitrogen, as N - Total Kjeldahl Nitrogen, as N - Total Nitrogen, as N - Sulfate - Total Dissolved Solids
FM-16101 (instrument FI-22-7)	V-notch weir overflow	Daily meter reading Monthly compilation of data	- Daily volume (gal/day) - Monthly volume (MG/month)

5.1.2. Analytical Methods

Analytical methods typically used for recycled water including preservative requirements and holding time requirements are shown in Table 11. Analytical methods specified in 40 CFR 141, "National Primary Drinking Water Regulations"; 40 CFR 143, "National Secondary Drinking Water Regulations," 40 CFR 136, "Guidelines Establishing Test Procedures for the Analysis of Pollutants," or those approved by DEQ are typically used.

Table 11. Typical wastewater analytical methods.

Parameter	Abbreviation	Units[1]	EPA[2]	Standard Methods[3]	Typical Detection Limit[4]	Preservative	Maximum Holding Time
pH	—	s.u.	150.1	4500-H^+	>1, <12	None required	Analyze immediately in field; <48 hours for laboratory analysis
Electrical Conductivity	EC	µS/cm	120.1	2510 B	2 µS/cm	None required for field analysis. Cool, 4°C for laboratory analysis.	Analyze immediately in field; 28 days for laboratory analysis
Total Dissolved Solids (or Total Filterable Residue)	TDS	mg/L	160.2	2540 C	10 mg/L	Cool, 4°C	7 days
Total Kjeldahl Nitrogen (as N)	TKN	mg/L	351.2	4500-Norg	0.1 mg/L	Cool, 4°C H_2SO_4 to pH<2	28 days
Nitrate+Nitrite (as N)	NNN	mg/L	300.0 or 353.2	4500-NO3 + 4500-4110	<0.2 mg/L	Cool, 4°C, H_2SO_4 to pH<2	28 days
Aluminum, filtered	Al	mg/L	200.7 or 200.8 or 200.9	3120 B	0.025 mg/L	HNO_3 to pH<2	6 months
Chromium, total and filtered	Cr	mg/L	200.7 or 200.8 or 200.9	3120 B	0.0025 mg/L	HNO_3 to pH<2	6 months
Iron, filtered	Fe	mg/L	200.7 or 200.9	3120 B	0.03 mg/L	HNO_3 to pH<2	6 months
Manganese, filtered	Mn	mg/L	200.7 or 200.8 or 200.9	3120 B	0.003 mg/L	HNO_3 to pH<2	6 months
Sulfate	SO_4	mg/L	300.0	4110 B or C	0.1 mg/L	Cool, 4°C	28 days
Chloride	Cl^-	mg/L	300.0	4110 B or C	0.1 mg/L	Cool, 4°C	28 days

Notes:
1. Unit abbreviations: s.u. – standard units; mg/L – milligrams per liter; µS/cm – microseimens per centimeter.
2. EPA Methods and Guidance for the Analysis of Water, Version 2.0. EPA 821/C-99-004**.** June 1999. For further approved methods, see US Code of Federal Regulations, CFR 40 § 136.3, Tables 1A and 1B, CFR 40 § 141, and CFR 40 § 143.
3. Eaton, A.D., and others (eds), 2005, Standard Methods for the Examination of Water and Wastewater – 21st Edition.
4. The typical detection limits are sample-specific.

5.1.3. Typical Sampling Equipment

The equipment and supplies generally used for sampling recycled water are listed in LI-8540.

5.1.4. Recycled Water Sampling Procedures

Sampling procedures are described in LI-8540.

5.1.5. Decontamination Procedures

Decontamination procedures are described in LI-8540 and LI-359, "Cleaning of Environmental Monitoring Services Sampling Equipment."

5.2. Ground Water Monitoring

This section addresses analytical methods, sampling equipment, sampling point purging procedures, sample collection procedures, and decontamination procedures for ground water monitoring.

