LMS/MNT/S15035

Monticello, Utah, National Priorities List Sites Federal Facility Agreement (FFA) Quarterly Report: July 1–September 30, 2016

October 2016

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
ICs	institutional controls
LCRS	Leachate Collection and Removal System
LDS	Leak Detection System
LM	Office of Legacy Management
LTS&M	long-term surveillance and maintenance
MMTS	Monticello Mill Tailings Site
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
UDOH	Utah Department of Health
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 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 July through September 2016. 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 January (for October through December), April (January through March), July (April through June), and October (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*, (2) semiannual monitoring of groundwater and surface water under the *Record of Decision for the Monticello Mill Tailings (USDOE) Site Operable Unit III, Surface and Ground Water, Monticello, Utah*, May 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 that was implemented under the *Final Groundwater Contingency Remedy Optimization Remedial Design/Remedial Action Work Plan for the Monticello Mill Tailings Site Operable Unit III, Monticello, Utah*, May 2014. This system focuses on groundwater remediation within a specified region of the alluvial aquifer that is referred to as the Area of Attainment (AOA).

Project milestones and guiding documents are further described in the *Monticello Site Management Plan* (updated annually). Annual groundwater reports present comprehensive data evaluation for the groundwater and surface water OU III remedy.

1.1 Quarterly Site Status

- The groundwater remedy optimization system operated as planned during the quarter.
- An apparent July 30 lightning strike resulted in damage to several monitoring well transducers. Replacement transducers were installed on August 2. The system was not shut down during these events. The affected wells were 3, 6, 9, 12, and 15.
- Water-quality monitoring was performed at the AOA monitoring wells in August 2016 to coincide with a cumulative volume of approximately 10 million gallons of groundwater extracted by the groundwater remedy optimization system since system startup in January 2015.
- 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.
- Water collection in the Pond 4 Leachate Collection and Removal System (LCRS) continued to exceed the action level. 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).
- The electrical upgrades project began September 6, 2016, and the work will continue into October. Installation of new electrical distribution cabinets, a transformer, disconnects, and wiring will provide the site with a more reliable and power-efficient system.
- Part of the electrical upgrades project involved the installation of new hand controllers in Vaults 1 and 3. The installation of the hand controllers in Vault 3 (LCRS Station Two) enabled the LCRS and Leak Detection System (LDS) pumps to begin pumping. Fifty-one gallons of water was pumped from Station Two's LDS sump. At no time did water reach the transducer activation set point, and there is no indication that water is leaking into the LDS sump.
- The annual inspection began on September 12 and concluded the next day on September 13. Attending were DOE site manager Jason Nguyen and LM prime contractor Navarro Research and Engineering, Inc., representatives Linda Sheader, Danika Marshall, Paul Wetherstein, and Fred Smith.
- UDEQ site manager Michael Storck toured the project site and portions of the City of Monticello on September 14.

2.0 Monticello Vicinity Properties

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

- No anomalous conditions for the MVP remedy were noted.
- LM representatives continued to coordinate with City of Monticello (City) officials in daily 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 street 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 LDS for the disposal cell and Pond 4, (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, 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:

- No anomalous surface feature conditions were observed for the disposal cell and Pond 4. Surveillance checklists for this quarter are attached as Appendix A.
- The disposal cell LCRS and LDS operated as intended.
  - — Leachate production from the disposal cell was about 700–800 gallons per week combined for LCRS sumps LCRS 1 and LCRS 2. This collection rate is typical over the past several years. 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.
  - — Manual operation of the repository LDS on September 13 resulted in removing approximately 50 gallons from LDS 2. This quantity is well below the action level, and at no time has the water level indicated leakage to the sump.
- Operation of the groundwater remedy optimization system has resulted in increased water collection in the Pond 4 LCRS and LDS. The Pond 4 LCRS and LDS monitoring and pumping systems are functioning as intended to circulate water back to the pond.
  - — Water collection at the Pond 4 LCRS slightly exceeded the action level during the quarter (see Appendix B). LM has previously notified EPA and UDEQ of this Pond 4 action level exceedance.
  - — As in recent reporting periods, the Pond 4 LDS received a small quantity of water during the quarter. Although the quantity of water collected in the Pond 4 LDS is well below the action level (see Appendix B), LM is required to notify EPA and UDEQ of any water collection in the Pond 4 LDS. Water quality in Pond 4 and the LDS is known from OU III and groundwater remedy optimization system monitoring data.

