LMS/MNT/S25044

Monticello, Utah, National Priorities List Sites Federal Facility Agreement (FFA) Quarterly Report: January 1–March 31, 2019

May 2019

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Abbreviations

AOA	Area of Attainment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
FFA	Federal Facility Agreement
gpm	gallons per minute
GRO	Groundwater Remedy Optimization
IC	institutional control
LCRS	Leachate Collection and Removal System
LDS	Leak Detection System
LM	Office of Legacy Management
LMS	Legacy Management Support
LTS&M	long-term surveillance and maintenance
MMTS	Monticello Mill Tailings Site
MNA	monitored natural attenuation
MVP	Monticello Vicinity Properties
NPL	National Priorities List
OU	Operable Unit
PRB	permeable reactive barrier
TSF	Temporary Storage Facility
UDEQ	Utah Department of Environmental Quality
UDOT	Utah Department of Transportation
ZVI	zero-valent iron

1.0 Introduction

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) submits this quarterly report to inform the U.S. Environmental Protection Agency (EPA) and the Utah Department of Environmental Quality (UDEQ) of the status of the Monticello Vicinity Properties (MVP) and the Monticello Mill Tailings Site (MMTS) (the LM Monticello, Utah, Disposal and Processing Sites) for the period of January through March 2019. The MVP and MMTS are regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Quarterly reports are submitted to EPA and UDEQ in February (for October through December), May (January through March), August (April through June), and November (July through September).

LM assesses MVP and MMTS conditions and remedy protectiveness through (1) inspections (monthly, quarterly, and annually) of site infrastructure and operations as specified under the *Long-Term Surveillance and Maintenance Plan for the Monticello NPL Sites* (DOE 2018a) (referred to here as the LTS&M Plan), (2) semiannual monitoring of groundwater and surface water under the *Record of Decision for the Monticello Mill Tailings (USDOE) Site Operable Unit III, Surface Water and Ground Water, Monticello, Utah* (DOE 2004), and (3) CERCLA Five-Year Reviews.

The primary long-term surveillance and maintenance (LTS&M) activities at the MVP and MMTS are conducted to (1) provide radiological control at properties where residual soil contamination from mill tailings remains in place (supplemental standards properties), (2) operate and maintain the mill tailings repository, (3) ensure that institutional controls (ICs) restricting the use of land and water remain effective, (4) monitor water quality restoration progress, and (5) operate the Operable Unit (OU) III pump-and-treat groundwater contingency remedy optimization system. This system, implemented in January 2015, focuses on groundwater remediation within a specified region of the alluvial aquifer that is referred to as the Area of Attainment (AOA).

Annual groundwater reports present comprehensive data evaluation for the groundwater and surface water OU III remedy. LM is utilizing the data presented in the most recent annual groundwater report to update the conceptual site model and to develop a three-dimensional numerical fate and transport model to assess remedial time frames to determine the best possible closure strategy for OU III.

Project milestones and guiding documents are further described in the *Monticello Site Management Plan* (DOE 2003). Section 5 of that document is updated annually.

1.1 Quarterly Site Status

A summary of the activities and observations for this quarter is as follows:

- The Groundwater Remedy Optimization (GRO) system operated as planned during the current period.
- Laboratory analytical results of the soil samples collected for the geochemical characterization in November 2018 were completed in March 2019. Data collected from the analyses will be used to determine the distribution of solid phase concentrations, which borehole soils will be used in the column tests, and which wells' water will be collected to

help with the column tests. Additionally, the analytical results of the soil samples will be used in the ongoing development of the groundwater fate and transport model.

- Routine surveillance noted no anomalous conditions for the MVP remedy.
- Routine surveillance noted no violations of MMTS ICs regarding land- and groundwater-use restrictions.
- Routine surveillance noted no anomalous conditions for the surface features of the disposal cell and Pond 4.
- The volume of water pumped from the Pond 4 Leachate Collection and Removal System (LCRS) continued to exceed the action level for this quarter. LM has previously notified EPA and UDEQ of this Pond 4 action level exceedance.
- Routine surveillance noted no operating deficiencies for the Temporary Storage Facility (TSF).
- Accumulation of snow from winter storms left the site covered for all of this quarter. Accumulation of approximately 3 feet was common in the area and on the site.

2.0 Monticello Vicinity Properties

The LTS&M for the MVP consists of providing radiological control at excavations in Monticello roadway and utility corridors, in Utah Department of Transportation (UDOT) right-of-ways within the city limits, and at property MS-00176-VL (privately owned supplemental standards property). Surveillance results for this quarter are as follows:

- No anomalous conditions for the MVP remedy were noted.
- LM representatives continued to coordinate with City of Monticello (City) officials in planning meetings regarding construction and excavation activities by the City, UDOT, and utility companies in roadway and utility corridors. LM has followed and will continue to follow normal LTS&M protocol to provide radiological control in the affected roadways.
- There were no planned or unplanned excavations in city streets or utility corridors where radiologically contaminated material was encountered that required LM management.
- Neither excessive erosion nor unauthorized excavations were observed at the Highway 191 embankment at Montezuma Creek (supplemental standards property).

Surveillance of property MS-00176-VL identified no excessive erosion of supplemental standards material or violation of the land-use restriction.

3.0 Monticello Mill Tailings Site

LTS&M activities for the MMTS consist of (1) maintaining the onsite repository and operating the associated LCRS and Leak Detection System (LDS) for the disposal cell and Pond 4 (the engineered solar evaporation pond), (2) surveillance of properties affected by groundwater- and land-use ICs on the former mill site and peripheral properties, and (3) operation and maintenance of the OU III groundwater remediation system.

3.1 Operable Unit I

OU I consists of the property of the former Monticello mill (mill site) and the repository. Radioactively contaminated materials were removed from the MVP, the mill site, and peripheral properties (OU II) and encapsulated at the repository as a remedial action that was completed in 1999. LM owns and manages the repository; the City owns the former mill site and manages it as a public park.

