INL/EXT-14-33353

Recycled Water Reuse Permit Renewal Application for the Materials and Fuels Complex Industrial Waste Ditch and Industrial Waste Pond

October 2014

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

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http://www.inl.gov

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ABSTRACT

This renewal application for the Industrial Wastewater Reuse Permit (IWRP) WRU-I-0160-01 at Idaho National Laboratory (INL), Materials and Fuels Complex (MFC) Industrial Waste Ditch (IWD) and Industrial Waste Pond (IWP) is being submitted to the State of Idaho, Department of Environmental Quality (DEQ). This application has been prepared in compliance with the requirements in IDAPA 58.01.17, *Recycled Water Rules.* Information in this application is consistent with the IDAPA 58.01.17 rules, pre-application meeting, and the Guidance for Reclamation and Reuse of Municipal and Industrial Wastewater (September 2007).

This application is being submitted using much of the same information contained in the initial permit application, submitted in 2007, and modification, in 2012. There have been no significant changes to the information and operations covered in the existing IWRP. Summary of the monitoring results and operation activity that has occurred since the issuance of the WRP has been included.

MFC has operated the IWP and IWD as regulated wastewater land treatment facilities in compliance with the IDAPA 58.01.17 regulations and the IWRP. Industrial wastewater, consisting primarily of continuous discharges of nonhazardous, nonradioactive, routinely discharged noncontact cooling water and steam condensate, periodic discharges of industrial wastewater from the MFC facility process holdup tanks, and precipitation runoff, are discharged to the IWP and IWD system from various MFC facilities. Wastewater goes to the IWP and IWD with a permitted annual flow of up to 17 million gallons/year.

All requirements of the IWRP are being met. The Operations and Maintenance Manual for the Industrial Wastewater System will be updated to include any new requirements.

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FIGURES

TABLES

ACRONYMS

BEA	Battelle Energy Alliance, LLC
bls	below land surface
CEC	cation exchange capacity
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFA	Central Facilities Area
DEQ	Idaho Department of Environmental Quality
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy Idaho Operations Office
ESRPA	Eastern Snake River Plain Aquifer
EBR	Experimental Breeder Reactor
EBR-II	Experimental Breeder Reactor II
EPA	Environmental Protection Agency
ESRP	Eastern Snake River Plain
FCF	Fuel Conditioning Facility
FFA-CO	Federal Facilities Agreement–Consent Order
FMF	Fuel Manufacturing Facility
HFEF	Hot Fuel Examination Facility
IDAPA	Idaho Administrative Procedures Act
INL	Idaho National Laboratory
IWP	Industrial Waste Pond
IWD	Industrial Waste Ditch
IWRP	Industrial Wastewater Reuse Permit
MCL	Maximum Contaminant Level
MCP	management control procedure
MFC	Materials and Fuels Complex
NA	Not Applicable
NOAA	National Oceanic and Atmospheric Administration
RCRA	Resource Conservation and Recovery Act
SMCL	Secondary Maximum Contaminant Level
TDS	total dissolved solids
TKN	total Kjeldahl nitrogen
USGS	U.S. Geological Survey

UNITS

bls	below land surface
°F	degrees Fahrenheit
ft	foot or feet
gal/min	gallons per minute
gal/mo	gallons per month
gal/yr	gallons per year
in.	inch or inches
L	liter
mg	milligram
mi	mile
yr	year

Recycled Water Reuse Permit Renewal Application for the Materials and Fuels Complex Industrial Waste Ditch and Industrial Waste Pond

1. INTRODUCTION

The IWRP (permit no. LA-000160-01) for the MFC IWD and IWP, was issued on May 1, 2010, was modified (permit no. WRU-I-0160-01) on June 21, 2012 and will expire on April 30, 2015. This renewal application is being submitted to provide updated information for renewal of the existing permit. This renewal application has been prepared in compliance with the requirements in IDAPA 58.01.17, Recycled Water Rules. Information in this application is consistent with IDAPA 58.01.17 rules, pre-application meeting held on June 4, 2014, and the DEQ Guidance for Reclamation and Reuse of Municipal and Industrial Wastewater (September 2007).

This renewal application proposes the following changes to the current permit, as follows:

- Update of contact personnel as shown on application form.
- Changes to monitoring requirements: Requesting those constituents that have not been detected since the beginning of the permit be dropped from the list of those for which analysis is required, i.e., cadmium, mercury, and silver. Other constituents that have been detected at low levels but always below the standards are barium, chloride, selenium, sulfate, and zinc; these are also candidates for consideration for removal from the list of sampled constituents. Suspended solids sampling is no longer required by the state regulations and is also requested to be removed from the list of sampled constituents. Sample results for these constituents are presented in Section 5.1.1.
- IDAPA 58.01.17.600.02 allows a permit to be effective for a period up to 10 years. No major changes to the MFC industrial wastewater system are anticipated during the next 10 years; therefore, INL is requesting the new permit be effective for a period of 10 years.

2. SITE LOCATION AND OWNERSHIP

2.1 Site Location

The INL Site occupies an 890 mi^2 area located on the Eastern Snake River Plain (ESRP) in portions of Bingham, Bonneville, Butte, and Clark counties (see Figure 1). The MFC is located in the southeastern corner of the INL Site, approximately 36 mi west of Idaho Falls in Bingham County at Township 3N, Range 32 E, Sections 12, 13, and 14. MFC facilities encompass approximately 60 acres

U.S. Department of Energy (DOE) controls all land within the INL Site, and public access is restricted to public highways, U.S. Department of Energy Idaho Operations Office (DOE-ID)-sponsored tours, special-use permits, and the Experimental Breeder Reactor-I (EBR-I) National Historic Landmark. DOE-ID also accommodates Shoshone-Bannock tribal-member access to specific areas on the INL Site for cultural and religious purposes. Cattle and sheep grazing is allowed on approximately 60% (350,000 acres) of INL Site lands. However, grazing is not allowed within 2 mi of any nuclear facility. Rights-of-way and grazing permits are granted and administered by the U.S. Department of Interior's Bureau of Land Management.

Security checkpoints are located on all major INL Site access roads. Only security-cleared employees and escorted visitors are allowed access to INL facilities. The nearest public roadway is Highway 20, approximately 2.5 mi to the south. The nearest MFC staffed building is 500 ft to the southeast of the IWP. The INL Site boundary begins approximately 25 mi west of Idaho Falls, Idaho. The Lost River, Lemhi, and Beaverhead mountain ranges border it on the north and northwest. Several INL Site facility areas are situated on an expanse of otherwise undeveloped, cool-desert terrain. Buildings and structures at the INL Site are clustered within those facility areas, which are typically less than a few square miles in size and separated from each other by miles of primarily undeveloped land.

Population centers in the region include large cities (more than 10,000 residents), such as Idaho Falls, Pocatello, and Blackfoot, located to the east and south, and several smaller cities (less than 10,000 residents) located around the INL Site, such as Arco, Howe, Mud Lake, and Atomic City. No permanent residents reside on the INL Site.

2.2 Site Ownership

The ownership of the land now comprising the INL Site, including the MFC, was transferred to the DOE from the public domain for use in atomic energy research and development. The MFC facility and the IWP and IWD are within the INL Site boundaries. The INL Site is expected to remain under federal government management and control for at least the next 100 years, with portions of the INL Site remaining under federal government management and control in perpetuity (INL 2011).

The INL Site is a government-owned, contractor-operated facility that is managed by DOE-ID. The INL Site includes several functional missions managed by separate contractors. These include clean-up, nuclear-energy research and technology development, developing and demonstrating national security technologies, and other science and technology activities. The current INL Management and Operating contractor, Battelle Energy Alliance, LLC (BEA) is responsible for the majority of MFC operations.

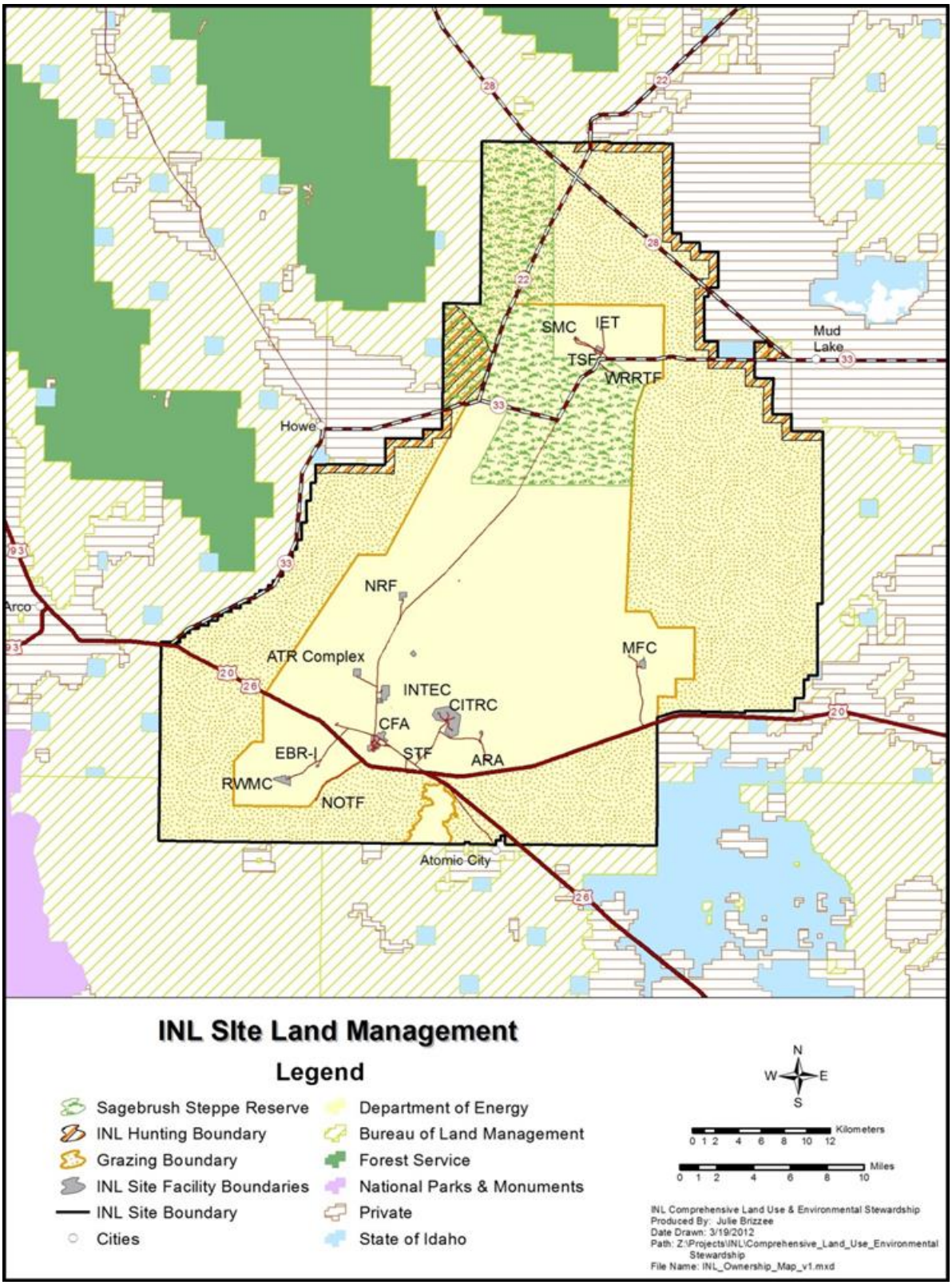

Figure 1. Idaho National Laboratory (INL) facilities and land uses.