3.1.2 Temporary Storage Facility

Routine surveillance of the TSF ensures that maintenance and radiological controls that govern access to and placement, storage, and transfer of contaminated material in the TSF are current and effective. Surveillance results for this quarter are:

- No anomalous conditions were observed for the TSF (see the surveillance checklist attached for this quarter in Appendix A).

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

- Waste added to the TSF this quarter was deteriorated radiological control rope from Pond 4 and personal protective equipment derived from maintenance work conducted at Pond 4 and Vault 1 of the repository LCRS and LDS.
- The volume of waste stored in the TSF is approximately 1 cubic yard.
- The contents of the TSF were last transferred to the Grand Junction disposal site in April of 2016.

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 are 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:

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

As a follow-up to LM's submittal of uranium analytical results from Seep 6 soil sampling (conducted in September 2015), LM received a draft Health Consultation Letter from the Utah Department of Health, dated February 23, 2016, regarding the potential for uranium accumulation in soil from contaminated groundwater at Seep 6. LM responded to the Health Consultation Letter in an April 5, 2016, letter that provided a technical basis for no further action regarding Seep 6. DOE has to date not received a response.

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:

- 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 (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.
- No storm events exceeding 2.8 inches of rain 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 levels) 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. Montezuma Creek is used for limited irrigation and livestock watering.

The groundwater remedy includes (1) monitored natural attenuation with ICs, and (2) pump-and-treat remediation by evaporation that was implemented as the groundwater remedy optimization system in January 2015. Previous remediation efforts included (1) treatment by a zero-valent iron (ZVI) in situ permeable reactive barrier (PRB), and (2) pump-and-treat remediation using ex situ ZVI treatment.

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 (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 results are:

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

3.3.2 Permeable Reactive Barrier

The PRB was installed in 1999 as a technology demonstration project. The capacity of the PRB to transmit water has diminished to the extent that it now serves as a groundwater flow barrier and represents the downgradient boundary of the AOA. Because of this, future decommissioning of the PRB is dependent on the progress of the groundwater remedy optimization system (Section 3.3.4). Routine monitoring at the PRB occurs as part of the OU III semiannual monitoring, and results are provided in annual groundwater reports.

3.3.3 Ex Situ Remediation System

An ex situ pump-and-treat groundwater remediation system was installed in May 2005 as a technology demonstration project. This system is located near the PRB approximately 600 feet east of the former mill site on private property. The system operated using a single extraction well and two aboveground ZVI-based treatment vessels.

Operation of this system was suspended in December 2014. During 9.5 years of operation, the system extracted approximately 33 million gallons of contaminated groundwater and 77 pounds of uranium from the aquifer. The groundwater remedy optimization system (Section 3.3.4) replaced the ex situ treatment system as the active component of the OU III groundwater remedy.

Removal of the spent ZVI occurred in April 2016 concurrent with the transfer of TSF material to the Grand Junction disposal site (see Section 3.1.2). The decommissioning/closure strategy for the ex situ treatment system is not yet determined.

3.3.4 OU III Groundwater Contingency Remedy Optimization System

The groundwater remedy optimization system began full operation in February 2015. Eight vertical extraction wells are strategically placed in the AOA to extract contaminated groundwater. The water 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 the 16 monitoring wells that were installed in the AOA. These wells are sampled on a frequency of approximately every 1-million gallons of water extracted by the treatment system.

Consumptive use (evaporation of the extracted groundwater in Pond 4) is allowed under a fixed-time water right appropriation (number 09-2347) and a temporary water right appropriation (number 09-2422) that LM obtained from the Utah Department of Natural Resources, Division of Water Rights.

Analysis of the groundwater remedy performance is presented in detail in annual groundwater reports that are transmitted by LM to EPA and UDEQ.