5.2.1. Monitoring

Information for identification, description, and location of monitoring points, assigned serial numbers, sample types and frequencies, and parameters, are in Table 12 and Table 13. Ground water monitoring is discussed in more detail in LI-330.

Table 12. Ground water monitoring point descriptions.

Monitoring Point Serial Number	Common Designation	Well Type	Gradient Location
GW-016101	USGS-098	Monitoring well	Upgradient
GW-016102	USGS-065	Monitoring well	Downgradient
GW-016104	USGS-076	Monitoring well	Down/cross-gradient
GW-016105	TRA-08	Monitoring well	Downgradient
GW-016106	Middle-1823	Monitoring well	Downgradient
GW-016107	USGS-058	Monitoring well	Downgradient
Note: Monitoring well TRA-07 (GW-016103) is not required under this permit.			

Table 13. Ground water monitoring requirements.

Monitoring Point Serial Number(s)	Sampling Point Description	Sample Type/Frequency	Parameters[1]
GW-016101 GW-016102 GW-016104 GW-016105 GW-016106	Monitoring wells	Unfiltered grab sample (unless otherwise specified), twice annually: April/May and September/October	- Water table elevation (feet) - Water table depth (feet) - pH (s.u.) - Aluminum, filtered - Chloride - Chromium, total - Chromium, filtered - Electrical Conductivity - Iron, filtered - Manganese, filtered - Nitrate+Nitrite Nitrogen, as N - Total Kjeldahl Nitrogen, as N - Total Nitrogen, as N - Sulfate - Total Dissolved Solids
GW-016107	Monitoring well USGS-058	Unfiltered grab sample (unless otherwise specified), twice annually: April/May and September/October	- Water table elevation (feet) - Water table depth (feet) - Total Dissolved Solids - Sulfate

1. Pursuant to IDAPA 58.01.11 400.05, “Site-Specific Ground Water Quality Levels,” compliance with the Primary Constituent Standard for Chromium, under this permit, shall not apply.

5.2.2. Analytical Methods

Analytical methods for preservative requirements and holding time requirements used for ground water (Table 14) are approved by DEQ, and include 40 CFR 141, 40 CFR 143, and 40 CFR 136.

Table 14. Typical ground water analytical methods.

Parameter	Abbreviations	Units[1]	EPA[2]	Standard Methods[3]	Typical Detection Limit[4]	Preservative	Holding Time
pH	—	s.u.	150.1	4500-H^+	>1, <12	None required	Analyze immediately in field; <48 hours for laboratory analysis
Electrical Conductivity	EC	µS/cm	120.1	2510 B	2 µS/cm	None required for field analysis. Cool, 4°C for laboratory analysis.	Analyze immediately in field; 28 days for laboratory analysis
Total Dissolved Solids (or Total Filterable Residue)	TDS	mg/L	160.2	2540 C	10 mg/L	Cool, 4°C	7 days
Static Water Level	SWL	Feet	NA[5]	steel tape, electric tape or other	0.01 ft	—	—
Total Kjeldahl Nitrogen (as N)	TKN	mg/L	351.2	4500-Norg	0.1 mg/L	Cool, 4°C H_2SO_4 to pH<2	28 days
Nitrate+Nitrite (as N)	NNN	mg/L	300.0 or 353.2	4500-NO3 + 4500-NO2 Or 4110	<0.2 mg/L	Cool, 4°C	28 days
Aluminum, filtered	Al	mg/L	200.7 or 200.8 or 200.9	3120 B	0.025 mg/L	HNO_3 to pH<2	6 months
Chromium, total and filtered	Cr	mg/L	200.7 or 200.8 or 200.9	3120 B	0.0025 mg/L	HNO_3 to pH<2	6 months
Iron, filtered	Fe	mg/L	200.7 or 200.9	3120 B	0.025 mg/L	HNO_3 to pH<2	6 months
Manganese, filtered	Mn	mg/L	200.7 or 200.8 or 200.9	3120 B	0.0025 mg/L	HNO_3 to pH<2	6 months
Sulfate	SO_4	mg/L	300.0	4110 B or C	0.1 mg/L	Cool, 4°C	28 days
Chloride	Cl^-	mg/L	300.0	4110 B or C	0.1 mg/L	Cool, 4°C	28 days