3. PROCESS DESCRIPTION

3.1 Process Flow Description

MFC missions are devoted mainly to research and development on nuclear technologies, nuclear environmental management, and space radioactive-power-source development. Currently, MFC consists of several major research facilities, in addition to a variety of operations, support, and office facilities discharging to the IWP or IWD system. Operational descriptions for the MFC facilities that routinely discharge non-contact cooling water and steam condensate or periodically discharge other pre-approved non-routine discharges to the IWP or IWD system are provided in Table 1.

Table 1. Descriptions of Materials and Fuels Complex (MFC) facilities with routine discharges.

Building	Description
Major Research Facilities	
Building 704. Fuel Manufacturing Facility (FMF)	FMF is designed to manufacture unirradiated (cold) uranium fuel and perform experiments in a secure environment.
Building 752. Analytical Laboratory and Office Building (L&O)	Located in the north end of the L&O, the Analytical Laboratory is, an extensive laboratory area for the analysis of both radiological and non-radiological samples. The primary mission of the Analytical Laboratory is to provide chemical and radiochemical analysis capabilities in support of MFC programs. Hot cells are used for the handling and chemical analyses of irradiated fuels and materials. The L&O also houses the laboratory administrative offices and certain division directors in the southern portion of the L&O. The cafeteria, document control, and safeguard offices are also in this portion of the L&O.
Building 765. Fuel Conditioning Facility (FCF)	FCF is a large hot cell that has recently been modified to prove reprocessing of metal fuels and nuclear waste materials using an electrochemical technique.
Buildings 768. Boilers	Building houses electric heated steam boilers, standby generator and air compressors, reject water from a reverse osmosis system,
Building 772. EBR-II Engineering Laboratory	The EBR-II Engineering Laboratory is a 3,450 square foot facility used for nondestructive testing in support of EBR-II.
Buildings 774	Adjacent to 775 is the Support Wing (774), which houses the Electron Microscopy Laboratory, and offices.
Building 785. Hot Fuel Examination Facility (HFEF)	HFEF is a large hot-cell laboratory used for destructive and nondestructive examination of irradiated fuels and materials. HFEF also houses Hazardous Waste Management Act (HWMA)/Resource Conservation and Recovery Act (RCRA) treatment and storage areas designated for the storage and treatment of mixed waste.
Building 793. Sodium Components Maintenance Shop (SCMS)	SCMS operates mainly as a HWMA/RCRA-permitted facility for the storage and treatment of mixed waste. The facility consists of container and tank storage and treatment process areas.
Building 799. Sodium Processing Facility (SPF)	SPF operates mainly as a HWMA/RCRA permitted facility for the storage and treatment of mixed waste. The facility consists of container and tank storage and treatment process areas.

Industrial wastewater discharged to the IWP system, up to 1.4 million gal/mo, consists primarily of noncontact cooling water, boiler blowdown, cooling tower overflow, water from sinks and drains, air wash flows, and steam condensate. Small amounts of industrial wastewater from the MFC facility process holdup tanks may also be discharged to the IWP and IWD system, once approved by the facility supervisor and environmental compliance staff. The IWP, first excavated in 1959, has a design capacity of approximately 285 million gal with a maximum water depth of 13 ft. The IWD is a ditch that goes to the IWP but, due to rapid infiltration, waters rarely reach the IWP.

3.2 Land Application Site

The IWP is an unlined, 3-acre, evaporative seepage pond fed by industrial wastewater from the Industrial Waste Lift Station and storm water from drainage ditches and conveyance pipelines. Before July 2007, under typical flows, water that entered the north IWD seeped into the ground prior to reaching the IWP. However, an extension to the pipeline that carries the industrial wastewater directly to the IWP was installed in July 2007.

Approximately one gpm of cooling tower blowdown will continue to be discharged to the south IWD (Figure 2, Ditch A). Wastewater from the reverse-osmosis treatment system and storm water will continue to be collected and transmitted through Ditch A and Ditch B into the IWD (Ditch C) and on to the IWP.

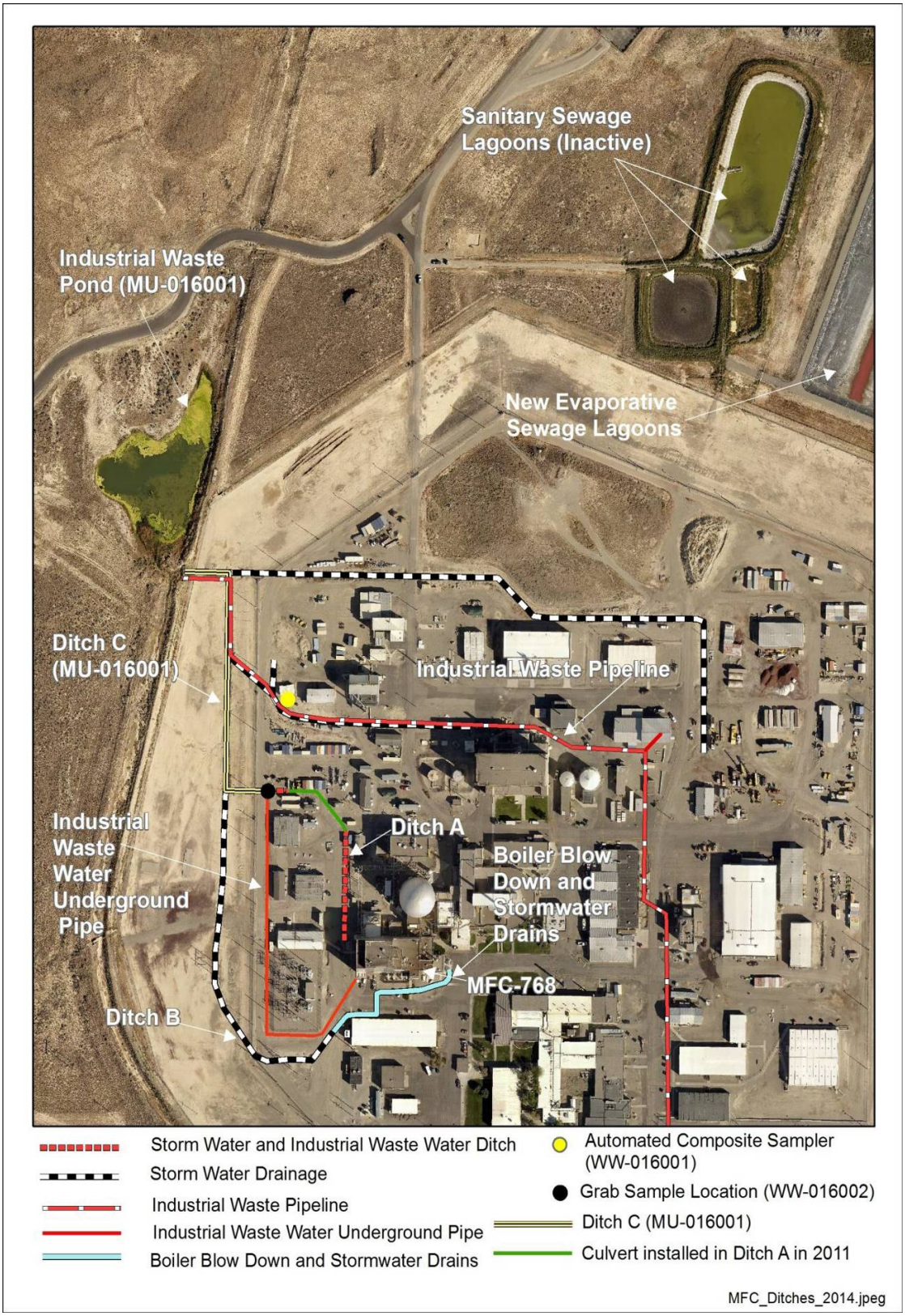

Figure 2. Aerial view of the MFC.

4. SITE CHARACTERISTICS

4.1 Site Management History

The ownership of the land now comprising the INL Site, including the MFC, was transferred to the DOE from the public domain for use in atomic-energy research and development. The MFC facility, IWD, and IWP system are within the INL Site boundaries. The current INL Management and Operating contractor is BEA. The INL Site occupies an 890 mi^2 area located in on the Eastern Snake River Plain in portions of Bingham, Bonneville, Butte, and Clark counties. The MFC is located in the southeastern corner of the INL Site, approximately 36 mi west of Idaho Falls in Bingham County. MFC has administrative control over approximately 900 acres, while the MFC facilities themselves encompass approximately 60 acres; see Table 1 for additional facility information.

The IWP system has been continuously managed for the disposal of industrial waste at MFC since approximately 1962. Historic data indicate that while the pond was constructed in 1959, it was not until 1962 that wastewater was discharged to the IWP. The annual discharges for those years ranged from 8 million gal/yr to 54 million gal/yr. Currently, the estimated average annual volume of industrial wastewater discharged to the IWP system from 2010 to 2014, is approximately 10 million gal/yr (approximately 0.8 million gal/mo). This equates to less than 13 ft of industrial wastewater applied to the soils in the IWP system per year. The estimated annual discharge volume for the years 2010 to 2014, is provided in Figure 12. Industrial wastewater volumes discharged to the IWP have been reduced in recent years due to the shutdown of the EBR-II reactor operations and the stand-by status of the SPF.

In 2004, the IWP sediments and sediments from the north drainage ditch (next to the industrial waste pipeline) were removed. As a result of the sediment removal in the ditch, wastewater discharged to the ditch infiltrated into the soil more quickly; hence, very little water traveled all the way to the pond. In July of 2007 a pipe system was installed to carry industrial wastewater directly to the pond from the north drainage ditch. The north drainage ditch continues to receive storm-water runoff.

Approximately one gpm of industrial wastewater (boiler blow down) will continue to be discharged to the south drainage ditch (Ditch A). Additionally, once-through cooling water may also flow to this ditch. Wastewater from a reverse-osmosis system, at less than an average of 1 gpm in this discharge, will continue to be discharged into the Industrial Wastewater Underground Pipe going to Ditch C. Both ditches will continue to be used to transport storm water runoff to the IWP.

4.2 Climatic Characteristics

The INL area climate exhibits low relative humidity, wide daily temperature swings, and large variations in annual precipitation. National Oceanic and Atmospheric Administration operates several meteorological observation stations at the INL Site. Data from the station nearest MFC for the period of calendar years 2004 through 2013 (Lewis 2014) are presented below:

- Average annual precipitation for the 10-year period was 6.35 inches
- Minimum monthly precipitation was 0.00 inches and occurred during the months of July 2008 and November 2011
- Maximum monthly precipitation was 4.51 inches and occurred during June 2009
- Average summer (June through August) temperature was 66.6°F
- Average winter (December through February) temperature was 17.7°F
- Extreme daily low temperature of -26°F occurred on January 27, 2009 and December 8, 2013
- Extreme daily high temperature of 102°F occurred on July 23, 2007
- Winds at the INL Site are generally from the southwest.