3.3.4.1 Quarterly Performance Summary

- The effective rate of groundwater extraction from the AOA was approximately 9 gallons per minute (gpm).
- Pumping rates were adjusted on wells OR 5, 6, 7, and 8 to maximize uranium recovery and preserve operating capacity in Pond 4.

- Extraction wells OR 1, 2, 3, and 4 remained off during the quarter to preserve operating capacity in Pond 4.
- Inflow to Pond 4 was balanced by the rate of evaporation (the water level in Pond 4 remained stable). The approximate volume of water in Pond 4 remains at approximately 8.0 million gallons (the operating capacity is 15 million gallons).
- Cumulatively, the system has removed approximately 10.3 million gallons of contaminated groundwater from the aquifer since system startup in January 2015 (Table 1).
- Water-quality monitoring during the quarter consisted of:
  - Sample collection at AOA monitoring wells on August 29 and 30, 2016, to coincide with the cumulative removal of approximately 10 million gallons of groundwater from the AOA. The extraction wells are shut down for 72 hours preceding each million-gallon interval monitoring event.
  - Monthly sampling and analysis of the transfer tank effluent to Pond 4. Monthly sampling is conducted to monitor the mass of uranium that is extracted from the aquifer.
  - Monthly sampling and analysis of individual extraction wells (from sampling ports in the groundwater transfer building). This monitoring is discretionary to evaluate uranium capture performance of the individual extraction wells.
  - In August, sampling and analysis of water in Pond 4. Discretionary sampling was also conducted in June 2016.
- Table 2 provides the estimated mass of uranium removed from groundwater in the AOA. The remediation system has removed approximately 63.1 pounds of uranium from the aquifer in the AOA.
- The effective rate of uranium removal has not significantly changed despite the reduced rate of groundwater extraction.

Table 1. Groundwater Remedy Optimization System Treatment Volumes and Rates: Calendar Month and Cumulative Volume from January 2015

Calendar Month	Approximate Volume Pumped[a] (million gallons)	Effective Pumping Rate[b] (gpm)	Approximate Cumulative Volume[c] (million gallons)
July 2016	0.4	9.1	9.6
August 2016	0.36	8.4	10.0
September 2016[d]	0.37	9.0	10.3

Notes:
[a] Total pumped from all eight extraction wells.
[b] Includes system downtime during month.
[c] Cumulative volume based on volume of groundwater extracted by the groundwater remedy optimization system since system startup in January 2015.
[d] Reporting cutoff is September 30, 2016.

Table 2. Uranium Mass Removal from Groundwater in the AOA

Tank Effluent Sample Date	Uranium Concentration (µg/L)	Volume Removed Between Tank Samples (million gallons)	Uranium Removed (pounds)[a]	Cumulative Mass Uranium Removed[b] (pounds)
End of prior quarter (June 30, 2016)	730	--	--	57.1
July 28, 2016	690	0.33	2.0	59.1
August 25, 2016	770	0.37	2.2	61.3
September 22, 2016	690	0.30	1.8	63.1

Notes:
[a] Based on median concentration between sampling dates.
[b] Cumulative mass based on mass of uranium removed by the groundwater remedy optimization system since system startup in January 2015.

Abbreviation:
-- = no value

Monitoring and reporting guidelines 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*, May 2014. Analysis of water quality trending toward meeting remediation goals in the AOA is beyond the scope of the FFA quarterly report but is provided in annual groundwater reports.

4.0 Schedule of Activities and Deliverables

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

Table 3. Recent and Near-Term Activities and Deliverables

Activity/Deliverable	Schedule
Recent	
FFA quarterly report: April–June 2016.	Submitted July 14, 2016.
Water-quality monitoring at AOA monitoring wells to coincide with a cumulative volume of approximately 10 million gallons of groundwater extracted.	Completed August 29–30, 2016.
CERCLA 5-Year Review Scoping Meeting.	Completed via teleconference with DOE, EPA, and UDEQ August 25, 2016.
LM submittal of Site Management Plan Section 5.0 Annual Update to EPA and UDEQ (penalty milestone).	Draft submitted July 27, 2016.
2016 Annual Site Inspection.	Completed September 13, 2016.
Near-Term	
Water-quality monitoring at AOA monitoring wells when approximately 11 million gallons have been pumped by the groundwater remedy optimization system since system startup in January 2015.	Tentatively scheduled for early December 2016.
Site Management Plan, Section 5.0 Annual Update: EPA and UDEQ concurrence.	No response from EPA/UDEQ to date.