Notes:
1. Unit abbreviations: mg/L – milligrams per liter; s.u. – standard units; µS/cm – microseimens per centimeter.
2. EPA Methods and Guidance for the Analysis of Water, Version 2.0. EPA 821/C-99-004. June 1999. For further approved methods, see US Code of Federal Regulations, CFR 40 § 136.3, Tables 1A and 1B, CFR 40 § 141, and CFR 40 § 143.
3. Eaton, A.D., and others (eds), 2005. Standard Methods for the Examination of Water and Wastewater – 21st Edition.
4. The minimum detection limits are sample-specific.
5. NA – not applicable.

5.2.3. Typical Sampling Equipment

The equipment and supplies used for sampling ground water are listed in LI-330.

5.2.4. Ground Water Sample Collection Procedures

Ground water sampling procedures are in LI-330.

5.2.5. Decontamination Procedures

Decontamination procedures are described in LI-330 and LI-359.

5.3. Soil Monitoring

The permit does not require soil monitoring.

5.4. Plant Tissue and Crop Monitoring

The permit does not require plant tissue and crop monitoring.

5.5. Hydraulic Management Unit Calculations and Reporting

This section provides descriptions of hydraulic management units (HMUs) and discusses hydraulic loading rates and calculations. Hydraulic loading limits, including calculation of a 5-yr moving annual average, are discussed in Section 4.2 of the permit.

The HMUs for the permit are listed in Table 15 and the required loading rate measurements related to them are listed in Table 16.

Table 15. Hydraulic management unit descriptions.

Serial Number	Description	Surface Area (Acres)
MU-16101	North Basin	1.78
MU-16102	South Basin	1.78
Total Surface Area		3.55

Table 16. Hydraulic management unit calculations and reporting.

Monitoring Point Serial Numbers	Parameter (calculate for each HMU)	Units
MU-16101 MU-16102	Recycled water loading rate	Gallons/day (0 gal/day) Million gallons/month (0.00 MG/month)
Other Reporting Requirements: 1. The permittee agrees to provide DEQ the results of ground water radiological monitoring with respect to the INL ATR Complex Cold Waste Ponds that is performed to fulfill Department of Energy Requirements under the Atomic Energy Act. The permittee agrees to provide the results with the annual report. Radiological monitoring is not required by the permit and is not subject to this QAPP.		

6. REFERENCES

40 CFR 136, 2014, "Guidelines Establishing Test Procedures for the Analysis of Pollutants," *Code of Federal Regulations*, Office of the Federal Register, July 2014.

40 CFR 141, 2014, "National Primary Drinking Water Regulations," *Code of Federal Regulations*, Office of the Federal Register, July 2014.

40 CFR 143, 2014, "National Secondary Drinking Water Regulations," *Code of Federal Regulations*, Office of the Federal Register, July 2014.

Eaton, A.D., L.S. Clesceri, E.W. Rice, and A.E. Greenberg, 2005, Standard Methods for the Examination of Water and Wastewater, 21st ed., American Public Health Assoc., Washington, D.C.

EPA, 1999, EPA Methods and Guidance for the Analysis of Water, Version 2.0, CD ROM, EPA 821/C-99-004.

GDE-8511, "Inorganic Analyses Data Validation for INL."

IDAPA 58.01.11, 400.05, "Site-Specific Ground Water Quality Levels," Idaho Department of Environmental Quality.

LI-330, "Groundwater Monitoring for the Advanced Test Reactor Complex Cold Waste Pond Industrial Wastewater Reuse Permit."

LI-359, "Cleaning of Environmental Monitoring Services Sampling Equipment."

LI-8540, "Liquid Effluent Sampling."

LWP-8101, "Environmental Correspondence."

MCP-8523, "Managing Hazardous and Non-Hazardous Samples."