The prevailing wind direction is from southwest to northeast. INL and the surrounding areas are formally designated as an attainment area for air pollutants, such as SOx and PM-10, with established national ambient air quality standards. INL routinely monitors air quality using a network of air monitors. These monitors collect samples for measurement of particulate matter, radioactivity, and other air pollutants.

4.3 Soils

Soil in the IWP and portions of the IWD were excavated in June, 2004, to remove cesium-137, chromium, mercury, selenium, silver, and zinc contamination as part of a Comprehensive Environmental Response Compensation and Liability Act (CERCLA) remedial action. Following the IWP excavation to remove contaminants, the IWP was placed back into service to receive industrial wastewater.

4.4 Surface Water

The INL Site is located within a closed basin. Surface water does not flow directly offsite. Water from the Big Lost River, as well as storm water and INL Site WRP discharges, evaporate or seep into the soils above the ESRPA.

Surface water on the INL Site consists of intermittent streams draining from three intermountain valleys. The streams are the Big Lost River and Birch Creek. Channels from these streams terminate within the INL Site. No streams flow off the INL Site.

There is no evidence to suggest stream flows would ever come near the MFC facility.

Aquatic habitats are limited to scattered wet areas near artificial ponds and intermittent streams. The IWP serves as a water source to many wildlife species. It should be noted that there are no springs, wetlands or surface waters within 1/4 mi of the IWP. Twenty-five, 50-yr and 100-yr floodplain boundaries for the Big Lost River do not apply (see Figure 3). There are no process chemical or residue storage facilities for the IWP. Buffer zones are not delineated, because the MFC is a restricted facility with no public access. There is no fencing around the IWP.

The IWD is located within the security fenced area of MFC. Access into the fenced area is through a guard gate that is staffed 24-hours/day. Individuals without an applicable security badge must check in at the guard gate and then be escorted by personnel with the appropriate badge.

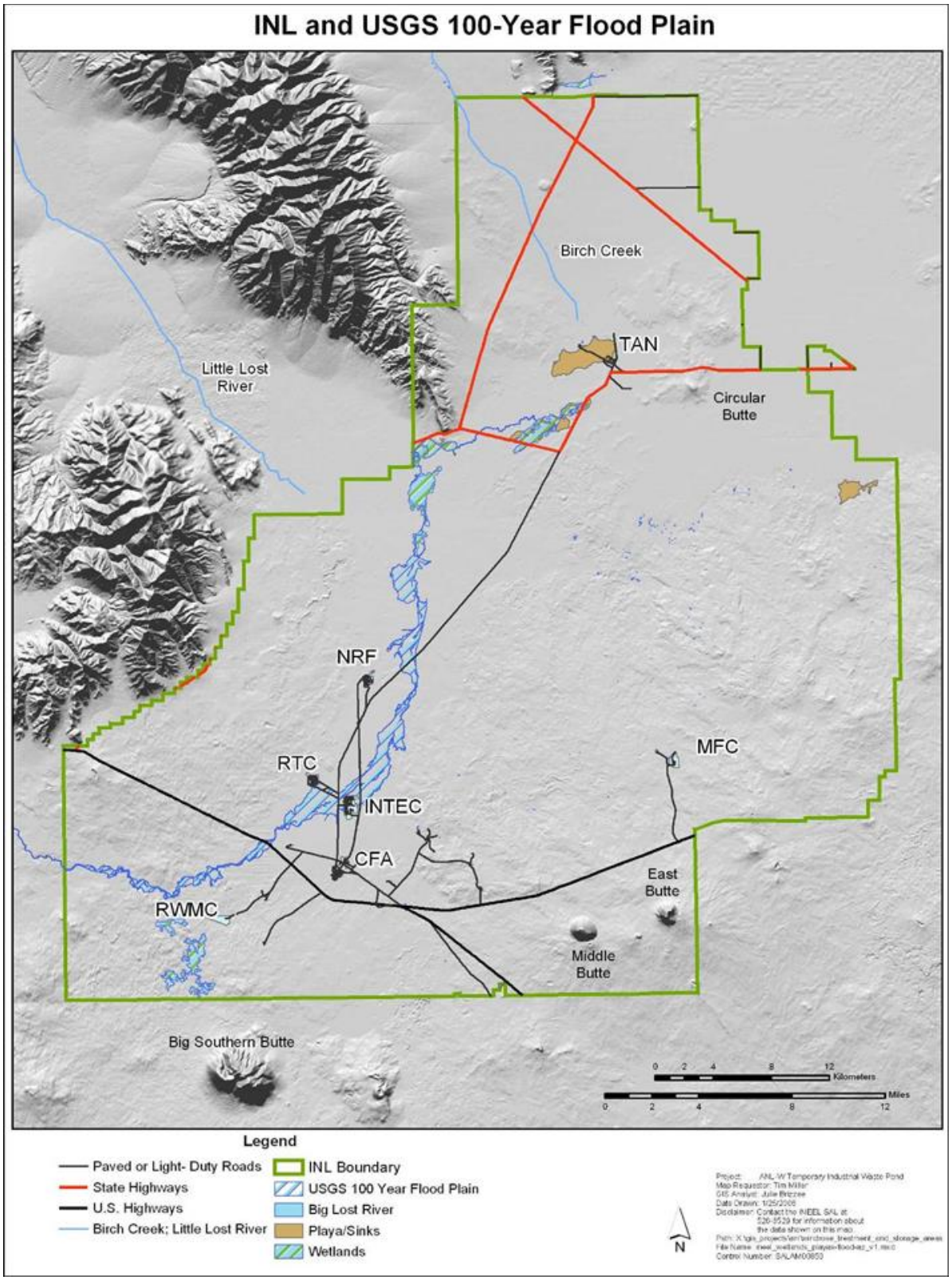

Figure 3. 100-yr flood plain for INL.

4.5 Groundwater/Hydrogeology

The ESRPA is the primary source of water upgradient and downgradient of INL Site. Principal uses of this water include domestic consumption, industrial uses, irrigation, and stock watering. Eight counties are located downgradient of INL. With the exception of Lincoln County and Twin Falls County, the majority of the downgradient populations live in rural areas.

Two wells (EBR-II #1 and EBR-II #2) provide water for use at the MFC. Figure 4 shows the locations of these production wells located at MFC. The up-gradient monitoring well (ANL-MON-A-012) and the two down-gradient monitoring wells (ANL-MON-A-013 and 014) are also shown in Figure 4. Well diagrams for the three monitoring wells were recently updated and submitted to DEQ (Miller 2014).

Groundwater monitoring results obtained in accordance with the current permit have not shown any impact from the IWP or IWD discharges.

The map provided in Figure 5, showing the elevation and general direction of groundwater movement beneath MFC, suggests the regional flow in the ESRPA is from northeast to southwest. Depth to the ESRPA at the MFC facility is approximately 660 ft based on recent water-level measurements.

The subsurface lithology is dominated by basaltic lava flows. Minor discontinuous sedimentary interbeds occur at various depths, overlying the tops of basalt flows. The subsurface geology at MFC is similar to that on the rest of the INL. The most striking difference is the lack of continuous sedimentary interbeds beneath the facility. Those sedimentary interbeds intercepted during drilling appear to be discontinuous and deposited in low areas on basalt surfaces. These interbeds are generally composed of calcareous silt, sand, or cinders. Rubble layers between individual basalt flows are composed of sand and gravel to boulder sized material. The interbeds range in thickness from less than 1 in. to 15 ft. Drilling near the IWP targeted a discontinuous, but locally extensive interbed, found approximately 40 to 50 ft bls, near the IWP. This interbed is not continuous across the MFC area and does not appear west of the IWP. More spatially extensive interbeds have been identified above the regional water table, at approximately 400, 550, and 600 ft bls (Northern Engineering and Testing, Inc. (1988). The nature of these sedimentary interbeds and rubble zones does not appear to cause perching, but may retard the downward movement of water and produce preferred flow paths.

Table 2 lists the depths for each of the six boreholes and whether they encountered perched water in the borehole or not.

The localized, non-extensive nature of the shallow perched water zone is attributed to the small volume of industrial wastewater discharged to the IWP. Additionally, the interbeds encountered are aerially non-extensive compared with other areas where perched water zones exist.

Table 2. Perched water wells at MFC IWP.

Borehole Number	Depth (ft)	Comments
ANL-M01	54.5	No static water identified
ANL-M02	80.0	No static water identified
ANL-M03	60.0	Dry
ANL-M04	68.0	Static water observed at 28.5 ft
ANL-M05	63.3	Static water observed at 58 ft
ANL-M06	423	Static water observed at 62.5 ft

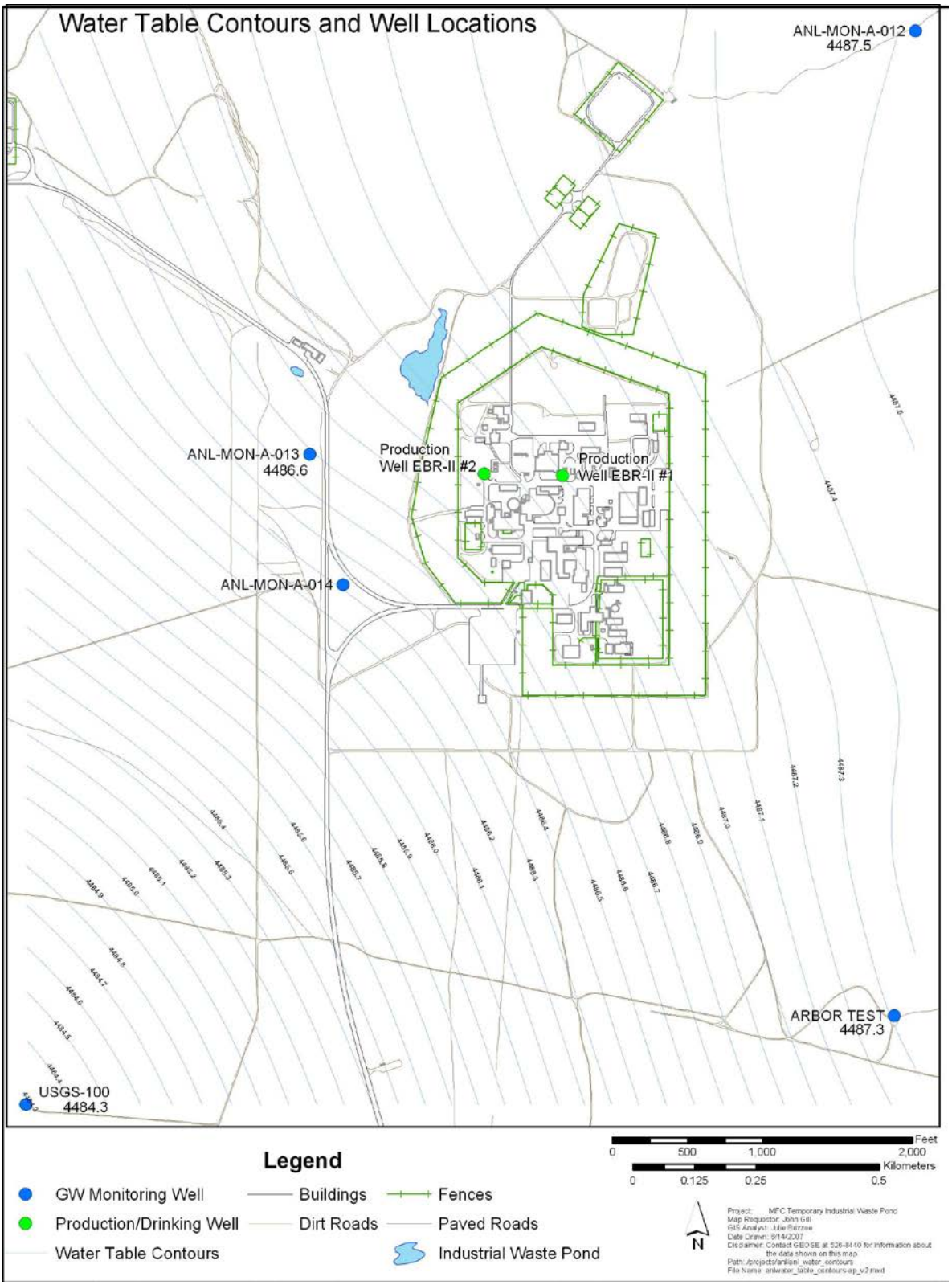

Figure 4. Well Locations at MFC.