Table 3 (continued). Recent and Near-Term Activities and Deliverables

Activity/Deliverable	Schedule
Recent	
Semiannual OU III groundwater and surface water monitoring.	October 10, 2016.
LM submittal of FFA quarterly report: October–December 2016.	Submit to EPA and UDEQ in January 2017.
LM submittal of OU III Annual Groundwater Report.	Submit to EPA and UDEQ in late October 2016.
5-Year CERCLA Review Report.	Submit draft to EPA/UDEQ on January 30, 2017.

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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 N/A inches of rainfall over the past 24 hours.

Inspection Item	Acceptable Yes	Acceptable No	Comments and Recommendation
Condition of:			
Fences, gates, and locks	☒	☐	Per management direction repository gates open. This will be the last mention of this item.
Roads[a]	☒	☐	Roads remain slightly rutted. They are not causing any problems.
Signs	☒	☐	
Site monuments	☒	☐	
Drainage ditches[a]	☒	☐	
Manholes	☒	☐	
Vegetation	☒	☐	Cover vegetation in good shape. Recent rains have helped with the dry conditions.
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:

Signature: Fred Smith Fred Smith Date: 7/27/2016

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 ~8.1 Feet

Inspection Item	Acceptable Yes	Acceptable No	Comments and Recommendation
Condition of:			
Fences, gates, and locks	☒	☐	
Roads	☒	☐	
Signs	☒	☐	New signs were installed on the perimeter fence and the rope boundary. Not all signs were exchanged. Signs that were still in good shape were left in place.
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 summer heat and wind is performing the evaporation of the water from the pond very nicely.

The old Rad Rope boundary was replaced with new Rad Rope.

The old LCR and LDS electrical junction boxes were removed, cleaned, and reinstalled. The electricians installed new uni-strut to mount the junction boxes. The old flexible conduit was removed and replaced with new flexible conduits.