3.1.1 Repository

Monthly, quarterly, and annual inspections of the repository ensure that remedy controls remain intact and that the waste remains isolated from the environment. Inspection observations and maintenance activities for the quarter are as follows:

- No area of the cover indicated settling, slumping, fracturing, seepage, ponding, or significant erosion.
- No anomalous surface feature conditions were observed at the disposal cell or Pond 4. Surveillance checklists for this quarter are attached as Appendix A.
- The minor burrowing on the disposal cell and the Pond 4 berm by voles and small ground squirrels was not observed this quarter due to the depth of snow that covers both the disposal cell and Pond 4 berms. Previously observed burrows were not deep and did not pose a concern.
- The disposal cell LCRS and LDS were operated in accordance with the requirements specified in the LTS&M Plan. Findings for the disposal cell LCRS and LDS this period include:
  - Leachate production from the disposal cell was approximately 600 gallons per week combined for LCRS sumps LCRS 1 and LCRS 2. There is no action level for the disposal cell LCRS. See Appendix B for a graphical depiction of leachate production history.
  - The disposal cell LDS continues to receive no water; therefore, the disposal cell LDS action level was not exceeded. See Appendix B for a graphical depiction of leachate production history.
- Operation of the GRO system has resulted in increased water collection in the Pond 4 LCRS and LDS. However, the Pond 4 LCRS and LDS monitoring and pumping systems continue to function as designed, to circulate water back to the pond. Findings for the Pond 4 LCRS and LDS this period include:
  - Water collection at the Pond 4 LCRS continued to exceed the action level between January and March (see Appendix B). LM has previously notified EPA and UDEQ of this Pond 4 action level exceedance.
  - Water collection in the Pond 4 LDS remained below the action level (see Appendix B). LM has previously notified EPA and UDEQ of water collection and removal in the Pond 4 LDS.

3.1.2 Temporary Storage Facility

Routine surveillance of the TSF ensures that maintenance and radiological controls that govern access to and the placement, storage, and transfer of contaminated material in the TSF are current and effective. Surveillance results for this quarter (see surveillance checklists in Appendix A) are as follows:

- The TSF cover, fencing, radiological controls, and signs have been maintained in accordance with the LTS&M Plan, and the TSF has been inspected and verified as ready to receive contaminated materials.

LM is required to initiate the transfer of TSF materials for permanent disposal at the Grand Junction, Colorado, Disposal Site when the contents reach a volume of approximately 75 cubic yards. The following summarizes recent TSF activity:

- The volume of waste stored in the TSF controlled area is approximately 1.5 cubic yards. Currently there are no soils or excavation products from city street projects or supplemental standards areas stored in the TSF. Present contents consist primarily of used personal protective equipment and onsite materials.

3.1.3 Former Mill Site

LM conducts surveillance of the former mill site (properties MP-00181-VL and MS-00893-VL) to ensure compliance with ICs that were implemented to preserve the OU I remedy for soil and groundwater. The ICs applicable to the former mill site include no installation of domestic-use wells in the alluvial aquifer, no construction of habitable structures, no camping, and preserving the properties as a public park for day-use recreation.

Surveillance results for this quarter are as follows:

- No nonconformance with water- and land-use restrictions was observed.

3.2 Operable Unit II

OU II consists of private and City-owned properties peripheral to the former mill site. LM conducts surveillance of OU II properties to verify compliance with ICs that were implemented to preserve the OU II remedy for soil and groundwater.

Surveillance results for this quarter are as follows:

- **Montezuma Creek Restrictive Easement Area (supplemental standards properties, both City-owned and privately owned):** No evidence of nonconformance with land-use restrictions (no soil removal or construction of habitable structures in supplemental standards areas) was observed.
- **Groundwater-use restrictions (i.e., no installation of domestic-use wells in the alluvial aquifer):** These were applied to several OU II properties under the 2004 covenant by which DOE transferred selected properties to the City. No evidence of nonconformance with this restriction was observed during the quarter.
- **Property MS-00211-VL (City-owned):** No evidence of nonconformance with the land-use restriction on building construction was observed.

- **Pinyon-juniper supplemental standards properties (City-owned):** No evidence of nonconformance with land- and groundwater-use restrictions was observed.
- **Excessive erosion:** No storm events exceeding 2.8 inches of precipitation in a 24-hour period occurred to require surveillance of supplemental standards cleanup properties for excessive erosion.

3.3 Operable Unit III

OU III consists of groundwater and surface water contamination resulting from operation of the former Monticello mill. Routine monitoring of OU III (water quality and water level) is performed semiannually in April and October.

The contaminated groundwater is within the alluvial aquifer beneath the valley of Montezuma Creek; some sections of Montezuma Creek are contaminated by the discharge of contaminated groundwater. The alluvial aquifer has no record of past or present use; however, a portion of the aquifer is subject to ICs to restrict use. Montezuma Creek is used for limited irrigation and livestock watering. There are no ICs that restrict surface water use.

The current groundwater remedy includes (1) monitored natural attenuation with ICs and (2) pump-and-treat remediation by evaporation that was implemented as the GRO system in January 2015. Operation and performance of the groundwater remedy is reported annually. Previous remediation efforts have included (1) treatment by a zero-valent iron (ZVI) in situ permeable reactive barrier (PRB) and (2) pump-and-treat remediation that used ex situ ZVI treatment. The ex situ ZVI treatment system was deactivated in December 2014 and replaced by the GRO system, which is described in greater detail in Section 3.3.2. The PRB remains a component of the GRO system as a groundwater flow barrier.

3.3.1 Groundwater Restricted Area/Institutional Controls

During spring and fall, LM conducts surveillance of properties where groundwater contamination is present to ensure compliance with the groundwater-use restriction (i.e., no installation of domestic-use wells in the alluvial aquifer). The affected OU III properties constitute the Monticello Groundwater Restricted Area, as defined and administered by the Utah Department of Natural Resources, Division of Water Rights. Surveillance found:

- No evidence of nonconformance with the groundwater-use restriction since its implementation in May 1999.

3.3.2 OU III Groundwater Contingency Remedy Optimization System

The GRO system, which began full operation in January 2015, includes eight vertical extraction wells strategically placed in the AOA to extract contaminated groundwater and an associated monitoring system. The water from the extraction wells is transmitted in buried pipelines to an aboveground holding tank in the groundwater transfer building; from there it is pumped through a buried water transmission line for about 1 mile to Pond 4 for evaporation.

The associated monitoring system consists of 22 wells installed in the AOA. Sixteen of the 22 wells were installed south of Montezuma Creek in 2014, and 6 wells were installed north of

Montezuma Creek in 2017. Beginning in 2017, sampling of the extraction and monitoring wells occurred on a monthly basis for approximately 1 year. As of October 2018, sampling will occur following the extraction of approximately every 1 million gallons from the GRO system. The extraction and monitoring wells were last sampled during the October 2018 semiannual sampling event.

