LMS/MNT/S22073

Monticello, Utah, National Priorities List Sites Federal Facility Agreement (FFA) Quarterly Report: July 1–September 30, 2018

November 2018

U.S. DEPARTMENT OF ENERGY | Legacy Management

This page intentionally left blank

Contents

Tables

Appendixes

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
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
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 July through September 2018. 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 2018b) (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).

Project milestones and guiding documents are further described in the *Monticello Site Management Plan* (DOE 2003). 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 (GRO) system operated as planned during the current period.
- Water samples were collected from the monitoring and extraction wells in the AOA on a monthly schedule this quarter. The water samples were analyzed for uranium concentrations in each well.
- Soil and surface water samples were collected from the OU III area in July. The soil samples ranged from surface to approximately 18 inches in depth. Surface water samples were collected from reaches of Montezuma Creek with apparent groundwater intrusion. The data from these samples will be utilized in the characterization of the OU III area.
- Routine surveillance noted no anomalous conditions for the MVP remedy.

- Routine surveillance noted no violations of MMTS ICs regarding land- and groundwater-use restrictions.
- In August, the land survey of OU III was completed. The survey measured the horizontal extents and elevations of the following features:

  — Top of the well casings (a reference point for depth-to-water measurements)

  — Centerline of Montezuma Creek at prescribed intervals

  — Water diversions in Montezuma Creek (e.g. culverts, head gates)

  The area of survey began at U.S. Highway 191 and terminated at the sediment pond to the east.

  The survey data have been collected using the State Plane Coordinate System instead of the Monticello grid system.
- 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 for July and August. LM has previously notified EPA and UDEQ of this Pond 4 action level exceedance. The water collected in September was below the action level.
- Routine surveillance noted no operating deficiencies for the temporary storage facility (TSF).
- A new powered gate was installed at the access to the Monticello administration parking lot in August.
- The annual site inspection occurred the week of September 10, 2018. The annual site inspection report will be generated in the near future. The site looks good and required site documentation has been maintained.
- Drought was prevalent in the Monticello area this quarter.

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) rights-of-way 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 and Pond 4. Surveillance checklists for this quarter are attached as Appendix A.
- Minor burrowing on the disposal cell and the Pond 4 berm by voles and small ground squirrels continue to be observed. These burrows are not deep and do not pose a concern.
- The disposal cell LCRS and LDS were operated in accordance with the requirements specified in the LTS&M Plan. Findings include:
  - Leachate production from the disposal cell was approximately 1150 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. 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 exceeded the action level between July and August but was below the action level in September (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 is in good shape and no correction items were identified.

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:

- The volume of waste stored in the TSF is approximately 1.5 cubic yards.

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 as follows:

- No nonconformance with water- and land-use restrictions was observed.
- The regional engineer with the Utah Division of Water Rights was contacted before the annual site inspection to verify that no new well applications were requested in the groundwater restricted area.

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.
- 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 affect surface water use.

The 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. Previous remediation efforts 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. Operation and performance of these are reported annually. The ex situ 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 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 began full operation in January 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 22 wells that were installed in the AOA. Sixteen active wells were installed south of Montezuma Creek in 2014, and 6 were installed north of Montezuma Creek in 2017. The monitoring wells were sampled for uranium concentration on a monthly basis during the quarter.

3.3.2.1 Quarterly Performance Summary

- Groundwater extraction was approximately 1.08 million gallons, equivalent to a net flow rate of 8.2 gallons per minute (gpm).
- During the quarter, the volume of water stored in Pond 4 decreased by 0.3 million gallons, from approximately 5.9 to 5.6 million gallons. The GRO system is operated to maintain a relatively constant inflow of 8 gpm to balance annual evaporation at the Pond 4 operating storage volume of 8 million gallons (the maximum storage volume of Pond 4 is approximately 15.6 million gallons).
- Cumulatively, the system has removed approximately 18.1 million gallons of contaminated groundwater from the aquifer since system startup in January 2015 (Table 1), equivalent between 5.0 and 7.0 pore volumes in the AOA. It has previously been reported that the removed groundwater was approximately 8.6 pore volumes. With newly acquired data and modeling the pore volume amount has been adjusted to better represent the OU III hydrology.
- Water monitoring during the quarter consisted of:
  - Monthly sampling from the monitoring and extraction wells for uranium concentration.
  - Monthly sampling from the transfer tank (see Table 2 for recent tank sample uranium concentrations).
  - Water-level monitoring in AOA extraction and monitoring wells on 5-minute intervals with the LM System Operation and Analysis at Remote Site (SOARS) system.