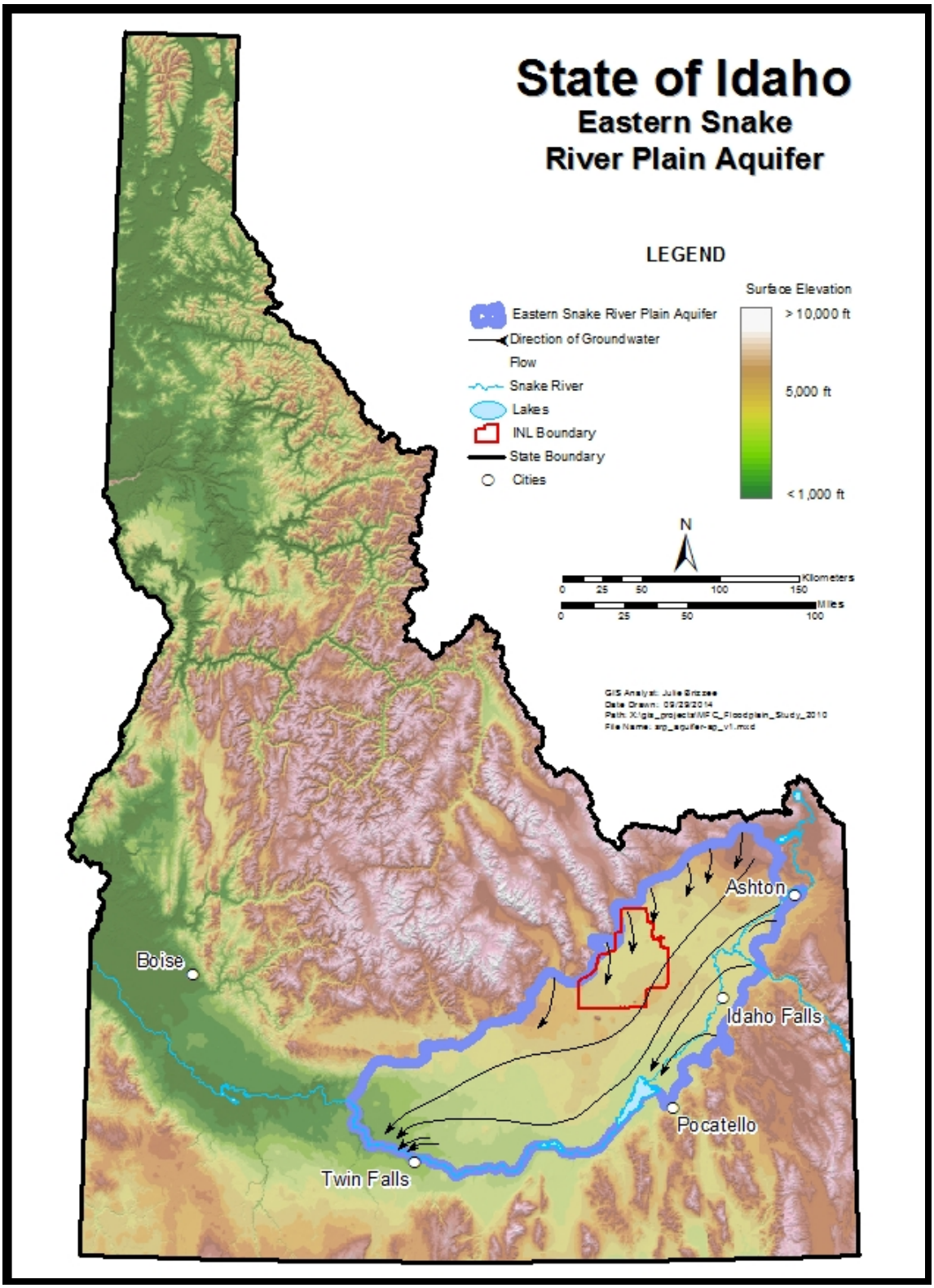

Figure 5. Eastern Snake River Plain Aquifer (ESRPA).

Other water-saturated zones may exist deeper in the subsurface. A fine-grained sedimentary interbed exists about 400 ft bls. Neutron logs suggest this 10 ft thick, aerially extensive unit may be saturated with water. A coarser grained sedimentary unit that occurs at a depth of approximately 504 ft bls may also retain some water.

The vadose zone at MFC is approximately 640 ft thick. However, physical and chemical properties of vadose zone materials are limited to the upper 100 ft. It can be inferred that deeper basaltic material is similar in composition and properties to those from other areas around the INL.

5. WASTEWATER CHARACTERIZATION, CROPPING PLAN AND LOADING RATES

5.1 Wastewater Characterization

The industrial wastewater discharged to the IWP and IWD systems is nonhazardous as defined and regulated under IDAPA 58.01.05, Rules and Standards for Hazardous Wastes. Industrial wastewater discharged to the IWP system, up to 1.4 million gal/mo, consists primarily of noncontact cooling water (estimated at over 90% of the flow), boiler blowdown, cooling tower overflow and drain waters, air wash flows, and steam condensate. Small amounts of industrial wastewater from the MFC facility process holdup tanks may also be discharged to the IWP and IWD systems, once approved by the facility supervisor and environmental compliance staff.

Analysis of the effluents have not shown any typical problem constituents. Occasional levels above background of some metals, such as lead or iron, and total suspended solids have been seen, but these occurrences have not been sustained or traced to any particular activity.

Wastewater monitoring is performed following the requirements specified in the existing permit. The existing permit requires a monthly 24-hr composite sample to be collected from the effluent to the IWP, a quarterly grab sample from the effluent to Ditch C, and semi-annual grab samples from the three monitoring wells.

5.1.1 Request for Removal of Specific Permit Required Monitoring Parameters

INL requests removing arsenic, cadmium, chromium, mercury, and silver from the current permit list of monitored parameters in the Industrial Waste Pipeline, Ditch C, and the three monitoring wells. These parameters have frequently been below the laboratory instruments' minimum detection levels or an order of magnitude or more below the groundwater quality standards (Tables 3–5).

Other parameters that have been detected at low levels, but always below the groundwater quality standards, are barium, chloride, selenium, sulfate, and zinc. Figures 6–10 compare the concentrations in the Industrial Waste Pipeline, Ditch C, and the groundwater monitoring wells with the applicable groundwater-quality standard. INL requests these parameters be removed from the permit list of required parameters.

When the current permit was issued, there was a regulatory limit (IDAPA 58.01.17.600.06.a and b) for total suspended solids (TSS) and total nitrogen. The limit was applicable to wastewater discharged to a rapid infiltration system. The regulations were subsequently revised and the limits removed. Therefore, INL is requesting these limits be removed from the new permit.

In addition, INL is requesting that TSS be removed from the current permit list of monitored parameters. TSS sample concentrations from the Industrial Waste Pipeline and Ditch C are typically below the laboratory instruments' minimum detection level of 4 mg/L (Figure 11).

Table 3. Industrial Waste Pipeline (WW-016001) parameters for possible removal from the reuse permit because of typically low concentrations from May 2010 through March 2014.

Parameter	Lowest Concentration (mg/L)	Highest Concentration (mg/L)	Groundwater Quality Standard (mg/L)	Total Non-detects	Total Detects
Arsenic	0.0025 U[a]	0.0036	0.05	40	7
Cadmium	0.001 U	0.001 U	0.005	47	0
Chromium	0.0025 U	0.0084	0.1	42	5
Mercury	0.0002 U	0.0002 U	0.002	47	0
Silver	0.005 U	0.0069	0.1	44	3

a. U flag indicates that the result was reported as below the instrument detection limit by the laboratory.

Table 4. Ditch C Industrial Wastewater Underground Pipe (WW-016002) parameters for possible removal from the reuse permit because of typically low concentrations from May 2010 through March 2014.

Parameter	Lowest Concentration (mg/L)	Highest Concentration (mg/L)	Groundwater Quality Standard (mg/L)	Total Non-detects	Total Detects
Arsenic	0.0033	0.011	0.05	2	14
Cadmium	0.001 U[a]	0.001 U	0.005	16	0
Chromium	0.003	0.0217	0.1	0	16
Mercury	0.0002 U	0.0002 U	0.002	16	0
Silver	0.005 U	0.005 U	0.1	16	0

a. U flag indicates that the result was reported as below the instrument detection limit by the laboratory.

Table 5. Wells ANL-MON-A-012 (GW-016001), ANL-MON-A-013 (GW-016002), and ANL-MON-A-014 (GW-016003) parameters for possible removal from the reuse permit because of typically low concentrations from May 2010 through September 2013.

Parameter	Lowest Concentration (mg/L)	Highest Concentration (mg/L)	Groundwater Quality Standard (mg/L)	Total Non-detects	Total Detects
Arsenic	0.0015	0.003	0.05	0	24
Cadmium	0.00025 U[a]	0.00025 U	0.005	24	0
Chromium	0.0025U	0.0094	0.1	6	18
Mercury	0.0002 U	0.0002 U	0.002	24	0
Silver	0.005 U	0.005 U	0.1	24	0

a. U flag indicates that the result was reported as below the instrument detection limit by the laboratory.

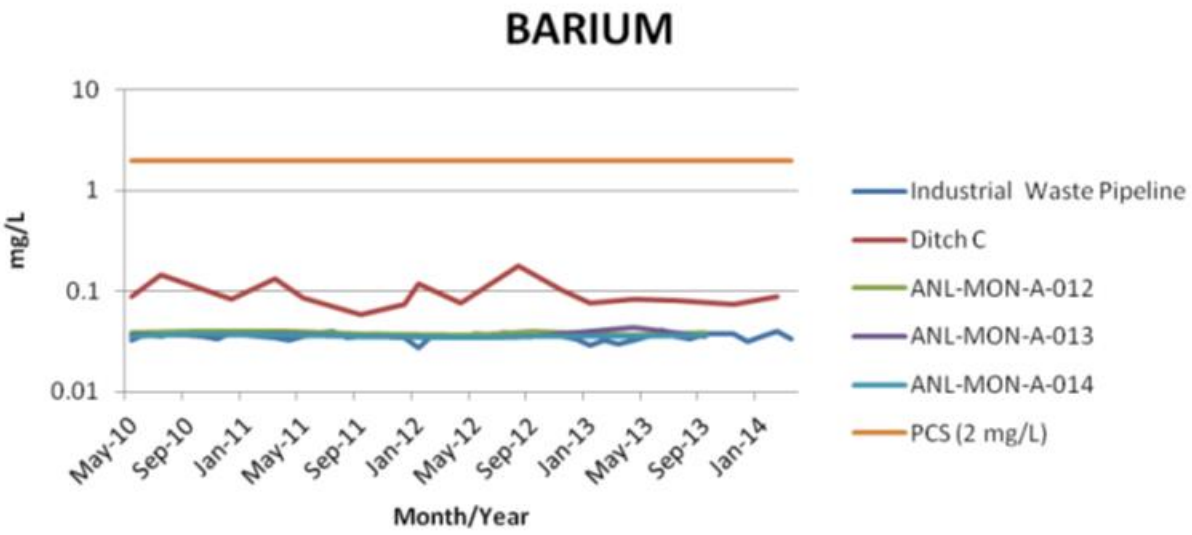

Figure 6. Barium data chart.