3.3.2.1 GRO System Quarterly Performance Summary

Groundwater extraction was approximately 0.3 million gallons, equivalent to an average flow rate of 2.4 gallons per minute (gpm).

- During the quarter, the volume of water stored in Pond 4 increased by approximately 1 million gallons, with the volume partially due to snow and ice accumulation. The GRO system is operated by balancing the extraction rate and the Pond 4 evaporation rate while maintaining the Pond 4 storage volume at approximately 8 million gallons (the maximum storage volume of Pond 4 is approximately 15.6 million gallons).
- Cumulatively, the system has removed a total of approximately 19.4 million gallons of contaminated groundwater from the aquifer since system startup in January 2015 (Table 1). Assuming a minimum AOA uranium plume pore volume of 2.4 million gallons and a maximum pore volume of 3.3 million gallons, the GRO system has removed between 5.8 and 8.1 pore volumes since system startup.
- Water-level monitoring during the quarter consisted of:
  - Continuous water-level monitoring in AOA extraction and monitoring wells using pressure transducers and data loggers (programed to record at 5-minute intervals) connected to the LM System Operation and Analysis at Remote Site (SOARS) system.

From January 2015 through October 2018, the GRO system has removed approximately 101.0 pounds of uranium from the AOA aquifer (Table 2). Samples were not collected from the end of October through March due to accumulated snow depths, and the amount of water removed was only slightly higher than the extraction amount of approximately 1 million gallons as stated in Section 1.5 of the *Remedial Action Completion Report for Operable Unit III Groundwater Contingency Remedy Optimization System, Monticello Mill Tailings Site, Monticello, Utah* (DOE 2016).

Table 1. GRO System Treatment: Monthly Volumes and Rates for This Quarter, and Cumulative Volumes Since January 2015

Calendar Month	Approximate Volume Pumped (million gallons)	Effective Pumping Rate (gpm)	Approximate Cumulative Volume[a] (million gallons)
January 2019	0.11	2.4	19.2
February 2019	0.10	2.5	19.3
March 2019[b]	0.10	2.2	19.4

Notes:
[a] Cumulative volume is based on the volume of groundwater extracted by the GRO system since system startup in January 2015.
[b] Reporting end date is March 31, 2019.

Table 2. Uranium Mass Removal from Groundwater in the AOA

Tank Effluent Sample Date[a]	Uranium Concentration (µg/L)	Volume Removed Between Tank Samples (million gallons)	Uranium Removed (pounds)[b]	Cumulative Mass Uranium Removed[c] (pounds)
September 26, 2018	270	Not applicable	Not applicable	100.18
October 18, 2018	330	0.34	0.86	101.04

Notes:
[a] As of March 31, 2019, the sampling of groundwater following the extraction of approximately every 1 million gallons from the GRO system had last occurred on October 18, 2018.
[b] Based on median concentration between sampling dates.
[c] Since GRO system startup in January 2015.

Abbreviation:
µg/L = micrograms per liter

Monitoring and reporting guidelines for the GRO system are described in the *Final Groundwater Contingency Remedy Optimization Remedial Design/Remedial Action Work Plan for the Monticello Mill Tailings Site Operable Unit III, Monticello, Utah* (DOE 2014). Evaluation of water quality trends and whether remediation goals are being met, in the AOA and sitewide, is beyond the scope of this Federal Facility Agreement (FFA) quarterly report but is provided in annual groundwater reports that are submitted to EPA and UDEQ.

3.3.3 OU III Closure Strategy

Several scenarios are being evaluated to develop a closure strategy for OU III and are detailed in the *OU III Closure Strategy for the Monticello Mill Tailings Site, Monticello, Utah* (DOE 2018c). These scenarios include (Scenario 1) monitored natural attenuation (MNA) and ICs, with remedy transition, decommissioning, and long-term monitoring; (Scenario 2) GRO system termination based on asymptotic trends prior to transitioning to MNA and ICs; and (Scenario 3) evaluation of alternative technologies and technical impracticability waiver. Efforts to determine the best possible closure strategy include hydrogeologic and geochemical characterization along with the development of a three-dimensional numerical fate and transport model to forecast remedial time frames.

Accomplishments this quarter (January to March) are as follows:

- The draft *Monticello Mill Tailings Site Operable Unit III Groundwater Flow Conceptual Site Model Update* report was completed in February 2019.
- Geochemical analytical results for the soils that were collected in November 2018 from the drilling project were received from the contract laboratory this quarter. The results are being evaluated by Legacy Management Support (LMS) scientists so that the correct soil samples can be used in the upcoming column tests. Information from the column tests will be used for the fate and transport groundwater model that will be developed later this summer.
- LMS personnel continued to add updates to the conceptual site model including evaluations of site geology, aquifer geometry, aquifer hydraulic properties, groundwater hydrographs, hydraulic gradients, groundwater velocities, flow directions, and the development of a

sitewide groundwater balance. The updated conceptual site model will be used as the basis for development of the three-dimensional numerical groundwater flow model.

- LMS personnel began construction and calibration of the three-dimensional numerical groundwater flow model.
- A groundwater flow presentation is being developed for the upcoming spring FFA meeting.

4.0 Schedule of Activities and Deliverables

Table 3 summarizes the completion of recently completed and near-term planned activities and deliverables for the Monticello National Priorities List (NPL) sites.

Table 3. Monticello Sites Recent and Near-Term Activities and Deliverables

Activity or Deliverable	Schedule
Recent	
Geochemical results were received for the OU III soil samples that were collected in November 2018	Completed the week of March 11, 2019.
Monticello, Utah, National Priorities List Sites Federal Facility Agreement (FFA) Quarterly Report: October 1–December 31, 2018, (DOE 2018b)	Submitted to EPA and UDEQ February 12, 2019.
Monticello Water Use Report	Submitted to the State of Utah Water Board on March 1, 2019.
Near-Term	
Monticello, Utah, National Priorities List Sites Federal Facility Agreement (FFA) Quarterly Report: January 1–March 31, 2019	Submit to EPA and UDEQ by May 15, 2019.
Spring Semiannual Sampling Event	Tentatively scheduled for the week of April 22, 2019.
Spring FFA Meeting	Tentatively scheduled for May 22, 2019.

5.0 References

DOE (U.S. Department of Energy), 2003. *Monticello Site Management Plan*, GJO-2003-493-TAC, Section 5 (this section is continually updated), Office of Legacy Management, October.

DOE (U.S. Department of Energy), 2004. *Record of Decision for the Monticello Mill Tailings (USDOE) Site Operable Unit III, Surface Water and Ground Water, Monticello, Utah*, DOE-LM/GJ629-2004, May.