The GRO system has removed approximately 100.2 pounds of uranium from the aquifer in the AOA through September 30, 2018.

Table 1. GRO System Treatment Volumes and Rates: Monthly and Cumulative Volumes (Since January 2015)

Calendar Month	Approximate Volume Pumped (million gallons)	Effective Pumping Rate (gpm)	Approximate Cumulative Volume[a] (million gallons)
July 2018	0.43	9.7	17.5
August 2018	0.38	8.5	17.9
September 2018[b]	0.27	6.3	18.2

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 September 30, 2018.

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)
June 14, 2018	560	Not applicable	Not applicable	96.3
July 23, 2018	540	0.43	2.0	98.2
August 13, 2018	250	0.33	1.1	99.3
September 26, 2018	300[c]	0.41[c]	0.9[c]	100.2[c]

Notes:
[a] Based on median concentration between sampling dates.
[b] Since GRO system startup in January 2015.
[c] Assumed value: Sample results not available as of October 30, 2018.

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). Analysis 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, typically in October.

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. Monticello Sites Recent and Near-Term Activities and Deliverables

Activity or Deliverable	Schedule
Recent	
Fiscal year 2018 revision of Section 5.0 of the Site Management Plan	Submitted to EPA and UDEQ July 9, 2018. Comments and approval required by EPA and UDEQ.
Monticello, Utah, National Priorities List Sites Federal Facility Agreement (FFA) Quarterly Report: April 1–June 30, 2018 (DOE 2018a)	Submitted to EPA and UDEQ August 9, 2018 (not subject to review).
Annual site inspection	Completed the week of September 10, 2018.
Draft *Monticello Mill Tailings Site Operable Unit III Annual Groundwater Report May 2017 Through April 2018*	Submitted to DOE September 21, 2018.
Near-Term	
Semiannual OU III groundwater and surface water monitoring	Scheduled for the week of October 15, 2018.
Discussion of Operable Unit III and the GRO system	Scheduled for October 24, 2018.
Semiannual 2018 FFA meeting	Scheduled for October 24, 2018.
Monticello Mill Tailings Site Operable Unit III Annual Groundwater Report, May 2017–April 2018	Submit to EPA and UDEQ in October 2018.
2018 Annual Inspection Report for the DOE Monticello, Utah, Mill Tailings Site and Monticello Vicinity Properties	Submit to EPA and UDEQ by December 31, 2018.
Monticello, Utah, National Priorities List Sites Federal Facility Agreement (FFA) Quarterly Report: October 1–December 31, 2018	Submit to EPA and UDEQ by February 15, 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), 2018a. *Monticello, Utah, National Priorities List Sites Federal Facility Agreement (FFA) Quarterly Report: April 1–June 30, 2018*, LMS/MNT/S18941, Office of Legacy Management.

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

Appendix A

Monthly and Quarterly Surveillance Checklists

This page intentionally left blank

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	☒	☐	Bottom strant of fence was found broken near perimeter sign # 5 it was repaired at that time.
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 appears to be dry but in good condition.

Signature: _____ Date: 7/31/2018

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 7.8217

Inspection Item	Acceptable		Comments and Recommendation
	Yes	No	
Condition of:			
Fences, gates, and locks	☒	☐	
Roads	☒	☐	
Signs	☒	☐	
Visible piping	☒	☐	
Visible liner and anchors	☒	☐	Pond liner has several heat wrinkles showing.
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: Things appear to be in good shape.