MCP-8540, "Reporting Requirements for Liquid Effluent and Wastewater Reuse Permit Monitoring."

PER-132 (Reuse Permit No. I-161-02), "Idaho Department of Environmental Quality Reuse Permit I-161-02 – Idaho National Laboratory Advanced Test Reactor Complex Cold Waste Ponds," Rev. 2, Department of Environmental Quality, November 20, 2014.

PLN-4653, "INL Records Management Plan."

PLN-8540, "Idaho National Laboratory Liquid Effluent Monitoring Plan."

RP-1710, "ATR Programs Utility Area Weekly Data Sheet (1)."

RP-2234, "ATR Complex Utility Area Monthly Report for Date: From / / To / /."

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Appendix A —Example Formats and Tables for Annual Report

Sample Month	November	December	January	February	March	April	May	June	July[a]	August	September	October
Sample Date	11/03/16	12/08/16	1/17/2017	2/7/2017	3/8/2017	4/12/2017	5/10/2017	6/6/2017	7/6/2017	08/9/17	09/14/17	10/05/17
Nitrite + nitrate as nitrogen (mg/L)	3.59	0.912	2.77	2.88	1.02	0.941	0.885	3.68	1.14J[b] (1.05)J	0.87	0.905	0.935
Total Kjeldahl nitrogen (mg/L)	0.772	0.0214U[c]	0.864	0.818J	0.0957U	0.0907UJ[d]	0.0613U	1.19	0.00198UJ (0.181UJ)	-0.014UJ	-0.0209U	0.129UJ
Total nitrogen[e] (mg/L)	4.36	0.93	3.63	3.70	1.12	1.03	0.95	4.87	1.14 (1.23)	<0.90	<0.94	1.06
pH (s.u.)	6.94	7.19	6.80	6.64	7.17	7.50	7.36	6.59	6.70	6.90	7.18	7.45
Electrical conductivity (µS/cm)	1,438	481	1,173	1,200	458	397	4[illegible]	1,324	452	479	435	447
Chloride (mg/L)	42.1	9.75	37.7J	35J	11.7	12.9J	11.4	4[illegible]	9.20 (9.24)	9.88J	11.9	13.2J
Sulfate (mg/L)	616	22.2	432	465	46.5	28.5J	27.0	644J	20.2 (20.2)	21.3	27.4	34.7
Total dissolved solids (mg/L)	1,130	256	880	904	269	2[illegible]	231	1,220	223 (227)	239	223	231
Aluminum, total (mg/L)	0.0438	0.0222	0.0412	0.015U	0.0165	0.0193U	0.0[illegible]U	0.0208	0.0193U (0.0285)	0.0193U	0.0193U	0.0193U
Aluminum, filtered (mg/L)	0.0379	0.016	0.034	0.015U	0.015U	0.01[illegible]U	0.0193U	0.0193U	0.0193U (0.028)	0.0193U	0.0193U	0.0193U
Chromium, total (mg/L)	0.0144	0.00375	0.00957	0.0102	0.0[illegible]33	0.00455	0.00374	0.0158	0.00484 (0.00508)	0.00432	0.00441	0.00419
Chromium, filtered (mg/L)	0.0149	0.00382	0.00971	0.0105	0.0335	0.0041	0.00355	0.0152	0.00495 (0.047)	0.00456	0.00449	0.00451
Iron, total (mg/L)	0.288	0.033U	0.20[illegible]	0.0338	0.033U	0.033U	0.033U	0.070	0.065 (0.0527)	0.0971	0.124	0.139
Iron, filtered (mg/L)	0.269	0.033U	0.189	0.033U	0.033U	0.033U	0.033U	0.033U	0.0452 (0.0439)	0.0957	0.121	0.108
Manganese, total (mg/L)	0.00242	0.001U	0.001U	0.00112J	0.001U	0.001U	0.001U	0.00375J	0.001U (0.001U)	0.001U	0.001U	0.00198
Manganese, filtered (mg/L)	0.00235	0.001U	0.001U	0.00106J	0.001U	0.001U	0.001U	0.00348J	0.001U (0.001U)	0.001U	0.001U	0.00127

a. Results shown in parenthesis are from field duplicate samples collected in July.