DOE (U.S. Department of Energy), 2014. *Final Groundwater Contingency Remedy Optimization Remedial Design/Remedial Action Work Plan for the Monticello Mill Tailings Site Operable Unit III, Monticello, Utah*, LMS/MNT/S10629, Office of Legacy Management, May.

DOE (U.S. Department of Energy), 2016. *Remedial Action Completion Report for Operable Unit III Groundwater Contingency Remedy Optimization System, Monticello Mill Tailings Site, Monticello, Utah,* LMS/MNT/S13373, Office of Legacy Management, May.

DOE (U.S. Department of Energy), 2018a. *Long-Term Surveillance and Maintenance Plan for the Monticello NPL Sites*, LMS/MNT/S00387, Office of Legacy Management, June.

DOE (U.S. Department of Energy), 2018b. *Monticello, Utah, National Priorities List Sites Federal Facility Agreement (FFA) Quarterly Report: October 1–December 31, 2018*, LMS/MNT/S24028, Office of Legacy Management, February.

DOE (U.S. Department of Energy), 2018c. *OU III Closure Strategy for the Monticello Mill Tailings Site, Monticello, Utah*, LMS/MNT/S18146, Office of Legacy Management, May.

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Appendix A

Monthly and Quarterly Surveillance Checklists

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Repository Area Surveillance Checklist

☒ Monthly surveillance ☐ Quarterly surveillance: ☐ February ☐ May ☐ August ☐ November

☐ Storm event triggered surveillance due to _____ inches of rainfall over the past 24 hours.

Inspection Item	Acceptable Yes	Acceptable No	Comments and Recommendation
Condition of:			
Fences, gates, and locks	☒	☐	
Roads[a]	☒	☐	
Signs	☒	☐	
Site monuments	☒	☐	
Drainage ditches[a]	☒	☐	
Manholes	☒	☐	
Vegetation	☒	☐	
Evidence of erosion of:			
Top of disposal cell[a]	☒	☐	
Disposal cell sideslopes[a]	☒	☐	
Ditches	☒	☐	
Surrounding area	☒	☐	
Evidence of:			
Vandalism	☒	☐	
Intrusion by livestock	☒	☐	
Burrowing animal damage	☒	☐	
Intrusion by humans	☒	☐	
Accumulation of trash	☒	☐	

Additional Quarterly Surveillance Requirements
Note: *All transects, shown in Figure 3-1, must be walked during this inspection.*

Condition of:			
Settlement plate structures	☐	☐	
Manholes[b]	☐	☐	
Sediment ponds	☐	☐	
Evidence of:	☐	☐	
Structural instability	☐	☐	

Additional comments: The is several inches of snow on the ground but the site appears to be in good condition.

Signature: _____ Date: 1/29/2019
Monticello LM Representative

[a]Inspections required following a significant storm event
[b]Open to inspect quarterly

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Monthly Pond 4 Surveillance Checklist

Level of water in Pond 4 8.7068

Inspection Item	Acceptable		Comments and Recommendation
	Yes	No	
Condition of:			
Fences, gates, and locks	☒	☐	
Roads	☒	☐	
Signs	☒	☐	
Visible piping	☒	☐	
Visible liner and anchors	☒	☐	
Rescue equipment	☒	☐	Boat remains at the pond.
Evidence of erosion of:			
Top of Pond 4 berm	☒	☐	
Pond 4 sideslopes	☒	☐	
Ditches	☒	☐	
Surrounding area	☒	☐	
Seepage from Pond 4	☒	☐	
Overtopping of Pond 4	☒	☐	
Evidence of:			
Vandalism	☒	☐	
Intrusion by wildlife	☒	☐	
Intrusion by humans	☒	☐	
Accumulation of trash	☒	☐	

Additional comments: The pond is frozen over with several inches of snow on the ground but things appear to be in good shape.

Monticello LM Representative: Gary McKenzie Date: 1/30/2019

MONTHLY CLIMATOLOGICAL SUMMARY for JAN. 2019

NAME: Monticello Office CITY: STATE:
ELEV: 7069 ft LAT: 37° 54' 00" N LONG: 109° 18' 00" W

TEMPERATURE (°F), RAIN (in), WIND SPEED (mph)