Monticello LM Representative: Gary McKinney Date: 7/31/2018

MONTHLY CLIMATOLOGICAL SUMMARY for JUL. 2018

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	72.4	84.0	5:00p	60.3	6:30a	0.6	7.9	0.00	9.5	32.0	10:30a	NW
2	75.7	88.3	4:00p	60.2	6:00a	0.6	11.3	0.00	7.4	29.0	2:30p	WNW
3	75.1	85.5	4:00p	64.8	7:00a	0.0	10.1	0.00	8.4	29.0	4:00p	S
4	74.4	86.4	3:30p	53.3	6:30a	1.0	10.4	0.00	6.4	23.0	1:00p	SSE
5	76.0	89.9	4:00p	65.8	6:00a	0.0	11.0	0.00	5.8	28.0	3:30p	SE
6	73.7	86.3	5:30p	58.8	4:30a	0.5	9.2	0.00	7.1	21.0	12:30a	S
7	73.8	89.1	3:00p	61.0	10:30p	0.3	9.1	0.13	7.8	28.0	10:30p	SE
8	72.2	89.3	4:00p	58.3	6:30a	1.1	8.3	0.65	4.8	29.0	6:30p	SE
9	73.8	87.3	6:30p	59.3	5:00a	0.7	9.4	0.00	5.8	20.0	1:30p	SE
10	74.5	86.7	5:00p	62.5	6:30a	0.1	9.6	0.00	7.0	21.0	7:00p	S
11	70.7	86.6	3:30p	59.5	5:30a	0.8	6.5	0.63	6.0	21.0	4:00p	SE
12	68.3	80.7	5:30p	59.0	5:30a	1.3	4.7	0.00	4.7	17.0	2:00p	SW
13	71.2	84.8	3:30p	59.2	5:30a	0.7	6.9	0.00	3.4	19.0	3:30p	NW
14	69.3	82.2	3:30p	58.7	6:00p	1.0	5.3	0.91	8.5	29.0	5:30p	WNW
15	69.1	79.7	3:00p	59.6	4:30a	1.0	5.2	0.00	3.8	13.0	11:30a	NW
16	73.1	85.2	6:00p	63.9	1:00a	0.0	8.1	0.00	6.3	27.0	8:00p	S
17	72.5	83.5	4:30p	61.5	2:00a	0.4	7.9	0.00	6.5	24.0	10:00p	SE
18	75.2	87.5	6:30p	61.2	7:00a	0.2	10.4	0.00	5.5	25.0	12:00p	W
19	79.0	91.7	4:00p	64.3	7:00a	0.0	14.0	0.00	4.1	17.0	3:00p	W
20	74.1	86.6	3:30p	64.9	7:30a	0.0	9.1	0.03	5.2	20.0	2:30p	ESE
21	77.3	90.4	5:00p	62.9	6:30a	0.1	12.4	0.00	7.0	26.0	10:00p	SSE
22	77.3	89.4	5:30p	63.8	4:30a	0.0	12.3	0.00	6.0	29.0	5:30p	SSE
23	78.9	90.7	2:30p	63.7	5:00a	0.0	13.9	0.00	5.8	22.0	1:30p	NNW
24	73.4	86.3	2:00p	64.7	7:00a	0.0	8.4	0.13	7.2	33.0	7:30p	SSE
25	74.5	87.0	4:30p	63.6	6:30a	0.1	9.5	0.00	6.8	36.0	7:30p	S
26	76.4	88.0	2:00p	62.8	6:30a	0.0	11.5	0.00	5.5	25.0	2:30p	WNW
27	73.8	86.9	5:30p	64.9	1:30p	0.0	8.8	0.03	8.0	21.0	9:30a	S
28	68.9	85.7	3:30p	62.0	6:30a	0.6	4.5	0.02	10.4	42.0	5:30p	S
29	73.6	89.1	4:30p	55.8	4:30a	1.7	10.3	0.00	5.8	33.0	5:30p	WNW
30	75.6	86.6	4:00p	62.3	6:30a	0.1	10.7	0.00	9.0	29.0	1:30p	NNW
31	74.7	88.8	5:30p	59.4	7:00a	0.3	9.9	0.00	6.0	21.0	9:30a	W
	73.8	91.7	19	53.3	4	13.2	286.6	2.53	6.5	42.0	28	SSE

Max >= 90.0: 3
Max <= 32.0: 0
Min <= 32.0: 0
Min <= 0.0: 0
Max Rain: 0.91 ON 07/14/18
Days of Rain: 8 (>.01 in) 5 (>.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

Monthly Pond 4 Surveillance Checklist

Level of water in Pond 4 7.603

Inspection Item	Acceptable Yes	Acceptable No	Comments and Recommendation
Condition of:			
Fences, gates, and locks	☒	☐	
Roads	☒	☐	
Signs	☒	☐	New sign regarding access was added
Visible piping	☒	☐	
Visible liner and anchors	☒	☐	
Rescue equipment	☒	☐	Boat and flotation ring buoys are 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: Overall Pond 4 appears in decent shape and no other issues were observed.