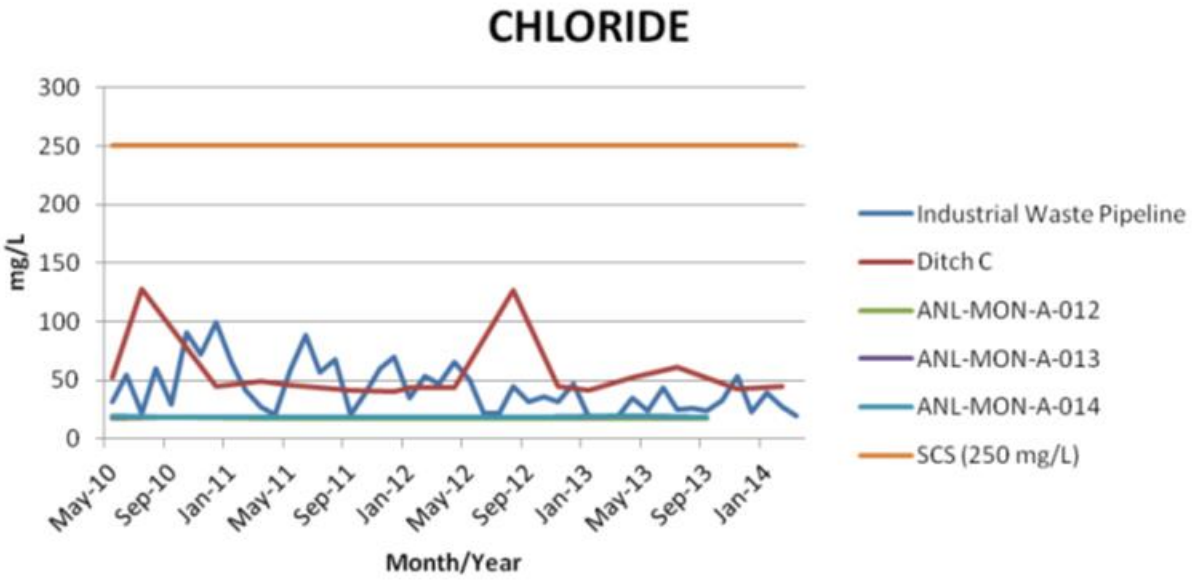

Figure 7. Chloride data chart.

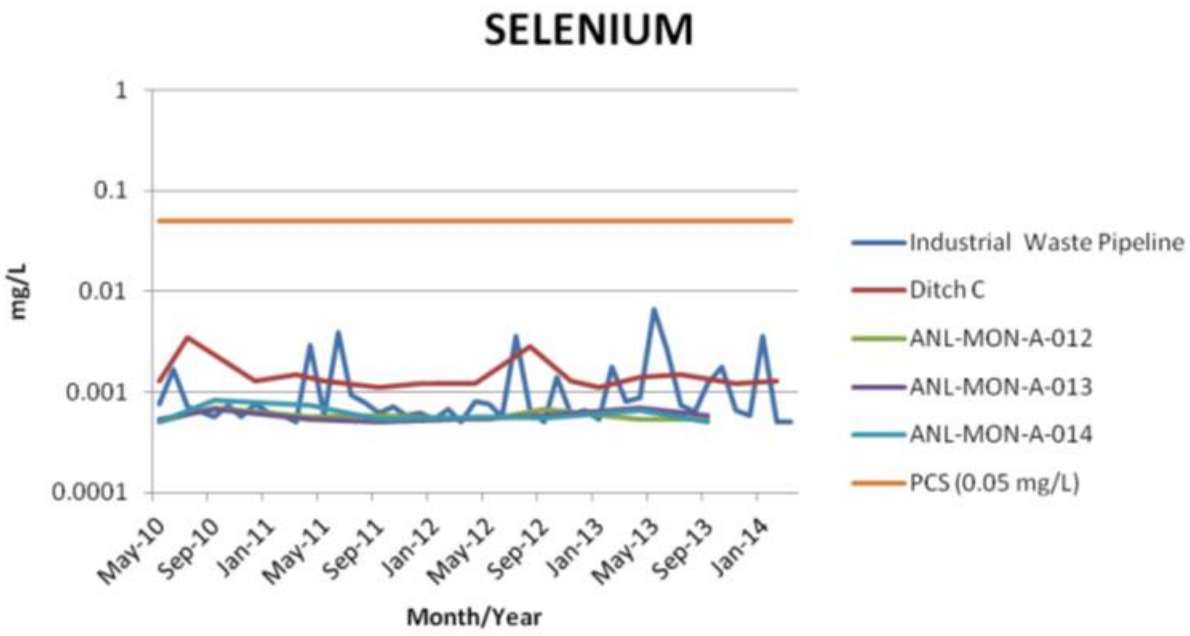

Figure 8. Selenium data chart.

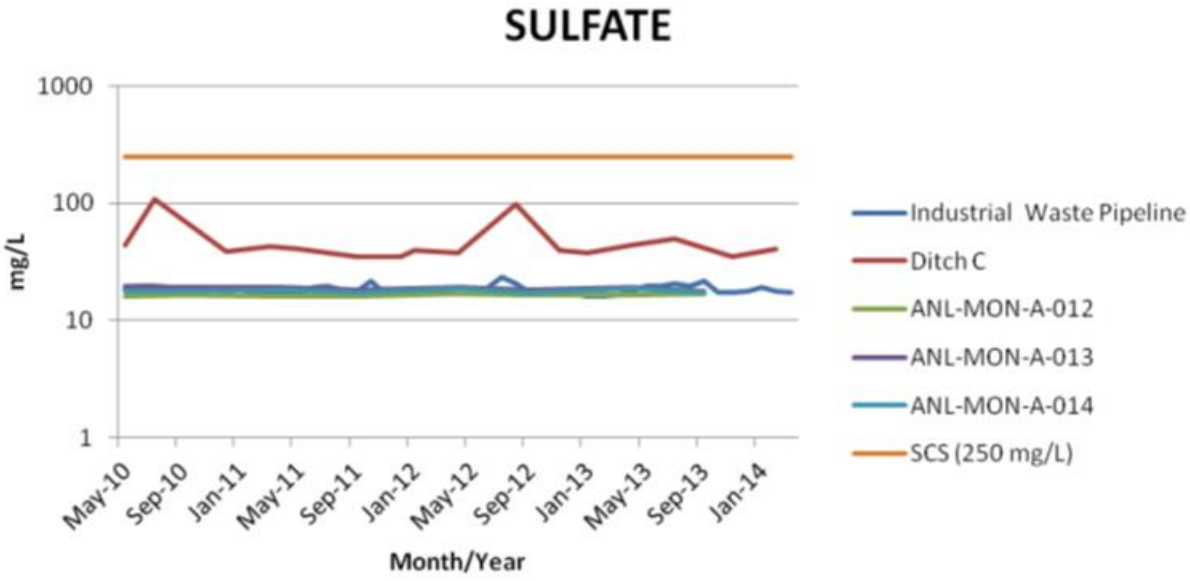

Figure 9. Sulfate data chart.

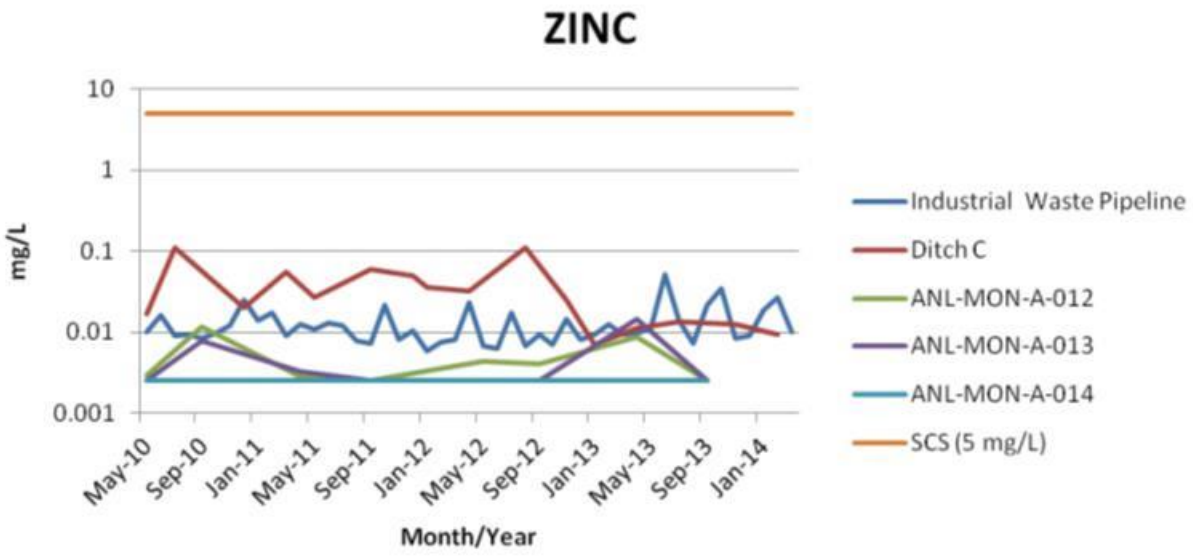

Figure 10. Zinc data chart.

Figure 11. Total-suspended-solids data chart.

5.2 Cropping Plan

Not Applicable

5.3 Hydraulic Loading Rate

The maximum hydraulic loading rate is 17 million gallons/yr. Effluent flows for the IWP and Ditch C are shown in Figure 12.