Monticello LM Representative: Fred Smith Fred Smith Date: 7/27/16

MONTHLY CLIMATOLOGICAL SUMMARY for JUL. 2016

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	59.4	62.5	5:30p	56.1	6:30a	5.6	0.0	0.25	4.0	20.0	3:00p	S
2	61.1	68.6	5:30p	55.9	6:30a	4.4	0.6	0.09	2.5	16.0	2:30p	SSE
3	63.8	76.5	4:00p	51.2	6:00a	4.3	3.1	0.02	4.7	41.0	7:00p	WNW
4	65.8	79.2	6:30p	53.2	5:30a	3.2	4.0	0.46	4.0	29.0	1:00p	W
5	73.1	83.6	4:30p	57.3	6:30a	0.4	8.5	0.00	7.3	29.0	3:30p	W
6	72.3	83.0	5:30p	59.3	5:30a	0.4	7.7	0.00	8.0	29.0	10:00a	SW
7	73.4	83.2	3:30p	60.5	6:00a	0.3	8.7	0.00	7.6	26.0	3:30p	SW
8	72.1	84.7	4:00p	56.6	7:00a	1.2	8.3	0.00	5.7	30.0	4:30p	W
9	74.2	85.7	4:30p	60.7	6:00a	0.4	9.6	0.00	6.0	34.0	2:30p	W
10	73.9	85.9	4:30p	58.2	6:30a	0.5	9.4	0.00	8.3	35.0	5:30p	SSW
11	70.1	79.4	6:00p	60.5	11:30p	0.6	5.7	0.00	6.0	21.0	4:30a	NNE
12	71.0	84.0	4:30p	56.0	6:30a	2.0	8.0	0.00	6.2	26.0	12:30p	N
13	74.3	86.2	5:30p	62.2	6:30a	0.1	9.3	0.00	5.4	20.0	5:30p	SSE
14	74.9	88.1	5:30p	60.4	4:00a	0.6	10.5	0.00	4.5	23.0	2:00p	WNW
15	75.7	87.9	4:30p	59.5	4:30a	0.1	10.9	0.00	7.8	26.0	3:00p	N
16	76.4	86.9	4:30p	59.8	6:30a	0.3	11.8	0.00	7.5	28.0	2:30p	N
17	75.5	86.2	6:30p	58.0	6:00a	0.6	11.2	0.00	6.8	29.0	11:00p	N
18	71.9	83.7	3:00p	64.2	12:00m	0.0	7.0	0.02	6.7	42.0	8:00p	NNW
19	67.0	79.8	1:30p	58.1	6:00a	2.2	4.2	0.43	5.6	29.0	2:00p	N
20	69.1	80.5	7:30p	58.2	3:00a	1.5	5.6	0.00	4.7	22.0	2:30p	S
21	70.8	83.4	6:00p	58.1	5:30a	1.1	6.8	0.00	4.8	19.0	2:30p	S
22	71.7	84.1	5:30p	59.6	6:30a	0.5	7.1	0.02	5.5	36.0	7:30p	SSE
23	70.7	85.0	1:00p	57.8	6:00a	1.3	7.0	0.10	4.0	20.0	4:00p	W
24	74.3	86.1	2:00p	59.5	7:00a	0.4	9.6	0.07	6.5	35.0	2:30p	SSW
25	75.0	87.5	3:30p	62.9	3:30a	0.1	10.1	0.00	7.1	25.0	11:30a	SSW
26	74.0	84.4	6:00p	65.1	6:30a	0.0	9.0	0.00	5.0	30.0	1:00a	SSW
27	77.2	89.7	3:30p	65.3	1:30a	0.0	12.2	0.00	5.9	26.0	4:00p	SW
28	78.7	92.8	5:00p	63.9	7:00a	0.0	13.7	0.00	6.2	25.0	4:30p	WNW
29	80.0	92.1	3:30p	64.1	7:00a	0.0	15.0	0.00	4.0	26.0	2:30p	NNW
30	74.5	86.2	2:00p	65.1	3:30p	0.0	9.5	0.04	6.5	30.0	1:30p	SSW
31	66.1	77.9	6:00p	56.9	7:30a	1.8	2.9	0.23	6.5	28.0	5:30a	ENE
	71.9	92.8	28	51.2	3	33.9	247.0	1.73	5.8	42.0	18	N

Max >= 90.0: 2
Max <= 32.0: 0
Min <= 32.0: 0
Min <= 0.0: 0
Max Rain: 0.46 ON 07/04/16
Days of Rain: 11 (>.01 in) 4 (>.1 in) 0 (>1 in)
Heat Base: 65.0 Cool Base: 65.0 Method: Integration

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]	☒	☐	Roads being repaired/graded
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: Subcontractor currently grading the transfer line road

Signature: David Dille Date: 8/31/2016

Monticello LM Representative

[a]Inspections required following a significant storm event

[b]Open to inspect quarterly

LMS 5502MON
07/15/2013

U.S. Department of Energy Office of Legacy Management

Monthly Pond 4 Surveillance Checklist

Level of water in Pond 4 N/A

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: Waiting on communication cable for the pond level transducer