DAY	MEAN TEMP	HIGH	TIME	LOW	TIME	HEAT DEG DAYS	COOL DEG DAYS	RAIN	AVG WIND SPEED	HIGH	TIME	DOM DIR
1	11.1	15.4	2:30a	4.4	12:00m	53.9	0.0	0.00	9.2	27.0	8:30a	NW
2	9.5	21.6	1:00p	-0.4	8:30a	55.5	0.0	0.00	3.5	14.0	3:30a	NNW
3	19.2	37.4	2:00p	8.3	5:30a	45.8	0.0	0.01	1.8	15.0	12:00p	W
4	20.6	33.2	3:00p	10.1	8:00a	44.4	0.0	0.00	2.5	13.0	12:00m	SE
5	30.5	37.1	12:30p	14.5	4:30a	34.5	0.0	0.00	8.0	28.0	11:30p	SSE
6	29.1	32.8	2:30p	25.7	10:00p	35.9	0.0	0.05	11.1	30.0	12:00p	S
7	26.1	30.2	4:00p	19.1	12:00m	38.9	0.0	0.00	12.5	32.0	11:00a	SSE
8	27.2	38.8	2:00p	17.7	1:00a	37.8	0.0	0.02	2.4	16.0	12:00m	W
9	35.3	39.1	12:00p	30.8	7:30p	29.7	0.0	0.00	8.2	23.0	2:00a	S
10	33.2	40.2	3:30p	21.5	11:00p	31.9	0.0	0.00	5.6	20.0	1:00a	SSE
11	29.5	32.9	3:00p	21.3	1:00a	35.5	0.0	0.00	13.8	32.0	12:30p	NW
12	28.4	34.3	12:30p	17.9	12:00m	36.6	0.0	0.00	4.2	24.0	1:00a	WNW
13	26.0	30.6	1:30p	17.4	12:30a	39.0	0.0	0.00	2.5	11.0	4:00a	WNW
14	29.4	35.1	4:30p	24.1	3:00a	35.6	0.0	0.01	2.2	13.0	1:00p	SSE
15	31.6	33.3	11:30a	27.9	2:00a	33.4	0.0	0.11	7.8	19.0	10:30a	SSE
16	32.2	38.8	3:00p	25.7	8:30p	32.8	0.0	0.36	5.6	26.0	9:30a	S
17	32.2	34.4	12:00p	28.9	1:00a	32.8	0.0	0.02	10.8	31.0	12:00p	SSE
18	29.8	34.5	2:30a	25.1	12:00m	35.2	0.0	0.06	14.9	39.0	10:30a	NW
19	27.3	40.7	1:30p	16.7	3:30a	37.7	0.0	0.04	3.1	10.0	1:00a	WNW
20	29.7	35.9	12:00m	19.7	6:30a	35.3	0.0	0.00	8.8	35.0	11:00p	SE
21	30.4	36.2	12:30a	24.9	12:00m	34.6	0.0	0.01	13.7	46.0	12:00m	S
22	21.4	25.1	12:30a	17.8	12:00m	43.6	0.0	0.00	23.0	49.0	5:30a	NW
23	21.4	33.9	3:00p	9.9	5:30a	43.6	0.0	0.00	3.2	20.0	9:30p	NNW
24	26.8	33.1	4:00p	18.3	11:30p	38.2	0.0	0.00	9.3	33.0	10:30a	NW
25	23.7	32.4	2:30p	15.9	7:00a	41.3	0.0	0.00	4.9	12.0	3:00p	WNW
26	27.9	34.7	3:00p	20.4	7:30a	37.1	0.0	0.00	9.1	25.0	11:30a	NW
27	28.8	41.4	2:30p	21.6	3:30a	36.2	0.0	0.00	2.5	11.0	5:00a	WSW
28	29.7	35.4	11:00a	20.9	10:00p	35.3	0.0	0.00	9.5	28.0	10:30a	NW
29	24.9	33.5	1:30p	18.5	11:00p	40.1	0.0	0.00	4.6	14.0	2:00p	WNW
30	24.7	37.2	4:00p	15.6	4:00a	40.3	0.0	0.00	4.2	10.0	5:30a	SE
31	27.7	39.7	5:00p	15.7	7:30a	37.3	0.0	0.00	3.6	9.0	12:30a	WSW
	26.6	41.4	27	-0.4	2	1189.8	0.0	0.69	7.3	49.0	22	NW

Max >= 90.0: 0
Max <= 32.0: 5
Min <= 32.0: 31
Min <= 0.0: 1
Max Rain: 0.36 ON 01/16/19
Days of Rain: 7 (>.01 in) 2 (>.1 in) 0 (>1 in)
Heat Base: 65.0 Cool Base: 65.0 Method: Integration

NAVARRO

Contractor to the U.S. Department of Energy Office of Legacy Management

Repository Area Surveillance Checklist

☒ Monthly surveillance ☒ Quarterly surveillance: ☒ February ☐ May ☐ August ☐ November

☐ Storm event triggered surveillance due to _____ inches of rainfall over the past 24 hours.

Inspection Item	Acceptable Yes	Acceptable No	Comments and Recommendation
Condition of:			
Fences, gates, and locks	☒	☐	
Roads[a]	☒	☐	
Signs	☒	☐	
Site monuments	☒	☐	
Drainage ditches[a]	☒	☐	
Manholes	☒	☐	Unable to access due to snow cover and ice
Vegetation	☒	☐	
Evidence of erosion of:			
Top of disposal cell[a]	☒	☐	Snowpack limited disposal cell observations, but overall appeared fine
Disposal cell sideslopes[a]	☒	☐	
Ditches	☒	☐	
Surrounding area	☒	☐	
Evidence of:			
Vandalism	☒	☐	
Intrusion by livestock	☒	☐	
Burrowing animal damage	☒	☐	
Intrusion by humans	☒	☐	
Accumulation of trash	☒	☐	

Additional Quarterly Surveillance Requirements

Note: *All transects, shown in Figure 3-1, must be walked during this inspection.*

Condition of:			
Settlement plate structures	☒	☐	Snowpack prevented observation of settlement plates, but personnel walked across the cell and it appeared fine
Manholes[b]	☒	☐	Snowpack and ice prevented access to manholes
Sediment ponds	☒	☐	
Evidence of:	☐	☐	
Structural instability	☒	☐	

Additional comments: Recent February snow storms deposited up to 45 inches of snow with drifts of more or less in certain areas. This limited access to certain areas and resulted in line of site inspections.

Signature: _____ Date: 2/28/19

Monticello LM Representative

[a]Inspections required following a significant storm event

[b]Open to inspect quarterly

NAVARRO

Contractor to the U.S. Department of Energy Office of Legacy Management

Monthly Pond 4 Surveillance Checklist

Level of water in Pond 4 9.2363

Inspection Item	Acceptable Yes	Acceptable No	Comments and Recommendation
Condition of:			
Fences, gates, and locks	☒	☐	
Roads	☒	☐	Snow packed
Signs	☒	☐	
Visible piping	☒	☐	
Visible liner and anchors	☒	☐	
Rescue equipment	☒	☐	
Evidence of erosion of:			
Top of Pond 4 berm	☒	☐	
Pond 4 sideslopes	☒	☐	
Ditches	☒	☐	
Surrounding area	☒	☐	
Seepage from Pond 4	☒	☐	
Overtopping of Pond 4	☒	☐	
Evidence of:			
Vandalism	☒	☐	
Intrusion by wildlife	☒	☐	
Intrusion by humans	☒	☐	
Accumulation of trash	☒	☐	

Additional comments: There is a lot of snow onsite and the pond is frozen.

Monticello LM Representative: Ray Mk Date: 2/28/2019

MONTHLY CLIMATOLOGICAL SUMMARY for FEB. 2019

NAME: Monticello Office CITY: STATE:
ELEV: 7069 ft LAT: 37° 54' 00" N LONG: 109° 18' 00" W

TEMPERATURE (°F), RAIN (in), WIND SPEED (mph)