b. J flag indicates the associated value is an estimate and may be inaccurate or imprecise.

c. U qualification indicates the analyte was not detected above the instrument detection limit or the analyte was detected at or above the applicable detection limit but the value is not more than 5 times the highest positive amount in any laboratory blank and is U qualified as a result of data validation.

d. UJ flag indicates the sample was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

e. Total nitrogen is calculated as the sum of the TKN, nitrite nitrogen, and nitrate nitrogen. For results reported as a negative value, the method detection limit (MDL) of 0.033 mg/L replaced the result for calculation purpose and the product was reported as a less than (<) number. For positive results reported below the instrument detection limit, the MDL was used in the total nitrogen calculation and the product was reported as a less than (<). Results were rounded to the nearest hundredth.

WELL NAME	USGS-098 (GW-16101)		USGS-065 (GW-16102)		USGS-076 (GW-16104)		TRA-08 (GW-16105)		Middle-1823 (GW-16106)		USGS-058 (GW-16107)		PCS/SCS[a]
Sample Date	05/4/17	09/12/17	05/09/17	09/13/17	05/08/17	09/13/17	05/08/17	09/13/17	05/04/17	09/12/17	05/04/17	09/14/17	
Water Table Depth (ft below ground surface)	429.36	429.64	476.97	476.74	484.95	484.67	490.18	489.84	494.56	494.56	472.93	472.66	NA[b]
Water Table Elevation (above mean sea level in ft)[c]	4459.85	4459.57	4451.60	4451.83	4448.26	4448.54	4448.88	4449.22	4448.31	4448.31	4448.96	4449.23	NA
Borehole Correction Factor (ft)[d]	2.53	2.53	NA	NA	NA	NA	0.63	0.63	NA	NA	NA	NA	NA
Nitrite + nitrate as nitrogen (mg/L)	1.07	0.825	1.41	1.24	1.04	0.93	0.975	0.822	0.985	0.855 (0.865)[e]	NR[f]	NR	10 (PCS)
Total Kjeldahl nitrogen (mg/L)	0.0398U[g]	0.0325U	0.132U	0.0817U	-0.0032U	-0.00857U	0.0362	0.0[illegible]3U	0.146U	-0.0097U (0.314U)	NR	NR	NA
Total nitrogen[h] (mg/L)	1.11	0.86	1.54	1.32	<1.07	<0.96	1.01	0.90	1.13	0.89 (1.18)	NR	NR	NA
pH (s.u.)	7.24	6.75	7.59	7.20	7.90	6.8[illegible]	[illegible]84	7.26	7.61	7.09	NR	NR	6.5 to 8.5 (SCS)
Electrical conductivity (µS/cm)	393	386	567	553	419	[illegible]80	41[illegible]	388	404	420	NR	NR	NA
Chloride (mg/L)	13.4	13.7	17.1	17.5J[i]	11.8	[illegible].8	10.4	10.3	10.4	10.3 (10.4)	NR	NR	250 (SCS)
Sulfate (mg/L)	21.5	21.6	150	143	34.8	34.3	44.5	43.7	34.3	33.6 (33.5)	35.9	34.3	250 (SCS)
Total dissolved solids (mg/L)	221	196	394	417	[illegible]3	267	231	280	243	260 (247)	216	236	500 (SCS)
Aluminum, filtered (mg/L)	0.0193U	0.0193U	0.0193U	0.0193[illegible]	[illegible]0193U	0.0193U	0.0953	0.0235	0.0193U	0.0193U (0.0193U)	NR	NR	0.2 (SCS)
Chromium[j], total (mg/L)	0.00752	0.00699	0.0852	0.0749	0.0119	0.0119	0.097	0.0202	0.0105	0.0105 (0.0101)	NR	NR	0.1 (PCS)
Chromium[j], filtered (mg/L)	0.00677	0.00689	0.0112	[illegible]0	0.0115	0.0112	0.0209	0.0195	0.0108	0.0102 (0.0107)	NR	NR	0.1 (PCS)
Iron, filtered (mg/L)	0.03U	0.03U	0.0[illegible]	[illegible].03U	0.03U	0.03U	0.0324	0.03U	0.03U	0.03U (0.03U)	NR	NR	0.3 (SCS)
Manganese, filtered (mg/L)	0.001U	0.001U	[illegible].001U	0.001U	0.001U	0.001U	0.00124J	0.001U	0.00167J	0.00118 (0.00115)	NR	NR	0.05 (SCS)