Monticello LM Representative: Gary McKinnon Gary McKinnon Date: 8/23/2016

MONTHLY CLIMATOLOGICAL SUMMARY for AUG. 2016

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	72.2	83.8	4:30p	60.7	7:00a	0.4	7.5	0.00	6.2	21.0	1:00a	ENE
2	71.0	82.6	7:00p	61.4	7:00a	0.5	6.6	0.00	6.1	20.0	2:00a	SSE
3	67.8	80.7	4:00p	55.3	7:00a	2.6	5.4	0.04	7.4	22.0	1:00p	S
4	61.8	70.3	6:00p	58.0	12:30a	3.8	0.6	0.18	2.8	14.0	5:30p	NNE
5	60.6	68.5	6:30p	56.3	10:00a	4.6	0.2	0.19	2.4	27.0	10:00a	SSW
6	63.4	74.3	4:30p	55.9	5:30a	3.5	1.9	0.11	6.3	18.0	5:30a	S
7	67.8	79.2	3:30p	56.2	6:30a	2.2	5.0	0.05	4.6	20.0	10:00a	SW
8	70.9	81.8	5:00p	62.9	1:00a	0.2	6.1	0.04	7.7	22.0	5:30p	SSW
9	71.4	82.3	4:30p	60.2	7:00a	0.5	6.9	0.02	6.6	30.0	4:30p	W
10	67.5	79.3	4:00p	57.3	12:00m	1.3	3.8	0.01	5.4	28.0	5:30p	SW
11	66.6	79.5	5:00p	53.2	7:00a	2.9	4.5	0.00	2.8	17.0	6:00p	NW
12	69.4	79.7	3:30p	57.8	7:00a	1.3	5.7	0.00	7.3	22.0	3:00p	NW
13	69.8	80.6	3:30p	58.7	6:00a	1.5	6.4	0.00	7.3	31.0	3:30p	NNW
14	68.7	82.2	7:30p	53.2	5:30a	1.9	5.6	0.00	5.3	21.0	10:30a	W
15	71.8	83.7	5:30p	61.9	3:00a	0.3	7.1	0.00	8.1	40.0	8:00p	SSW
16	68.8	80.1	3:30p	61.9	12:00m	0.5	4.3	0.02	5.4	31.0	4:00p	SW
17	66.0	77.4	2:30p	55.8	4:00a	1.7	2.8	0.02	6.0	24.0	8:30p	SSW
18	62.9	72.4	12:30p	53.8	7:00a	3.2	1.1	0.00	4.1	21.0	11:00a	WSW
19	65.3	77.9	5:30p	51.1	6:30a	3.4	3.6	0.00	3.9	17.0	5:00p	WNW
20	66.4	79.4	4:30p	54.0	5:00a	3.1	4.6	0.00	5.8	22.0	3:00p	SSW
21	66.9	81.2	5:00p	53.3	4:00a	2.2	4.1	0.00	6.8	20.0	10:00a	SSW
22	62.0	73.6	4:30p	53.0	10:30p	4.3	1.4	0.00	8.7	23.0	1:00p	SSW
23	55.8	67.0	12:30p	49.7	12:00m	9.2	0.0	0.02	4.7	24.0	2:00p	SW
24	59.2	71.8	4:30p	50.0	6:30a	6.8	1.0	0.00	3.8	26.0	6:00p	W
25	58.2	73.7	3:30p	47.5	4:00a	8.0	1.2	0.01	6.9	36.0	5:00p	S
26	56.1	68.2	3:30p	44.4	6:00a	9.1	0.1	0.01	5.1	22.0	11:00p	S
27	58.9	68.0	2:00p	49.2	5:00a	6.4	0.3	0.00	4.0	18.0	5:00p	SSW
28	59.7	71.1	5:30p	48.5	6:00a	6.3	1.0	0.00	3.6	19.0	1:30p	NNE
29	63.8	77.3	4:30p	52.6	3:00a	4.4	3.2	0.00	3.1	33.0	4:00p	NW
30	64.3	79.6	5:00p	50.1	6:30a	4.3	3.6	0.00	3.1	24.0	5:00p	W
31	67.1	79.6	5:30p	56.0	3:00a	2.1	4.2	0.00	5.4	20.0	11:30a	SSW
	65.2	83.8	1	44.4	26	102.5	109.8	0.72	5.4	40.0	15	SSW

Max >= 90.0: 0
Max <= 32.0: 0
Min <= 32.0: 0
Min <= 0.0: 0
Max Rain: 0.19 ON 08/05/16
Days of Rain: 10 (>.01 in) 3 (>.1 in) 0 (>1 in)
Heat Base: 65.0 Cool Base: 65.0 Method: Integration

U.S. Department of Energy Office of Legacy Management

Monthly Pond 4 Surveillance Checklist

Level of water in Pond 4: 8 feet

Inspection Item	Acceptable Yes	Acceptable No	Comments and Recommendation
Condition of:			
Fences, gates, and locks	☒	☐	
Roads	☒	☐	
Signs	☒	☐	
Visible piping	☒	☐	
Visible liner and anchors	☒	☐	
Rescue equipment	☒	☐	Ring bouys, rope ladders, boat all present
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:			

Monticello LM Representative: David Dille David Dille Date: 9/21/2016

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: Annual Inspection conducted this month.