Monticello LM Representative: Joanna Dalin Date: 8/31/18

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	☒	☐	
Vegetation	☒	☐	Knapweed is present on the northern side of the repository, towards the bottom of the rock slopes
Evidence of erosion of:			
Top of disposal cell[a]	☒	☐	Disposal cell is fine; vegetation is very dry
Disposal cell sideslopes[a]	☒	☐	
Ditches	☒	☐	
Surrounding area	☒	☐	
Evidence of:			
Vandalism	☒	☐	
Intrusion by livestock	☒	☐	
Burrowing animal damage	☒	☐	There are small animal burrows, but not of concern
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: Overall the disposal cell appears fine. A lot of rain was received between 8/1/18 and 8/31/18, and knapweed is intruding along the northern slopes where native vegetation deteriorated during the summer drought. No other notable issues were observed.

Signature: Joanna Dardis Date: 8/31/18

Monticello LM Representative

[a]Inspections required following a significant storm event

[b]Open to inspect quarterly

MONTHLY CLIMATOLOGICAL SUMMARY for AUG. 2018

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	76.5	86.9	5:30p	60.4	5:30a	0.1	11.6	0.01	7.6	23.0	2:30p	WSW
2	75.3	87.3	1:30p	64.6	7:00a	0.0	10.3	0.00	5.9	31.0	3:30p	WNW
3	73.0	84.5	5:00p	64.4	6:30a	0.0	8.0	0.00	5.1	21.0	6:00p	SW
4	73.7	87.4	2:00p	60.3	4:30a	0.5	9.2	0.00	5.2	25.0	1:00p	WSW
5	76.5	88.1	4:00p	60.7	5:00a	0.3	11.8	0.00	7.2	26.0	2:00p	WSW
6	77.5	89.0	3:00p	64.6	6:30a	0.0	12.5	0.00	6.5	22.0	7:30p	NW
7	76.6	88.7	3:00p	63.8	7:30a	0.0	11.7	0.00	6.9	26.0	2:30p	NW
8	77.4	88.0	3:00p	65.5	6:30a	0.0	12.4	0.00	9.1	26.0	1:30p	WNW
9	75.4	88.0	5:00p	59.8	7:00a	0.2	10.6	0.00	6.1	20.0	1:30p	WSW
10	74.1	88.0	5:30p	64.3	7:00a	0.0	9.1	0.00	8.4	25.0	8:30a	S
11	72.8	85.8	6:00p	62.7	5:30a	0.4	8.2	0.00	7.6	23.0	9:00a	S
12	74.0	87.8	4:00p	61.1	5:30a	0.3	9.4	0.00	8.3	23.0	9:30a	SSE
13	76.5	88.6	4:30p	63.6	7:30a	0.0	11.5	0.00	7.3	28.0	7:30p	WNW
14	73.4	84.9	4:30p	62.4	6:00a	0.1	8.5	0.00	5.1	42.0	8:00p	SSW
15	71.3	79.2	6:00p	65.7	2:30a	0.0	6.3	0.00	3.6	17.0	5:00p	WSW
16	71.8	82.4	5:30p	64.2	6:00a	0.0	6.8	0.28	5.2	23.0	1:30p	SSW
17	70.2	81.8	5:00p	56.9	7:00a	1.1	6.3	0.00	4.9	17.0	2:00a	WSW
18	70.9	81.6	4:30p	60.7	7:30a	0.3	6.2	0.00	8.1	28.0	3:00p	NW
19	68.5	79.5	3:00p	56.8	4:30a	1.6	5.1	0.00	8.1	24.0	1:00p	NW
20	72.0	85.7	3:30p	55.5	7:00a	2.0	8.9	0.00	6.6	25.0	2:00p	W
21	65.5	80.9	12:30p	56.2	11:30p	2.9	3.5	0.52	6.8	42.0	2:30p	SSE
22	62.4	72.3	5:30p	55.3	6:30a	4.0	1.4	0.02	7.3	23.0	12:30p	SSW
23	66.0	77.6	6:00p	57.1	4:30a	2.2	3.2	0.00	5.4	19.0	12:30a	SE
24	68.1	80.6	5:30p	52.7	7:30a	2.5	5.6	0.00	4.7	21.0	4:00p	S
25	68.2	81.6	2:30p	55.9	6:30a	1.9	5.1	0.00	6.1	32.0	1:30p	SW
26	66.4	79.8	5:00p	56.2	6:30a	2.4	3.8	0.01	10.8	29.0	12:00p	SSE
27	67.6	79.7	5:00p	54.5	7:00a	2.7	5.3	0.00	9.8	39.0	6:00p	SSE
28	68.3	80.3	3:30p	49.1	7:00a	2.1	5.4	0.00	7.3	27.0	1:00a	S
29	68.7	80.3	4:30p	54.9	5:30a	2.0	5.8	0.00	6.4	26.0	12:30p	SSE
30	69.2	83.1	5:00p	52.5	7:00a	2.4	6.6	0.00	6.0	28.0	12:00p	S
31	69.0	79.6	4:00p	57.3	5:30a	1.2	5.2	0.00	6.8	30.0	5:00p	SSW
	71.5	89.0	6	49.1	28	33.2	235.3	0.84	6.8	42.0	14	S