a. Primary constituent standards (PCS) and secondary constituent standards (SCS) in groundwater referenced in the Ground Water Quality Rule, IDAPA 58.01.11.200.01.a and b.

b. NA- Not applicable.

c. Elevation data provided using the North American Vertical Datum of 1988 (NAVD 88).

d. The USGS performed gyroscopic surveys on TRA-08 and USGS-098 (circa 2002 to 2005) and discovered some well deviation which can cause discrepancies in the water level measurements. The borehole correction factors determined from gyroscopic surveys attempt to reconcile these discrepancies.

e. Results shown in parenthesis are from the field duplicate samples.

f. NR indicates the parameter is not required by the Reuse Permit.

g. U qualification indicates the analyte was not detected above the instrument detection limit or the analyte was detected at or above the applicable detection limit but the value is not more than 5 times the highest positive amount in any laboratory blank and is U qualified as a result of data validation.

h. Total nitrogen is calculated as the sum of the total Kjeldahl nitrogen (TKN) and nitrite +nitrate as nitrogen. For results reported as a negative value, the method detection limit (MDL) of 0.033 mg/L replaced the result for calculation purpose and the product was reported as a less than (<) number. For positive results reported below the instrument detection limit, the MDL was used in the total nitrogen calculation and the product was reported as a less than (<). Results were rounded to the nearest hundredth.

i. J flag indicates the associated value is an estimate and may be inaccurate or imprecise.

j. PCS for Chromium does not apply under this permit.

Month	North Pond (MU-16101) (MG)[a]	South Pond (MU-16102) (MG)	Monthly Total for Both Ponds (MG)
November 2016	17.00	0.00	17.00
December 2016	0.76	16.79	17.55
January 2017	12.61	0.39	13.00
February 2017	0.00	12.27	12.27
March 2017	23.24	0.00	23.24
April 2017	1.40	21.46	22.86
May 2017	22.55	0.00	22.55
June 2017	0.00	20.28	20.28
July 2017	23.80	0.90	24.70
August 2017	0.00	24.10	24.10
September 2017	20.33	3.22	23.55
October 2017	0.00	12.95	12.95
Annual Total	**121.69**	**112.36**	**234.05**

a. MG-million gallons. Reuse Permit I-161-02 requires monthly flow volumes to be report to the nearest 0.00 MG.