DAY	MEAN TEMP	HIGH	TIME	LOW	TIME	HEAT DEG DAYS	COOL DEG DAYS	RAIN	AVG WIND SPEED	HIGH	TIME	DOM DIR
1	31.4	46.3	5:00p	19.9	6:30a	33.6	0.0	0.00	2.9	9.0	2:30a	SW
2	34.6	39.3	3:00p	25.8	1:30a	30.4	0.0	0.00	7.5	29.0	12:00m	SSE
3	35.9	40.2	3:00p	30.7	12:00m	29.1	0.0	0.55	12.1	41.0	7:00a	SSW
4	35.3	41.2	4:00p	27.1	2:30a	29.7	0.0	0.01	14.4	33.0	9:30a	S
5	32.5	37.4	5:00p	29.0	8:00a	32.5	0.0	0.00	16.4	43.0	9:30a	S
6	22.3	29.5	1:30a	16.0	10:30p	42.7	0.0	0.00	10.2	29.0	3:00a	SSE
7	15.1	26.1	2:30p	5.4	7:00a	49.9	0.0	0.00	3.9	19.0	12:30a	WSW
8	20.4	28.3	10:00p	6.0	2:30a	44.6	0.0	0.00	9.5	28.0	12:00p	S
9	28.2	34.3	4:30p	22.4	11:00p	36.8	0.0	0.00	9.2	25.0	5:00a	S
10	26.9	36.3	5:00p	14.1	6:00a	38.1	0.0	0.00	12.9	38.0	1:30p	S
11	21.8	28.3	4:00p	14.8	11:30p	43.2	0.0	0.00	10.4	40.0	10:30a	WNW
12	23.1	31.6	3:30p	10.5	3:30a	41.9	0.0	0.00	8.8	27.0	1:00p	S
13	31.4	36.4	5:30p	28.2	5:30a	33.6	0.0	0.00	10.5	30.0	11:30a	SSE
14	32.6	35.6	3:00a	30.8	10:30a	32.4	0.0	0.06	10.6	35.0	3:30a	S
15	33.2	39.0	1:30a	25.8	7:30a	31.8	0.0	0.38	11.5	36.0	8:30p	S
16	24.7	31.2	12:30a	12.1	11:00p	40.3	0.0	0.00	10.6	33.0	7:00a	WNW
17	18.8	28.1	12:30p	7.0	7:30a	46.2	0.0	0.00	6.7	20.0	4:30p	S
18	18.7	24.6	2:30p	9.2	10:00p	46.3	0.0	0.00	6.2	28.0	1:30p	S
19	14.8	21.2	2:00p	5.1	10:00p	50.2	0.0	0.00	8.9	26.0	2:30p	NW
20	12.5	19.4	2:30p	-0.1	3:30a	52.5	0.0	0.00	7.1	29.0	11:00a	SSE
21	22.2	26.0	9:00p	17.4	12:30a	42.8	0.0	0.00	10.5	29.0	9:00p	SSE
22	23.0	25.2	2:00p	20.0	12:00m	42.0	0.0	0.00	11.4	38.0	10:00p	NW
23	19.0	29.8	3:30p	6.4	11:00p	46.0	0.0	0.16	9.4	33.0	12:30a	WNW
24	19.1	29.0	3:30p	7.1	3:30a	45.9	0.0	0.00	5.1	15.0	5:30p	S
25	26.1	33.6	3:00p	16.5	3:00a	38.9	0.0	0.00	8.7	21.0	10:00a	SE
26	31.3	36.4	4:00p	22.0	12:30a	33.7	0.0	0.00	9.9	30.0	3:00a	S
27	35.7	41.9	4:00p	26.1	3:00a	29.3	0.0	0.00	7.3	23.0	1:00p	S
28	37.2	43.6	11:00p	30.0	2:00a	27.8	0.0	0.00	8.4	27.0	11:00p	S
	26.0	46.3	1	-0.1	20	1092.2	0.0	1.16	9.3	43.0	5	S

Max >= 90.0: 0
Max <= 32.0: 14
Min <= 32.0: 28
Min <= 0.0: 1
Max Rain: 0.55 ON 02/03/19
Days of Rain: 4 (>.01 in) 3 (>.1 in) 0 (>1 in)
Heat Base: 65.0 Cool Base: 65.0 Method: Integration

NAVARRO

Contractor to the U.S. Department of Energy Office of Legacy Management

Monticello Long-Term Surveillance and Maintenance Temporary Storage Facility (TSF) Record Book Inspection Report

Acceptable?

Yes	No	
☒	☐	Was the gate locked upon arrival?
☒	☐	Are signs posted in accordance with Section 3.4.4?
☒	☐	Are all posting legible?
☒	☐	Are enclosures on the concrete bin and stored drum containers tight?
☒	☐	Are containers in good physical condition (no rust, no holes, no bulges, etc.)?
☒	☐	How much radiologically contaminated material is in the concrete bin? Note: the material should be shipped when the volume in storage approaches 75 percent of the storage capacity.
☒	☐	Is the surface area of the TSF in good physical condition (no erosion, no flood damage, no excessive vegetation growth, etc.)?
☒	☐	Has radiological monitoring been conducted in accordance with Section 3.4.5?
☒	☐	Is the security fence in good condition?

Comments: Was unable to access TSF because of large amount of snow on the ground. Observed the area from outside the security fence.

Bill Cary / Bill Cary

Signature of Monticello LM Representative

2/28/2019

Date of Inspection

U.S. Department of Energy Office of Legacy Management

Repository Area Surveillance Checklist

☒ Monthly surveillance ☐ Quarterly surveillance: ☐ February ☐ May ☐ August ☐ November

☐ Storm event triggered surveillance due to _____ inches of rainfall over the past 24 hours.

Inspection Item	Acceptable Yes	Acceptable No	Comments and Recommendation
Condition of:			
Fences, gates, and locks	☒	☐	
Roads[a]	☒	☐	
Signs	☒	☐	
Site monuments	☒	☐	
Drainage ditches[a]	☒	☐	
Manholes	☒	☐	
Vegetation	☒	☐	
Evidence of erosion of:			
Top of disposal cell[a]	☒	☐	
Disposal cell sideslopes[a]	☒	☐	
Ditches	☒	☐	
Surrounding area	☒	☐	
Evidence of:			
Vandalism	☒	☐	
Intrusion by livestock	☒	☐	
Burrowing animal damage	☒	☐	
Intrusion by humans	☒	☐	
Accumulation of trash	☒	☐	

Additional Quarterly Surveillance Requirements
Note: *All transects, shown in Figure 3-1, must be walked during this inspection.*

Condition of:			
Settlement plate structures	☐	☐	
Manholes[b]	☐	☐	
Sediment ponds	☐	☐	
Evidence of:	☐	☐	
Structural instability	☐	☐	

Additional comments: The site has snow and mud in a few spots but things appears to be in good condition.