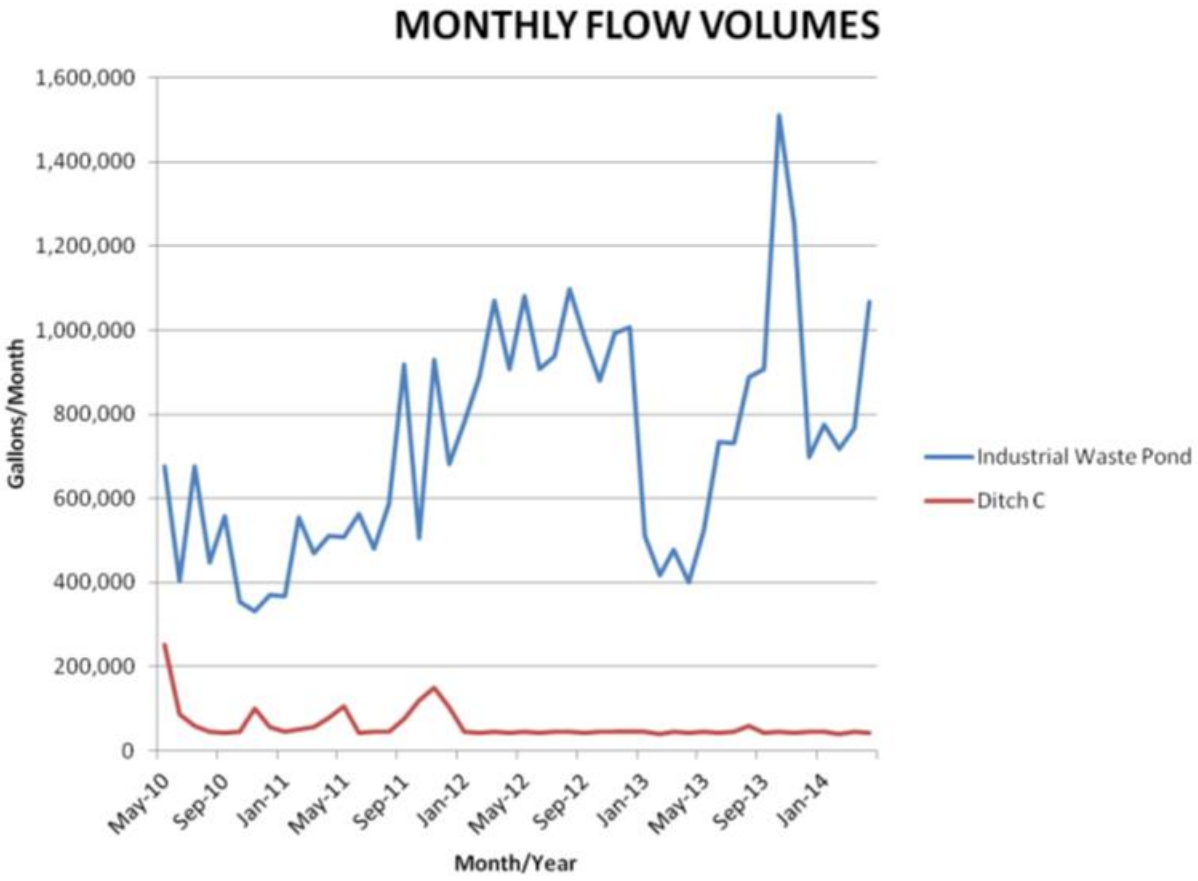

Figure 12. MFC flow volumes for the Industrial Waste Pond and Ditch C.

5.4 Constituent Loading Rates

Not Applicable

6. SITE MANAGEMENT

6.1 Compliance Activities

Section E of the IWRP identifies two compliance activities: preparation of a Plan of Operation and a Waste Solids Management Plan. Section H, Paragraph 5, of the permit requires that DEQ be notified within 30 days of completing any work described in Section E and that the annual report provide the status of compliance activities still in progress at the end of the permit year.

Compliance Activity CA-160-01: This compliance activity to submit a final Operation and Maintenance Manual was completed in June 2011 with the approval letter from the DEQ (Rackow, 2011)

Compliance Activity CA-160-02: This compliance activity requires a Waste Solids Management Plan shall be submitted to DEQ as needed. The compliance activity states:

> *A Waste Solids Management Plan shall be submitted for DEQ review and shall be approved by DEQ prior to any dredging or removal of solids, mud, or sludge from the Industrial Waste Pond. The plan shall outline actions associated with the removal (dredging) of solids in the Industrial Waste Pond. The plan shall include: specific information used in the determining the need for removal of solids, responsible person(s) for the decision, and a complete SOP for the removal of the solids.*

The due date for CA-160-02 is as needed, review and approval required prior to removal of any waste solids. Currently there are not any plans to remove solids from the pond.

6.2 Seepage Rate Testing

Not applicable.

6.3 Site Management Plans

6.3.1 Buffer Zone Plan

Not applicable. The site has controlled access and the public is not allowed within several miles of the pond. Fencing and signs have not been required due to the public not being allowed close to the disposal areas.

6.3.2 Grazing Management Plan

Not applicable.

6.3.3 Nuisance Odor Management Plan

Not applicable.

6.3.4 Waste Solids Management Plan

Will be determined at time of closure. The only solids going into the pond are from storm-water-runoff events.

6.3.5 Total Dissolved Inorganic Solids Management Plan

Not applicable.

6.3.6 Runoff Management Plan

Not applicable.

6.4 Monitoring

6.4.1 Monitoring the Quantity of Land Applied Wastewater

There is a flow meter located on the industrial waste pipe line. The flow meter has an actual current time read out and a cumulative total. The flow measurements going to Ditch C are estimated based on visual readings.

6.4.2 Sampling and Analysis of Land–applied Wastewater

Environmental professionals from Monitoring Services (MS) perform the monthly and quarterly effluent monitoring required in Section G of the permit. Effluent samples are collected monthly from the IWP (sampling location WW-016001) prior to discharge to the IWP. In addition, quarterly grab samples are collected from the effluent discharging into Ditch C from the Industrial Waste Water Underground Pipe (WW-016002). All samples are collected according to established programmatic sampling procedures. Effluent samples are typically collected during a preselected week following a randomly generated sampling schedule to represent normal operating conditions.

Samples are analyzed using methods identified in 40 Code of Federal Regulations (CFR) 136, "Guidelines Establishing Test Procedures for the Analysis of Pollutants," 40 CFR 141, "National Primary Drinking Water Regulations," 40 CFR 143, "National Secondary Drinking Water Regulations," or approved by the DEQ.

The hydrogen ion activity (pH) of the samples is measured with a calibrated meter at the time of sample collection. All other permit required samples are submitted under full chain of custody to Southwest Research Institute's Analytical and Environmental Chemistry Department located in San Antonio, Texas for analyses.

6.4.3 Method of Calculating Hydraulic and Constituent Loading

Not applicable.

6.4.4 Monitoring Supplemental Irrigation Water

Not applicable.

6.4.5 Soil Monitoring

Not applicable.

6.4.6 Groundwater Monitoring

The MFC IWP and IWD permit identifies three INL aquifer wells (ANL-MON-A-012, ANL-MON-A-013, and ANL-MON-A-014) as compliance wells. Well ANL-MON-A-012 is an up gradient well and ANL-MON-A-13 and ANL-MON-A-014 are down gradient wells. Samples are to be collected semi-annually in April/June and September/October.

MS personnel collect the semi-annual samples. The MS personnel use project-specific sampling and analysis plans and procedures that govern sampling activities and quality-control protocols. The permit identifies a specified list of parameters that are to be analyzed in the groundwater samples. Constituent concentrations in the compliance wells are limited by primary constituent standards (PCS) and secondary constituent standards (SCS) specified in IDAPA 58.01.11, "Ground Water Quality Rule." All permit-required samples are collected as unfiltered samples with the exception of iron and manganese in wells that exceed the SCS for these parameters.

Note: Filtered samples for iron and manganese analysis are only required by the permit in the event the unfiltered sample results for these two parameters exceed the applicable SCSs.

The conductivity and pH of the samples are measured at the time of sample collection by MS personnel using a calibrated meter. Groundwater temperature is also measured at the time of sample collection. All other permit required groundwater samples are submitted under full chain of custody to Southwest Research Institute's Analytical and Environmental Chemistry Department located in San Antonio, Texas for analyses.

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 used for analysis of all permit-required parameters.

6.4.7 Crop Uptake Values

Not applicable.

6.4.8 Other Monitoring

Not applicable.

6.4.9 Meteorological Monitoring

Not applicable.

7. SITE OPERATIONS AND MAINTENANCE

7.1 Operator Information

BEA operates, monitors, and maintains the land application site and associated wastewater collection system for DOE-ID. MFC utilities-operations personnel perform routine surveillances of the Industrial Waste Collection System and Land Application Area seven days a week.

7.2 Operator Certification Credentials

Certified operators are not required for this system. However, BEA does have operating personnel for the MFC Industrial Waste Collection System, and Land Application that are licensed through the State of Idaho Bureau of Occupational Licenses. Licenses of the personnel who currently operate and oversee the permitted wastewater system at MFC are listed in Table 6.

Table 6. MFC Industrial Waste Treatment Wastewater System Operators.

Operator	Wastewater System	License Number	License Expiration Date
Jorgensen, Brian K	Wastewater Collection —Class I	WWC1-19473	8/7/2015
Jorgensen, Brian K	Wastewater Treatment—Land Application	WWTLA-19472	8/7/2015
Duncan, Larry L.	Wastewater Collection—Class I	WWC1-14349-GP	12/25/14
Duncan, Larry L.	Wastewater Treatment—Land Application	WWTLA-1621-GP	12/25/2014

7.3 Other Party Site Operations and Maintenance

Not applicable. BEA operates and maintains the MFC industrial land application systems.

8. REFERENCES

Idaho DEQ, Guidance for Reclamation and Reuse of Municipal and Industrial Wastewater. September 2007.

INL 2011, Idaho National Laboratory Comprehensive Land Use and Environmental Stewardship Report, INL/EXT-05-00726, Revision 1, august 2011

Lewis, M., INL, email to J. Gill, INL, "MFC Climate Data from NOAA for Years 2004 through 2013," CCN 234111, September 30, 2014.

Miller, T. A., INL, to T. Rackow, P. E., DEQ, "Idaho National Laboratory Materials and Fuels Complex Industrial Waste Pond Wastewater Reuse Permit (WRU-I-0160-01), Update of Associated Groundwater Monitoring Well Diagrams for Wells GW-016001, GW-016002, and GW-016003," CCN 233981, September 23, 2014

Portage, "Data Quality Assessment Report for the Post-Remedial Action Confirmation Sampling of the MFC CERCLA Sites", report Portage-04-015.

Rackow. T.. P.E., DEQ, to J.A. Stenzel, INL, LA-000160-01 INL MFC Industrial Wastewater Pond, CA-141-03 Plan of Operation Approval, CCN 224615, June 23, 2011.

Recycled Water Reuse Permit Application

Contents

September 26, 2014

Idaho Department of Environmental Quality

Regional Office Contact

Name, title: Tom Rackow, PE, Staff Engineer

Regional office: Idaho Falls

Address: 900 N. Skyline, Suite B, Idaho Falls, ID 83402

Phone/e-mail: 208-528-2650 *thomas.rackow@deq.idaho.gov*

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1. Application for Recycled Water Reuse Permit

Instructions: Complete the following form and attachments as completely as possible. Failure to provide sufficient information will delay processing of the application and final action on the permit. A pre-application meeting between the applicant and Idaho Department of Environmental Quality (DEQ) is strongly encouraged to discuss site-specific issues and level of detail needed. If clarification is needed, contact DEQ's Idaho Falls Regional Office at (208) 528-2650.