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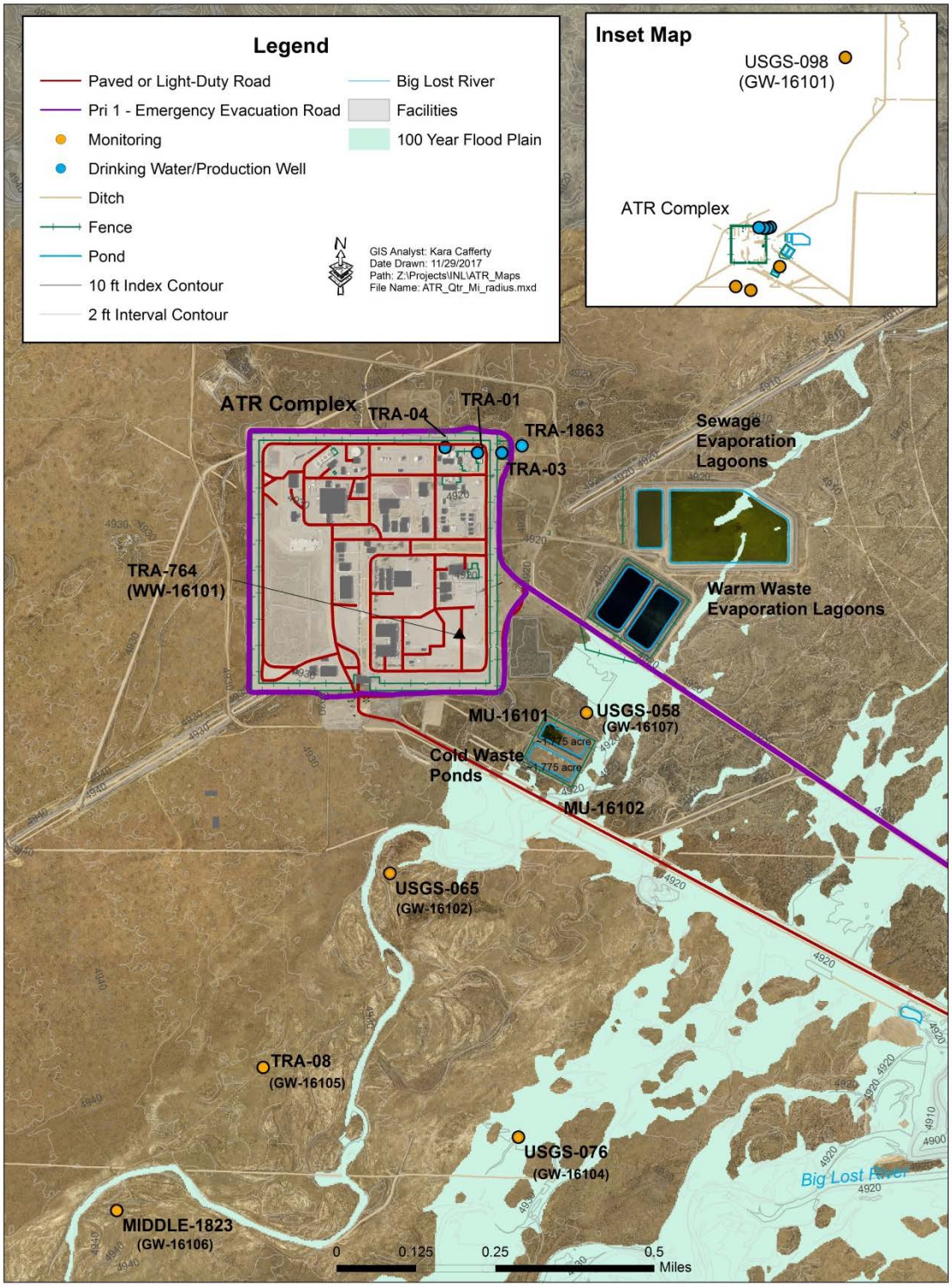
Appendix B — Wastewater and Groundwater Sampling locations



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Appendix C — Example Logbook

Idaho National Laboratory

Liquid Effluent Monitoring Program Sample Logbook

Sampling Event

Sampler #1: Kara Cafferty
Sampler #2: Michael Towler
Sample Date: 05/10/2017
Location: TRA-764 Effluent to Cold Waste Pond
Work Control Doc.: LI-8540
Pre-job Briefing: Michael Towler & Kara Cafferty reviewed hazards and sampling plan.
Approver/Date: Kara Cafferty - 07/10/2017

Effluent

Color Standard: Clear
Odor: None
Clarity: Clear
Foam: None
Solids - Floating: None
Solids - Suspended: Slight
Solids - Settled: Slight
Comments: None

Weather

Temp Range (F): 50 - 60
Wind Speed Range: < 10 mph
Wind Direction: W
Weather Conditions: Clear