Signature: _____ Date: 3/26/2019
Monticello LM Representative

[a]Inspections required following a significant storm event
[b]Open to inspect quarterly

U.S. Department of Energy Office of Legacy Management

Monthly Pond 4 Surveillance Checklist

Level of water in Pond 4 9.4349

Inspection Item	Acceptable		Comments and Recommendation
	Yes	No	
Condition of:			
Fences, gates, and locks	☒	☐	
Roads	☒	☐	
Signs	☒	☐	Sections of the Rad rope around the pond needs replaced and then rehang (postings) signs to the new Rad rope.
Visible piping	☒	☐	
Visible liner and anchors	☒	☐	
Rescue equipment	☒	☐	Boat remains at the pond.
Evidence of erosion of:			
Top of Pond 4 berm	☒	☐	
Pond 4 sideslopes	☒	☐	
Ditches	☒	☐	
Surrounding area	☒	☐	
Seepage from Pond 4	☒	☐	
Overtopping of Pond 4	☒	☐	
Evidence of:			
Vandalism	☒	☐	
Intrusion by wildlife	☒	☐	
Intrusion by humans	☒	☐	
Accumulation of trash	☒	☐	

Additional comments: The pond is frozen over, things are a little muddy but everything appears to be in good shape.

Monticello LM Representative: Ray McKinney Date: 3/26/2019

MONTHLY CLIMATOLOGICAL SUMMARY for MAR. 2019

NAME: Monticello Office CITY: STATE:
ELEV: 7069 ft LAT: 37° 54' 00" N LONG: 109° 18' 00" W

TEMPERATURE (°F), RAIN (in), WIND SPEED (mph)

DAY	MEAN TEMP	HIGH	TIME	LOW	TIME	HEAT DEG DAYS	COOL DEG DAYS	RAIN	AVG WIND SPEED	HIGH	TIME	DOM DIR
1	38.2	43.6	5:00p	33.6	8:30a	26.8	0.0	0.00	6.8	21.0	1:00a	SE
2	37.7	43.2	7:00a	34.2	3:00p	27.3	0.0	0.35	9.9	34.0	6:30a	SE
3	34.9	42.8	4:00p	28.9	6:00a	30.1	0.0	0.01	5.7	24.0	3:30p	S
4	32.6	37.0	3:30p	27.2	7:00a	32.4	0.0	0.22	6.4	22.0	2:00p	NW
5	34.7	41.9	2:00p	23.3	7:00a	30.3	0.0	0.01	3.7	19.0	3:00p	SSE
6	40.2	45.8	7:00p	35.0	6:00a	24.8	0.0	0.04	10.3	29.0	7:00p	S
7	40.4	49.3	5:30p	34.2	11:30p	24.6	0.0	0.06	7.0	26.0	1:00a	S
8	33.4	37.9	12:30a	28.4	11:00p	31.6	0.0	0.45	10.2	35.0	11:30p	S
9	29.4	37.2	4:30p	21.6	5:30a	35.6	0.0	0.00	6.4	37.0	12:30a	SSE
10	33.6	41.3	4:30p	25.5	12:30a	30.1	0.0	0.00	5.6	21.0	11:00a	SSE
11	36.4	43.4	5:00p	30.3	1:00a	28.6	0.0	0.10	3.7	18.0	12:30p	SE
12	36.2	40.2	5:00p	33.4	5:30a	28.8	0.0	0.66	2.8	21.0	12:00m	SW
13	30.4	35.2	1:30p	24.4	9:30p	34.6	0.0	0.16	16.6	47.0	5:30p	WNW
14	26.2	31.9	4:00p	21.9	12:00m	38.9	0.0	0.00	15.4	32.0	12:30a	NW
15	28.1	37.6	4:00p	18.3	8:00a	36.9	0.0	0.00	5.4	14.0	4:30a	WNW
16	33.9	44.2	5:00p	22.9	7:00a	31.1	0.0	0.00	5.1	14.0	4:00p	W
17	38.3	50.6	3:30p	28.8	6:00a	26.7	0.0	0.00	4.1	10.0	12:00m	WSW
18	39.9	51.9	5:30p	30.2	7:00a	25.1	0.0	0.00	4.7	15.0	5:00p	WSW
19	39.4	46.1	4:30p	31.2	12:00m	25.6	0.0	0.00	8.7	22.0	1:00p	WNW
20	39.5	54.1	6:00p	26.1	7:30a	25.5	0.0	0.00	3.6	12.0	2:30a	WNW
21	35.2	41.1	12:30a	30.6	2:00p	29.8	0.0	0.60	7.3	30.0	5:00a	SE
22	33.3	40.7	6:30p	29.0	9:30a	31.7	0.0	0.20	5.0	19.0	9:00a	SSE
23	37.1	46.4	2:00p	28.0	5:00a	27.9	0.0	0.00	2.8	12.0	6:00p	SE
24	40.0	51.0	6:30p	33.0	8:00a	25.0	0.0	0.00	5.2	20.0	2:00p	SSW
25	42.5	55.5	5:00p	31.6	5:00a	22.5	0.0	0.00	4.4	14.0	1:00a	W
26	46.0	57.5	5:30p	33.2	3:30a	19.0	0.0	0.00	5.1	21.0	4:00p	SW
27	48.7	58.3	6:00p	43.2	6:30a	16.3	0.0	0.00	6.5	22.0	2:00p	S
28	47.2	57.5	4:30p	37.5	7:00a	17.8	0.0	0.00	6.3	22.0	5:00p	SSE
29	39.2	46.8	12:30a	31.4	12:00m	25.8	0.0	0.00	10.6	27.0	8:00p	WNW
30	35.2	44.1	2:30p	28.6	6:00a	29.8	0.0	0.00	8.8	21.0	10:30a	NW
31	34.6	43.1	5:00p	27.3	6:30a	30.4	0.0	0.00	6.6	21.0	2:00p	WNW
	36.9	58.3	27	18.3	15	871.4	0.0	2.86	6.8	47.0	13	SSE

Max >= 90.0: 0
Max <= 32.0: 1
Min <= 32.0: 22
Min <= 0.0: 0
Max Rain: 0.66 ON 03/12/19
Days of Rain: 10 (>.01 in) 7 (>.1 in) 0 (>1 in)
Heat Base: 65.0 Cool Base: 65.0 Method: Integration