Signature: David Dilk Date: 9/21/2016
Monticello LM Representative

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

LMS 5502MON
07/15/2013

Time	Rain_Fall_in_Tot: Monticello Met Daily, (N/A)	Column1	Column2
9/1/2016 23:55	0.007874		
9/2/2016 23:55	0.0708662		
9/3/2016 23:55	0		
9/4/2016 23:55	0		
9/5/2016 23:55	0		
9/6/2016 23:55	0		
9/7/2016 23:55	0		
9/8/2016 23:55	0		
9/9/2016 23:55	0		
9/10/2016 23:55	0		
9/11/2016 23:55	0		
9/12/2016 23:55	0.244095		
9/13/2016 23:55	0.003937		
9/14/2016 23:55	0.0866142		
9/15/2016 23:55	0		
9/16/2016 23:55	0		
9/17/2016 23:55	0		
9/18/2016 23:55	0		
9/19/2016 23:55	0		
9/20/2016 23:55	0.0708662		
9/21/2016 23:55	0.129921		
9/22/2016 23:55	0.0236221		
9/23/2016 23:55	0.468504		
9/24/2016 23:55	0		
9/25/2016 23:55	0		
9/26/2016 23:55	0		
9/27/2016 23:55	0		
9/28/2016 23:55	0		
9/29/2016 23:55	0.46063		
9/30/2016 23:55	0.0748032		
Month Total	1.6417329		