Equipment

Carboy: TRA764 (Dedicated)
Beaker: B5
Funnels: F27,D
Tubing: TRA764 (Dedicated)
Compositor: Sigma 900 Max All-Weather Refrigerated Prop ID 389305 (dedicated) TRA764

Shipping Information

Shipped To: General Engineering Laboratory
Shipped Date: 05/10/2017
COC#: 7791 0433 9525

Field Comments

1224 on 5/9/2017: started Sigma 900 Max All-Weather Refrigerated Prop ID 389305 (dedicated) compositor - programmed to collect 200 ml/135 counts of flow meter. Locked compositor. Flow rate = 590 gpm.
1215 on 5/10/2017: arrived at compositor - still locked. 57 aliquots were collected, last at 1213. ~11 liters of sample.Flow rate = 600 gpm.

Idaho National Laboratory

Liquid Effluent Monitoring Program Sample Logbook

Sample #	Analysis	Preservative	Container Type	Lot #	Sample Notes	Skipped?
BEA02-384-05	Suite 46: Gamma Spec (TAL plus K-40 and Gross Alpha/Beta)	HNO3 to pH < 2	4 L Cubitainer	00062264		
BEA02-384-06	Suite 58: Chloride and Sulfate	4 deg C	250 mL nalgene	1131854		
BEA02-384-07	Suite 59: NNN and TKN	H2SO4 to pH < 2, 4 deg C	1 L nalgene	00062301		
BEA02-384-10	Total Dissolved Solids	4 deg C	250 mL nalgene	1131854		
BEA02-384-12	Tritium	none	250 mL HDPE	1131854		
BEA02-384-15	Metals Set #1 - LE	HNO3 to pH < 2	500 mL nalgene	00066435		
BEA02-384-16	Metals Set #1 - LE (Filtered)	HNO3 to pH < 2	500 mL nalgene	00066435		

Appendix D — Example Chain of Custody Record

INL CHAIN OF CUSTODY FORM

7800 8771 1417

Page 1 of 1

Sampler (Printed):	Sampler (signature):	Project Name: Liquid Effluent - CY2018	
Kara Cafferty		Sampling & Analysis Plan Number:	TOS/SOW Number:
Laboratory Shipped To: General Engineering Laboratory		LI-8540	TOS-S4046

Sample ID#	Sample Date	Sample Time	Sample Location	Depth	Sample Matrix	Analysis Type No(s)	Preservative	Remarks
BEA03-801-03	03/15/2018	09:55	TRA-764 Effluent to Cold Waste Pond		WASTE WATER	Metals Set #1 - LE (Filtered): IEXP-A-032 (filtered)	HNO3 to pH < 2	1 - 250 mL nalgene
BEA03-801-02	03/15/2018	09:55	TRA-764 Effluent to Cold Waste Pond		WASTE WATER	Metals Set #1 - LE: IEXP-A-032	HNO3 to pH < 2	1 - 250 mL nalgene
BEA03-801-09	03/15/2018	09:55	TRA-764 Effluent to Cold Waste Pond		WASTE WATER	Suite 58: WCH-A-011, IWCH-A-[illegible]	4 deg C	1 - 125 mL HDPE
BEA03-801-10	03/15/2018	09:55	TRA-764 Effluent to Cold Waste Pond		WASTE WATER	Suite 59: WCH-A-022, WCH-A-039	H2SO4 to pH < 2, 4 deg C	1 - 125 mL HDPE
BEA03-801-12	03/15/2018	09:55	TRA-764 Effluent to Cold Waste Pond		WASTE WATER	Total Dissolved Solids: WCH-A-[illegible]	4 deg C	1 - 250 mL nalgene

Comments: IEXP-A-032 is defined as Al, Cr, Fe, and Mn by EPA Method 200.8.

Cooler Number(s): 1

Relinquished By (Printed)	Relinquished By (Signature)	Date	Time	Received By (Printed)	Received By (Signature)	Date	Time
Kara Cafferty		03/15/2018	13:00				

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