Appendix B

Graphs Showing Performance History for Disposal Cell and Pond 4 LCRS and LDS

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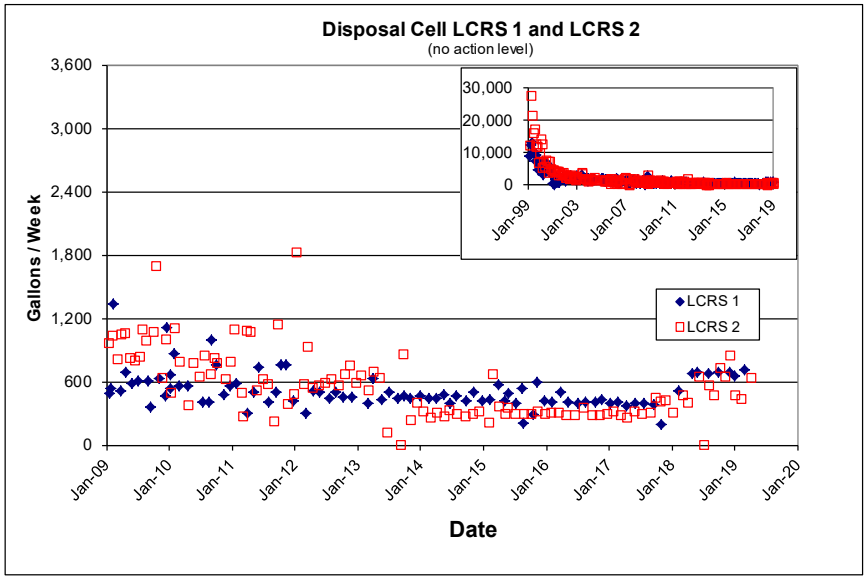
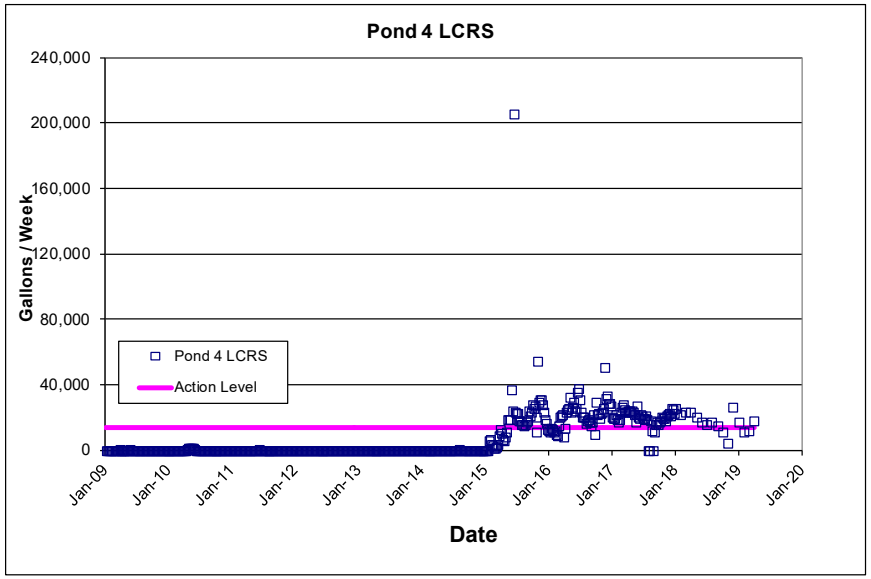
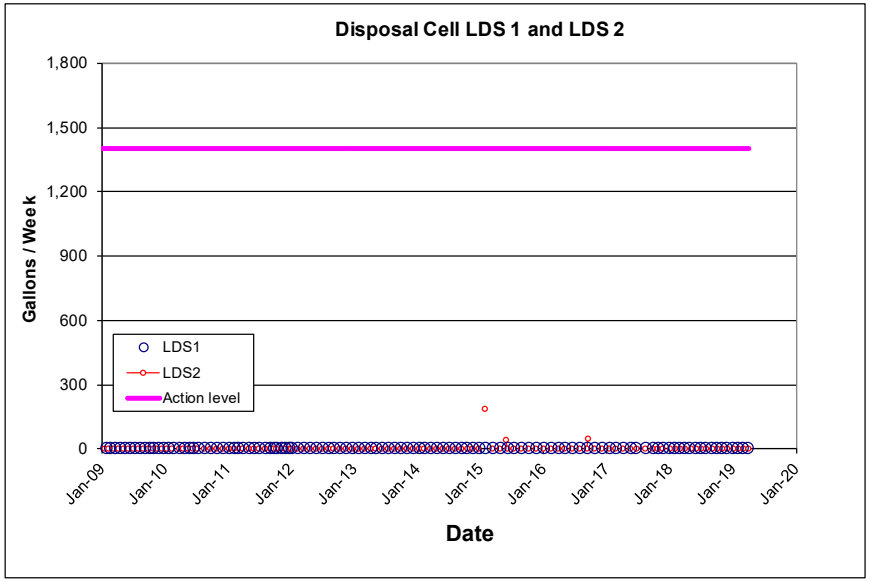
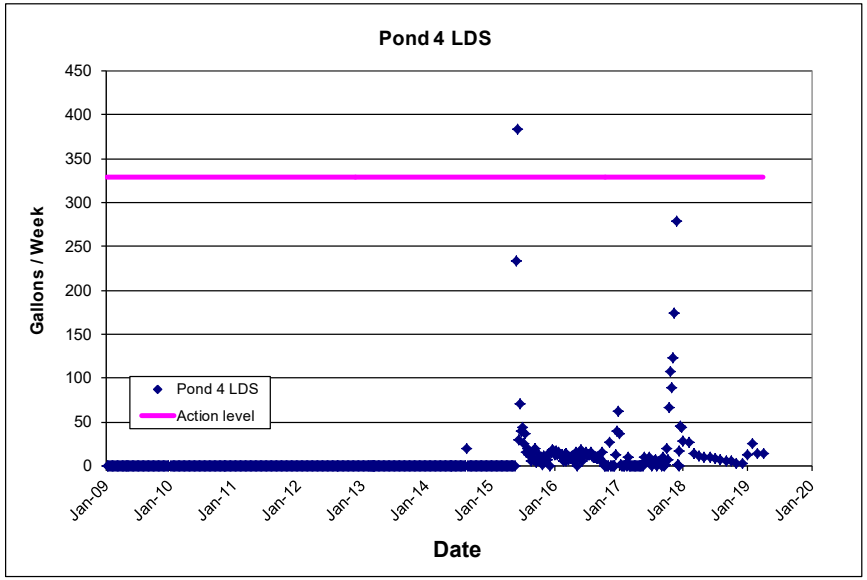
Graphs Showing Performance History for Disposal Cell and Pond 4 LCRS and LDS









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