Max >= 90.0: 0
Max <= 32.0: 0
Min <= 32.0: 0
Min <= 0.0: 0
Max Rain: 0.52 ON 08/21/18
Days of Rain: 3 (>.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

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: There is no radiological material in the concrete bin.

Bill Cary / Bill Cary
Signature of Monticello LM Representative

8/15/2018
Date of Inspection

Monthly Pond 4 Surveillance Checklist

Level of water in Pond 4 7.404

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: Things appear to be in good shape.

Monticello LM Representative: Joanna Wardini Date: 9/26/2018

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 appears to be dry but in good condition.

Signature: Joanna Bordine Monticello LM Representative Date: 9/26/2018

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

MONTHLY CLIMATOLOGICAL SUMMARY for SEP. 2018

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	72.6	1:00p	51.6	11:30p	6.4	0.8	0.15	6.1	38.0	2:30p	WNW
2	60.3	76.6	3:30p	48.2	5:30a	6.5	1.8	0.00	3.7	21.0	7:00p	SE
3	62.6	73.9	3:30p	54.6	7:00a	4.1	1.7	0.00	4.9	17.0	10:30a	SSE
4	60.7	76.3	2:30p	53.6	6:30p	6.1	1.8	0.47	4.0	32.0	5:00p	WSW
5	57.8	69.2	3:30p	48.9	5:00a	7.6	0.4	0.04	4.2	17.0	4:00p	WNW
6	60.6	73.3	6:30p	52.3	1:30a	5.6	1.1	0.00	4.1	15.0	2:00p	WSW
7	66.4	79.2	4:30p	54.6	7:00a	2.9	4.3	0.00	5.0	30.0	3:30p	S
8	69.5	83.0	5:30p	56.6	7:30a	1.7	6.2	0.00	5.8	18.0	10:30a	SW
9	69.6	81.4	4:00p	58.7	6:00a	0.9	5.6	0.00	5.3	21.0	2:00p	WNW
10	71.0	83.0	2:00p	61.3	2:00a	0.4	6.4	0.00	7.2	30.0	1:30p	SSE
11	68.7	80.2	5:00p	56.4	6:30a	1.8	5.5	0.00	7.7	25.0	12:30p	SSE
12	67.7	80.7	5:00p	51.7	7:30a	2.3	5.1	0.00	8.5	31.0	2:00p	SSE
13	65.3	78.3	4:30p	50.3	7:30a	3.5	3.8	0.00	7.1	28.0	3:30p	S
14	64.8	78.4	4:30p	51.2	7:30a	4.5	4.4	0.00	5.9	23.0	2:00p	SSE
15	68.2	81.8	4:30p	52.6	6:30a	2.9	6.1	0.00	5.6	29.0	2:00p	W
16	70.0	82.3	3:00p	57.3	7:00a	1.4	6.4	0.00	5.1	26.0	3:30p	SSW
17	70.5	81.7	3:30p	57.7	7:00a	1.2	6.7	0.00	6.0	33.0	2:00p	SW
18	69.3	81.9	4:00p	54.4	7:30a	1.8	6.1	0.00	6.4	28.0	12:30p	WSW
19	61.5	73.7	2:30p	55.4	11:30p	4.0	0.6	0.00	7.7	27.0	3:00p	SSW
20	60.5	73.1	4:30p	50.9	6:30a	6.1	1.6	0.00	8.9	28.0	2:30p	SSE
21	63.6	77.1	4:30p	50.6	7:30a	5.0	3.5	0.00	5.4	19.0	3:30p	WNW
22	63.6	76.6	4:00p	47.1	4:30a	4.4	3.0	0.00	7.5	24.0	11:00a	SSE
23	65.2	76.3	2:30p	55.6	1:00a	2.8	3.0	0.00	7.2	24.0	1:30p	SSW
24	66.9	76.4	4:00p	56.2	12:00m	1.1	3.0	0.00	8.1	29.0	2:30p	SW
25	60.6	71.8	4:00p	49.4	7:30a	5.6	1.2	0.00	9.4	28.0	3:00p	WNW
26	59.8	71.0	2:00p	48.9	7:00a	6.5	1.3	0.00	8.4	26.0	2:00p	NW
27	61.1	77.2	5:00p	47.7	3:30a	6.7	2.8	0.00	4.5	15.0	2:00p	WSW
28	65.4	78.9	4:00p	47.7	7:30a	3.6	4.0	0.00	5.6	19.0	2:30p	W
29	64.4	76.0	4:30p	51.2	8:00a	3.5	2.9	0.00	7.2	27.0	4:30p	S
30	63.1	75.3	5:00p	48.1	7:30a	4.2	2.3	0.00	6.8	27.0	1:00p	SSE
	64.6	83.0	8	47.1	22	115.1	103.4	0.66	6.3	38.0	1	SSE