Type of application (attach appropriate checklists) New ☐ Renewal ☒: Permit No.: **I-160-02** (previous permit WRU-I-0160-01) Major modification ☐ Minor modification ☐ Waiver ☐	
Legal name of applicant:	U.S. Department of Energy – Idaho Operations Office
Responsible Official and title (see Form A for definition of Responsible Official and Authorized Representative)	U.S. Department of Energy – Idaho Operations Office: Robert D. Boston, Deputy Manager Operations Support
Authorized Representative and title (attach Form A for designating Authorized Representative)	Battelle Energy Alliance, LLC: Timothy A. Miller, Director Environmental Support and Services
Mailing address:	U.S. Department of Energy – Idaho Operations Office 1955 North Fremont Ave., Mail Stop 1206 Idaho Falls, ID 83415 Battelle Energy Alliance, LLC: Idaho National Laboratory P.O. Box 1625, MS 3405 Idaho Falls, ID 83415
Facility address, if different:	Scoville, ID 83415 Facility location – Materials and Fuels Complex, southeastern corner of Idaho National Laboratory, approximately 36 miles west of Idaho Falls, ID, in Bingham County, Township 3N, Range 32E, Sections 12, 13, and 14.
Phone/fax:	U.S. Department of Energy – Idaho Operations Office: Responsible Official – (208) 526-8077/(208) 526-0542 Battelle Energy Alliance, LLC: Authorized Representative – (208) 526-9989/(208) 526-3149

E-mail address:	U.S. Department of Energy – Idaho Operations Office: Responsible Official – Bostonrd@ID.doe.gov Battelle Energy Alliance, LLC: Authorized Representative – Timothy.Miller@inl.gov
Company Internet address:	U.S. Department of Energy – Idaho Operations Office: www.id.energy.gov Battelle Energy Alliance, LLC: www.inl.gov

Attachments (check all that apply):

☒ Form A
☒ Section 2. Facility Information
☒ Section 3. Plan of Operation Checklist / Preliminary Technical Report Checklist
☐ Plan of Operation
☒ Preliminary Technical Report/Renewal Application
☐ Other:

"I certify that the information provided in this submittal is, to the best of my knowledge, true, accurate and complete and I acknowledge that knowing submission of false or incomplete information may result in permit revocation as provided for in IDAPA 58.01.17.920.01, non-issuance of the permit, or other enforcement action as provided for under Idaho law."

Signature of Responsible Official: [signature]

Title: DM Operations Support

Date: 10/24/2014

Form A: Responsible Official / Duly Authorized Representative Designation Form

Use the following form to specify facility contacts.

Permittee name: U.S. Department of Energy – Idaho Operations Office	
Permit number: **I-160-02** (previous permit WRU-I-0160-01)	
I hereby certify that I am qualified to be the responsible official for the above-named permittee.	
Specifically, I,	
☐	am an officer of the corporation.
	My title is:
☐	perform policy or decision-making functions similar to that of an officer of the corporation.
	Explain:
☐	am a general partner in a partnership.
☐	am the owner of a sole proprietorship.
☒	am a principal executive officer, ranking elected official, or a person of decision-making authority of a municipality, state, federal, or other public agency who can legally bind the permittee with respect to the permit.
	My office/title is: Deputy Manager, Operations Support
	My agency is: U.S. Department of Energy – Idaho Operations Office
I hereby designate the following person or position title as a duly authorized representative: Timothy A. Miller, Director, Environmental Support and Services	
I certify that the individual filling this position is responsible for the overall operation of the regulated facility or an individual having overall responsibility for environmental matters.	
Signature of responsible official:	
Signature of duly authorized representative designee:	
Date: 10/24/2014	

The Responsible Official is the facility contact person authorized by the permittee to communicate with DEQ on behalf of the permittee on any matter related to the permit, including without limitation, the authority to communicate with and receive notices from DEQ regarding notices of violation or noncompliance, permit violations, permit enforcement, and permit revocation.

The Responsible Official is responsible for providing written certification of permit application materials, annual report submittals, and other information submitted to DEQ as required by the permit. Any notice to or communication with the responsible official is considered a notice to or communication with the permittee.

The Responsible Official may designate an Authorized Representative to act as the facility contact person for any of the activities or duties related to the permit, except signing and certifying the permit application, which must be done by the Responsible Official.

The designated Authorized Representative shall act as the Responsible Official and shall bind the permittee as described above. The designation of an Authorized Representative must a) be made in writing by the Responsible Official and attached to the permit application using Form A and b) specify an individual having responsibility for the overall operation of the regulated facility, such as the plant manager, superintendent, or an individual having overall responsibility for environmental matters.

2. Facility Information

Type of facility from which wastewater is generated	Federal-U.S. Department of Energy, conducts nuclear research and technology development.
Types of wastewater produced	Industrial Wastewater (nonhazardous/nonradiological) consisting primarily of a mixture of non-contact cooling water, steam condensate, boiler blowdown, reverse osmosis effluent, laboratory sink effluent, and periodic industrial wastewater discharges.
Method(s) of wastewater treatment	Rapid Infiltration
For municipal wastewater systems, provide and collection and treatment system classifications. Refer to IDAPA 58.01.16.202.01.a located at: *Wastewater Rules*	Not Applicable for MFC
For municipal wastewater treatment, designate "class" of recycled water generated and method(s) of reuse	☐Class A ☐Class B ☐Class C ☐Class D ☐ Class E Not Applicable for MFC
For industrial wastewater treatment, describe the different types of recycled water streams generated and method(s) of reuse	100% rapid infiltration
Facility ownership	☐ Public (specify type): ☒ Private – Federal ownership boundaries closed to the public
Site elevation (feet above sea level)	5110 ft
USGS Quadrangle	Circular Butte 3SW
Legal location (township, range, section)	Township 3N, Range 32 E, Sections 11, 12, 13, and 14
County	Bingham
Representative soil profile for method of reuse	Bondfrm-Rock Outcrop-Grassy Butte Complex
Seasonal high ground water, if available	None
Depth, thickness, and flow direction of aquifer(s) located at or near the reuse facility	Depth to Eastern Snake River Plain Aquifer – 650 ft. Flow to Southwest.
Beneficial uses of ground water **(Check all that apply)**	☒ Agriculture ☒ Industrial ☒ Domestic ☒ Aquaculture ☒ Other (identify): The Eastern Snake River Plain Aquifer is a sole source aquifer.

Nearby surface water(s) and distance(s) to nearest reuse area	NA
Beneficial uses of surface water **(Check all that apply)**	☐ Agriculture ☐ Industrial ☐ Domestic ☐ Aquaculture ☐ Aquatic life ☐Salmonid spawning ☐ Primary Recreation ☐ Secondary Recreation ☒ Other (identify): NA Note: Beneficial uses of surface water are listed in the Water Quality Rules, 58.01.02, sections 110 through 160.
Operator Certification Requirements (for municipal systems only)	NA
Engineer/consultant that prepared application documents: Firm Person(s) Address Phone/fax/email	Battelle Energy Alliance, LLC Mike Lewis/John Gill P.O. Box 1625, Idaho Falls, ID 83415 Phone: (208) 526-0623/(208) 533-7911 Fax: (208) 526-3149/(208) 533-7344 Email: Michael.Lewis@inl.gov/John.Gill@inl.gov

3. Plan of Operation Checklist / Preliminary Technical Report Checklist

For facilities with an existing reuse permit, use these checklists as a guide to update your plan of operation and prepare a preliminary technical report for submittal with the permit application. A pre-application workshop will be held one year prior to permit expiration to discuss permit application requirements and answer questions regarding application content.

For facilities applying for a new reuse permit, provide an outline of the plan of operation with the permit application. If reuse facilities are in the design and construction phase, submit a detailed plan of operation at the 50% completion point of construction. After 1 year of operating the reuse facility, the plan must be updated to reflect actual operating procedures. A pre-application workshop between the applicant and DEQ is *strongly encouraged.*

Consult the DEQ Guidance or other information source listed in the right-hand column of the checklists for assistance in developing the plan of operation or preliminary technical report. If additional clarification is needed, contact your DEQ regional office.

The preliminary technical report is the core of the application. This report shall describe how the facility will comply with the "Recycled Water Rules" (IDAPA 58.01.17) and conform to DEQ guidance (*Guidance for Reclamation and Reuse of Municipal and Industrial Wastewater*). The application should include those checklist items **as applicable and necessary to characterize the wastewater treatment and reuse systems.**

Plan of Operation and Preliminary Technical Report Checklists

Plan Section and Requirements	Plan of Operation	Prelim. Technical Report	DEQ Guidance Section No. or other source of information
Section 1. Operation and Management Responsibility			
a. Attach organizational chart showing positions responsible for operation and maintenance of wastewater treatment and reuse systems. For municipal systems, include operator training and certification requirements, certification credentials for operators, and any other operator certification information.	X	X	Classification and Licensure
b. Describe operator and manager responsibilities.	X		
c. Describe process for updating the plan of operation as operational and/or facility changes occur.	X		
d. If a party other than the applicant operates and maintains any portion of the wastewater treatment or recycled water reuse system, provide a copy of the signed contract or agreement. The contract or agreement must contain language outlining how the system will be operated to meet the conditions and requirements of the reuse permit.		X	

Plan Section and Requirements	Plan of Operation	Prelim. Technical Report	DEQ Guidance Section No. or other source of information
Section 2. Permits and Other Regulatory Requirements			
a. Attach copies of the reuse permit, National Pollutant Discharge Elimination System (NPDES) permit, planning and zoning conditional use permits, and all other applicable permits, licenses, and approvals.	X	X	NPDES Permits in Idaho
b. List applicable ordinances, rules, statutes, and standards.	X		
Section 3. Land Application Site			
a. A topographic map identifying and showing the location and extent of wastewater inlets, outlets, and storage structures and facilities, land application area, wells, springs, wetlands, surface waters, FEMA floodplains, service roads, natural or man-made features necessary for treatment, buildings and structures, and process chemical and residue storage facilities. See 58.01.17.300.03.e	X	X	Recycled Water Rules
b. A topographic map extending ¼ mile beyond the outer limits of the facility site identifying and showing the location and extent of wells, springs, wetlands, surface waters, public and private drinking water supply sources, applicable source water assessment areas, public roads, dwellings, and public gathering places. See 58.01.17.300.03.f	X	X	Recycled Water Rules
c. Description of and a regional map showing important land features (cities, major roads, major surface water bodies, county/state lines) in relation to the reuse facility.		X	
d. A scaled map showing hydraulic management units (HMUs) and associated acres, ground water monitoring wells, and wastewater and recycled water lagoons.	X	X	
e. A scaled map showing the recycled water and supplemental water (if used) irrigation system, including piping, appurtenances, and the type & efficiency of irrigation system used for each HMU.	X	X	
f. Description of land uses adjacent to reuse facility.		X	
g. Identify ownership of the reuse sites, including documentation. If not owned by the applicant, include copies of leases and agreements for the reuse sites. For leased or rental reuse sites, provide a signed agreement between applicant and landowner that clearly states the applicant will have sufficient control of the site to meet reuse permit requirements.		X	
Section 4. General Plant Description			
a. Describe wastewater treatment design basis and/or criteria.	X	X	
b. Describe wastewater treatment processes and/or unit operations used to generate recycled water for reuse, including design capacities. For municipal systems, include disinfection processes and disinfection level. (See	X	X	Municipal Disinfection Class