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Appendix B

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

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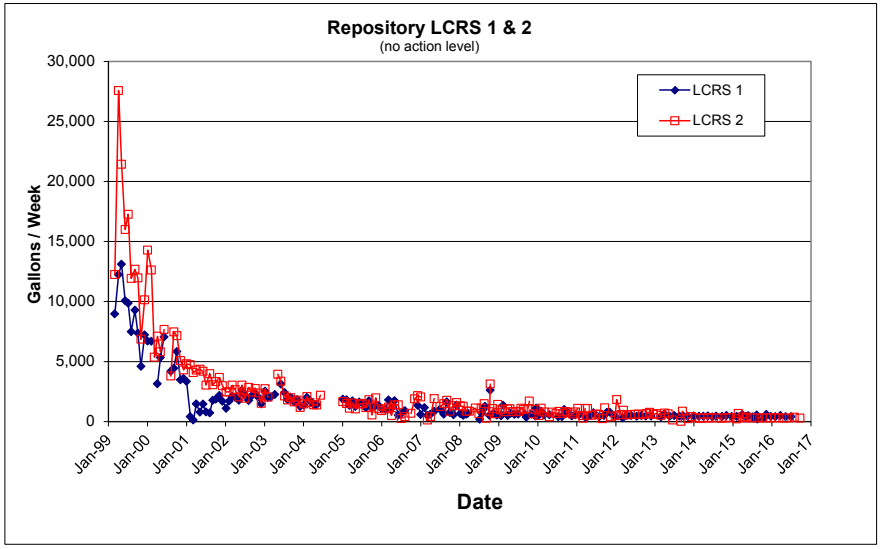
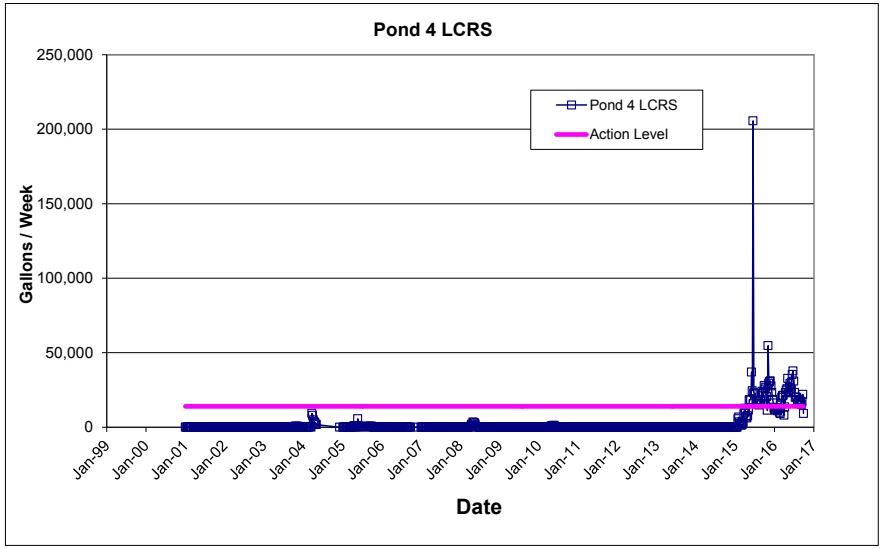
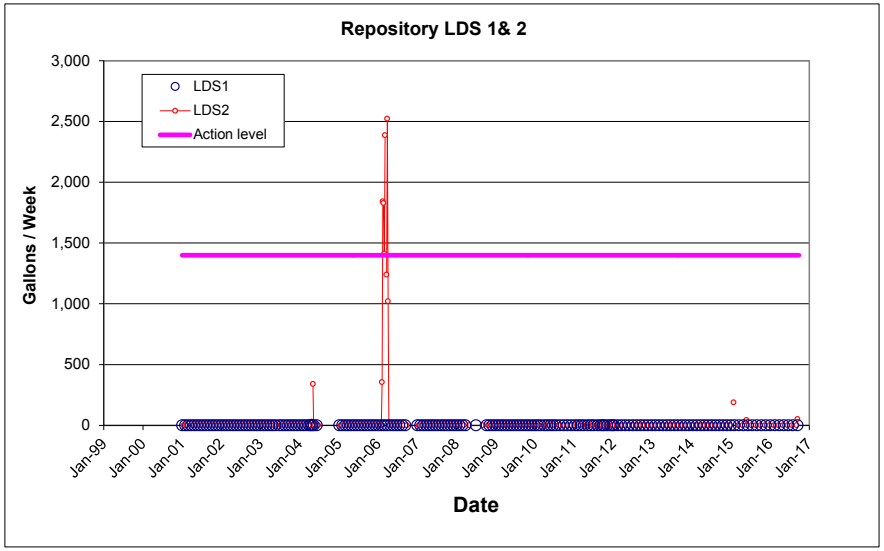
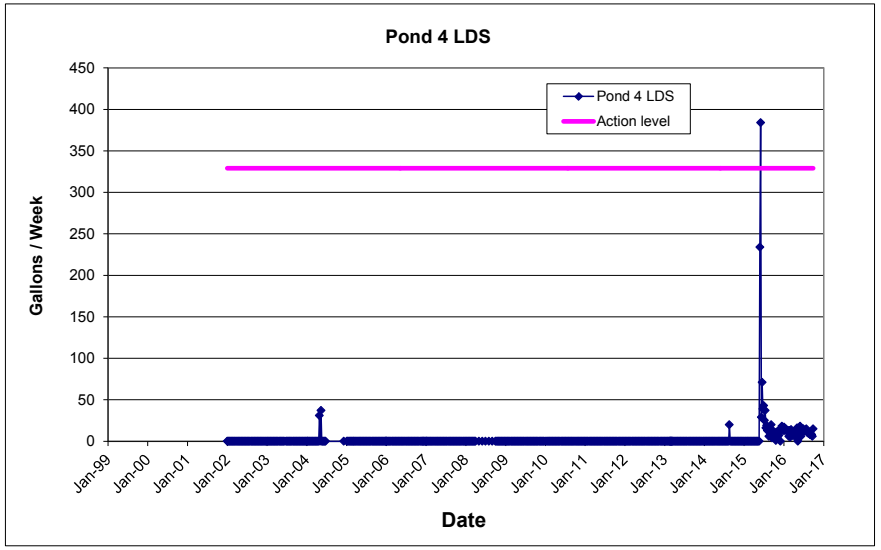
Graphs Showing Performance History for Disposal Cell and Pond 4 LCRS and LDS









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