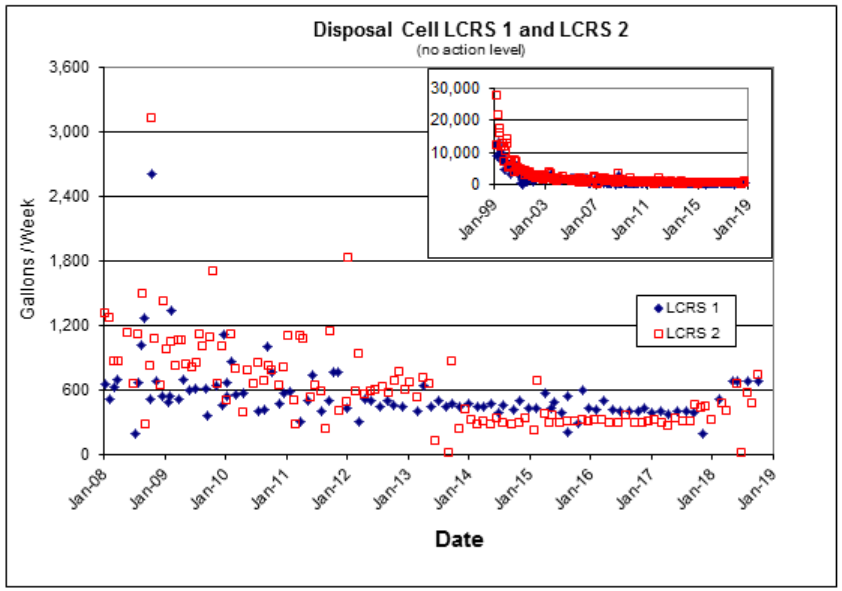
Max >= 90.0: 0
Max <= 32.0: 0
Min <= 32.0: 0
Min <= 0.0: 0
Max Rain: 0.47 ON 09/04/18
Days of Rain: 3 (>.01 in) 2 (>.1 in) 0 (>1 in)
Heat Base: 65.0 Cool Base: 65.0 Method: Integration