Plan Section and Requirements	Plan of Operation	Prelim. Technical Report	DEQ Guidance Section No. or other source of information
58.01.17.601 for municipal recycled water classifications)			
c. Provide plot plans and process and instrumentation diagrams. (P&IDs)	X	X	
d. Provide hydraulic profile, including key inverts and elevations.	X		
e. Characterize wastewater and recycled water streams, including daily, monthly, & annual flow rates, seasonal variability, chemistry and microbiology. Provide source of data for this characterization.	X	X	Guidance 3.1, 3.2, 3.3, 3.4
f. Describe wastewater treatment and reuse system efficiencies.	X		
Section 5. Description, Operation, and Control of Unit Operations and Processes			
a. Describe unit operation/process purpose and control strategy.	X		
b. Describe normal operations. (e.g., flow patterns, typical process and reuse system flow rates, and sludge production rates)	X		
c. Describe process monitoring and control systems.	X		
d. Provide operating instructions for equipment with reference to manufacturer's operation and maintenance (O&M) manuals, standard operating procedures (SOPs), or other applicable documents.	X		
e. Discuss common operating problems and solutions. (troubleshooting guide)	X		
f. List laboratory tests for process control.	X		
g. List laboratory tests for compliance determination.	X		
h. Describe start-up procedures.	X		
i. Provide emergency operating plans and procedures.	X		
Section 6. Wastewater and Recycled Water Treatment and Storage Lagoons			
a. Describe all treatment and storage ponds and lagoons, including date constructed, purpose, capacity, liner material, last seepage rate test date and result, scheduled seepage rate tests, and operating parameters (e.g., minimum freeboard and minimum depth).	X	X	Guidance 6.3
b. Describe lagoon maintenance.	X		Guidance 6.3.4
c. Sludge accumulation monitoring	X		
Section 7. Reuse Site Features and Characteristics			
a. Describe fencing and posting (signs) used on each HMU. Fencing and posting guidance is shown in Tables 6.4 and 6.5 of the Guidance.	X	X	Guidance 6.5
b. Describe backflow prevention equipment for each irrigation well, domestic well and public water system that has an	X		

Plan Section and Requirements	Plan of Operation	Prelim. Technical Report	DEQ Guidance Section No. or other source of information
interconnection with a wastewater, recycled water system, or other source of contamination.			
c. Climatic characteristics – provide meteorological data of the site, including precipitation, high and low temperature data, frost-free days, and wind speed and direction.		X	Guidance 2.1.1, 4.1.1.1
d. Soils i. Describe the soil types present at all reuse sites. Use Natural Resources Conservation Service (NRCS) soil survey information if available or site-specific information, ii. provide and interpret available soil monitoring results, and iii. for sites applying or proposing to apply during the non-growing season, provide calculations used to determine acceptable non-growing season hydraulic loading rates. (See Guidance Section 4.4.9)		X	Guidance 2.1.2, 4.4.9, 7.4.3
e. Topography – describe configuration of land surface: elevation, slope, relief, and aspect and the relationship to land application design.		X	Guidance 2.1.3
f. Surface Water i. Identify and describe the location of surface water(s) located near the wastewater treatment and reuse sites. ii. List applicable DEQ beneficial uses of surface water. (See 58.01.02, sections 110 through 160) iii. Describe the influence of the wastewater treatment system and reuse site on nearby surface waters.		X	Beneficial Uses of Surface Water
g. Ground Water i. Describe the ground water conditions including depth to first water, depth to regional ground water, confined or unconfined (if known), ground water flow direction, and seasonal variations in depth or flow direction. ii. Describe the ground water monitoring well network, including location, depth, construction, completion, lithology, and aquifer parameters for each monitoring well (attach well logs). Describe the gradient position of each monitoring well and the purpose it serves in the network. Identify wells that no longer produce samples. iii. Provide the location of public wells, private wells, irrigation wells, and injection wells located within a one-quarter mile of the reuse site(s). Include copies of well logs if available. iv. Conduct a well location acceptability analysis for the wells identified. (see Guidance Section 6.6.4) v. Provide and interpret ground water monitoring or modeling results.		X	Guidance 2.1.4, 6.6, 7.1, 7.2, 7.7.4
Section 8. Reuse Site Loading Rates			
a. Describe how the facility tracks recycled water and irrigation water hydraulic loading for each HMU.	X	X	Guidance 4.1, 7.5.2.2

Plan Section and Requirements	Plan of Operation	Prelim. Technical Report	DEQ Guidance Section No. or other source of information
b. Provide the design and typical recycled water and irrigation water hydraulic loading rates by month for each HMU and the basis used to establish design rates.	X	X	Guidance 4.1.1
c. Describe irrigation scheduling methods and practices used.	X	X	Guidance 4.1.1.2
d. Describe the source(s) of supplemental irrigation water and typical hydraulic loading rate by month.	X	X	Guidance 4.1.1.2.1, 4.1.1.2.2
e. Attach documentation of water rights for supplemental irrigation water (if used)	X	X	
f. Describe non-growing season application practices.	X		Guidance 4.1.2
g. If storage ponds/lagoons are used, include monthly water balances for the storage system, including all inputs and outputs to demonstrate sufficient capacity is provided for the system.	X	X	
h. Describe how the facility calculates and manages loading rates for relevant constituents (e.g., nitrogen, phosphorus, chemical oxygen demand, NVDS) for each HMU. Loading rate information should identify respective loadings from each source, such as recycled water, waste solids, and fertilizers.	X	X	Guidance 4.2.1, 4.2.2
i. Identify the land limiting constituent for the land application system.	X	X	Guidance 4.
Section 9. Reuse Site Vegetation			
a. Cropped sites: describe the crop rotation plan. Include crop type, approximate planting and harvest dates, expected yield, expected crop uptake values for relevant constituents, method used to calculate crop uptake, anticipated commercial fertilizers application rates, any other anticipated source of nutrients or constituents of concern, irrigation water requirement (IWR) for each crop type and the basis used to determine IWR.	X	X	Guidance 2.2
b. Silvicultural (forest) site: describe dominant forest and understory species, respective percentage of the site occupied by each, and age class and successional stage of the forest. Describe management of forested sites. Include pest and weed control, harvest, thinning, new planting, and anticipated dates of these operations.	X	X	Guidance 2.2.2
c. Native vegetation site: describe dominant vegetation species and respective percentage of the site occupied by each. Describe the management of sites with native vegetation, including pest and weed control and other operations, if any, and anticipated dates of these operations.	X	X	

Plan Section and Requirements	Plan of Operation	Prelim. Technical Report	DEQ Guidance Section No. or other source of information
Section 10. Reuse Site Management			
a. Site management history – describe past uses and management of reuse sites including important events and dates, agronomic practices, and other relevant land use practices.		X	
b. Compliance Activities: If applying for a permit modification or renewal, provide a summary of the status of each compliance activity in the existing permit.		X	
c. Site Management Plans - If the site has previously developed management plans listed below (or other site-specific plans), provide updated plans as necessary to reflect current operations. For new sites or if the applicable management plan(s) have not been developed for existing sites, prepare the following plans:	X	X	
i. Buffer Zone Plan – Address buffer zones for dwellings, areas of public access, surface waters, private and public water sources, and irrigation and monitoring wells. Compare proposed or existing buffer zone distances with DEQ guideline buffer distances and describe any proposed mitigation measures to reduce buffer zone distances. Include a scaled map showing buffer zones (existing or proposed).	X	X	Guidance 6.5, 6.6
ii. Grazing management: describe planned grazing activities, including type and number of animals, grazing rotation, and time of year.	X	X	Guidance 6.4
iii. Nuisance management: describe administrative and engineering controls to prevent nuisance conditions, such as odors, overspray, vector attraction, and noise. Include specific design considerations, operation and maintenance procedures, and management practices to be employed. Describe procedures for handling and responding to complaints about facility-caused nuisances.	X	X	Guidance 2.3.2 Air Quality Pollutants and Odors
iv. Waste solids management: describe type and quantity of waste solids generated, process by which wastes are generated, physical and chemical characteristics, and waste storage systems. Describe disposal or recycling of these wastes, identify locations of disposal or recycling sites, and discuss criteria for selecting these sites. (See 58.01.16.650 of the Wastewater Rules). Waste solids management plans should be submitted prior to stockpiling, disposal, or reuse for DEQ review and approval.	X	X	Sludge and Biosolids Wastewater Rules
v. Nonvolatile Dissolved Solids (NVDS) Management Plan – Systems with high NVDS (referred to as salts) loading rates may cause elevated ground water total dissolved solids (TDS) levels. The NVDS management plan is used to identify sources of salt and reduce NVDS-loading rates as necessary to satisfy the *Ground Water*	X	X	Guidance 4.2.2.5

Plan Section and Requirements	Plan of Operation	Prelim. Technical Report	DEQ Guidance Section No. or other source of information
Quality Rule, IDAPA 58.01.11.			
vi. Runoff management: describe administrative and engineering controls and best management practices used to prevent runoff of recycled water from the reuse site. Include provisions/practices to prevent run-on of storm water onto reuse sites.	X	X	Guidance 4.1.3
vii. Weed management.	X		Guidance 6.8
Section 11. Quality Assurance Project Plan			
Prepare and implement a quality assurance project plan (QAPP) to assist in planning for collection, analysis, and reporting of all monitoring in support of permit and explaining data anomalies when they occur. At a minimum, the QAPP must include the following: i. Number of measurements, number of samples, type of sample containers, preservation of samples, holding times, analytical methods, analytical detection, and quantitation limits for each target compound, type and number of quality assurance field samples, precision and accuracy requirements, sample preparation requirements, sample shipping methods, and laboratory data delivery requirements. ii. Maps indicating the location of each monitoring and sampling point. iii. Personnel qualification and training. iv. Names, addresses, and telephone numbers of the laboratories used by or proposed to be used by the permittee. v. Example formats and tables that will be used by the permittee to summarize and present all data in the annual report. The QAPP format and content should adhere to recommendations and references in the quality assurance and data processing sections of the DEQ guidance. Note: For existing facilities having a QAPP, include with the preliminary technical report. For new facilities, QAPP requirements will be discussed during the pre-application conference.		X	Guidance 7.1.5, 7.1.6, 7.1.7
Section 12. Monitoring Activities			
a. Describe recycled water monitoring.	X	X	Guidance 7.5, 7.7.8
b. Describe supplemental irrigation water monitoring.	X	X	Guidance 7.5
c. Describe ground water monitoring.	X	X	Guidance 7.2, 7.7.3.1, 7.7.4
d. Describe soil monitoring.	X	X	Guidance 7.4, 7.7.6, 7.7.7
e. Describe crop tissue monitoring.	X	X	Guidance 7.6, 7.7.9

Plan Section and Requirements	Plan of Operation	Prelim. Technical Report	DEQ Guidance Section No. or other source of information
f. Describe any other monitoring (e.g., meteorological and vadose zone).	X	X	Guidance 7.3, 7.7.5
Section 13. Maintenance			
Provide maintenance information, including the following: preventative maintenance schedules; troubleshooting charts and guides; maintenance record system; location of manufacturer's manuals; management of spare parts inventory; vendors, outside contractors and suppliers.	X		
Section 14. Records and Reports			
a. Provide general overview of records kept, recordkeeping system, and reports generated.	X		
b. Describe daily operating logs and provide examples.	X		
c. Describe laboratory records and reports and provide examples.	X		
d. Describe reporting procedures for permit violations.	X		