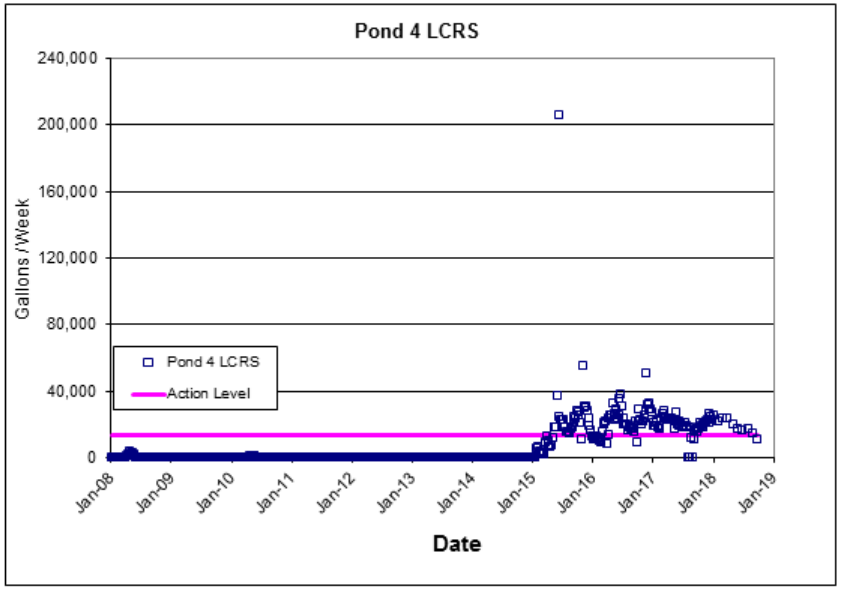
Appendix B

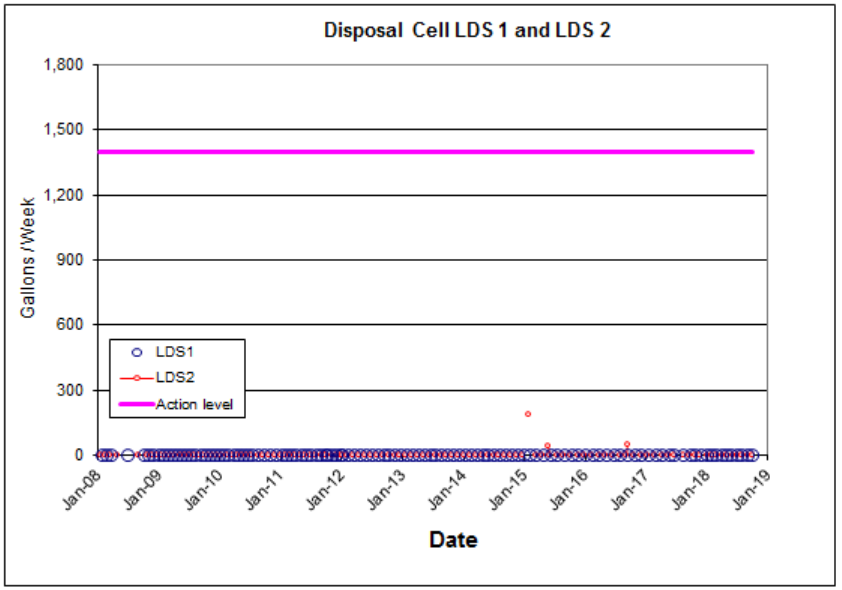
Graphs Showing Performance History for Disposal Cell and Pond 4 LCRS and LDS

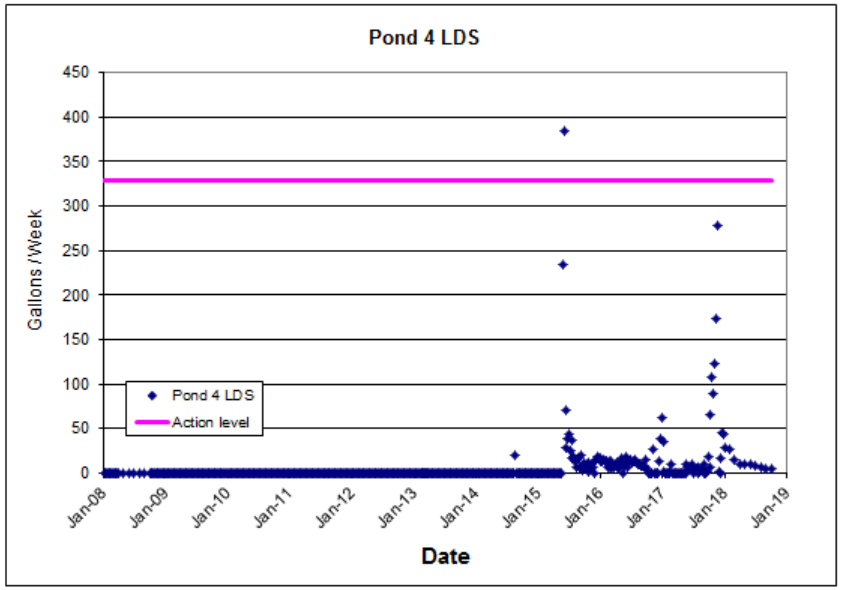
This page intentionally left blank

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









This page intentionally left blank