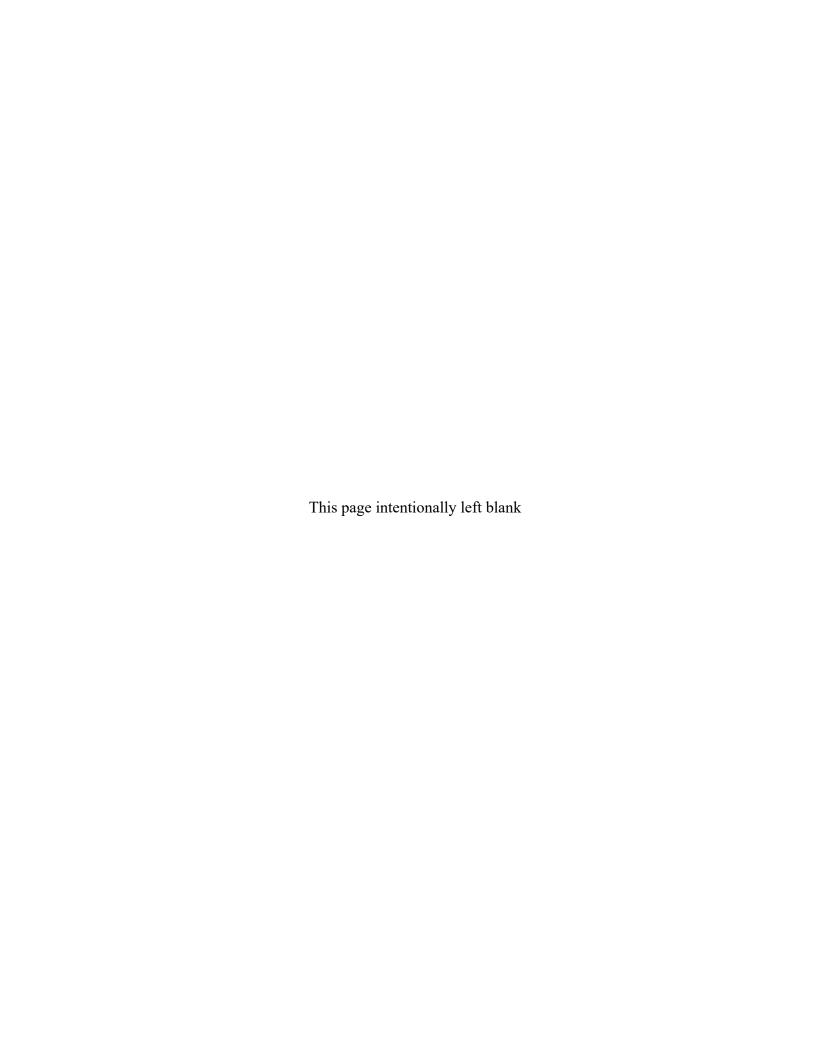


Monticello, Utah, National Priorities List Sites Federal Facility Agreement (FFA) Quarterly Report: October 1–December 31, 2019

February 2020





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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 ManagementLMS 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 October through December 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 develop a three-dimensional numerical fate and transport model to assess remedial time frames.

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 and pumped approximately 0.74 million gallons of water from the AOA.
- The semiannual sampling event for OU III and the 1-million-gallon water volume removal point from the AOA occurred during the week of October 14, 2019. The water samples were analyzed by the Legacy Management Support (LMS) subcontracted laboratory.

- In October, four game cameras were installed at the site. The game cameras were installed to view wildlife with emphasis on any wildlife that may be classified as special status (e.g., BLM species of special concern). The cameras were tentatively installed for 1 year. Photos that have been viewed, up to date, reveal no animals of concern.
- A meeting was held at the Westminster, Colorado, office on October 24, 2019, with LM, the LMS contractor, EPA, UDEQ, and Geosyntec Inc. to present preliminary results of the geochemistry study and discuss modeling efforts for the proposed closure strategy of OU III.
- The semiannual testing of the GRO emergency shutoff systems was performed in November. The system performed as designed.
- Additional column tests were performed on soils collected from the November 2018 core
  drilling in OU III. A 5% nitric acid leach procedure was used to help quantify the amount of
  mobile uranium from the soils/sediment used in the column tests. Prior data quantified total
  uranium, which included both mobile and immobile uranium.
- In December, Monticello project personnel met with the Utah Division of Natural Resources (DNR) officer concerning the newly installed wildlife-friendly fence. The Utah DNR plans on writing a "blog" about the installation and why ranchers, farmers, etc. may want to use a similar design for their fence installation.
- The *Quality Assurance Project Plan, Monticello, Utah, Disposal and Processing Sites* (December 2019) was updated this quarter.
- 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) did not exceed the action level this quarter. The Leak Detection System (LDS) did not exceed the action level for this quarter. Per the LTS&M Plan, LM has previously notified EPA and UDEQ of the past Pond 4 LCRS exceedance and the continued water being pumped from the LDS.
- Routine surveillance noted no operating deficiencies for the Temporary Storage Facility (TSF).

## 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 follows the 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 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.

- 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 860 gallons per week combined for 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.
  - A battery failure associated with System Operation and Analysis at Remote Site (SOARS) in LCRS 2 occurred in October, and the LMS-subcontracted electricians installed a new battery in November.
  - 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 but did not exceed the action levels this quarter (see Appendix B). LM has previously notified EPA and UDEQ of any Pond 4 action level exceedances.
  - 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, one pump, and materials removed from onsite radiological areas during maintenance.

#### 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 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. Sampling the wells is currently performed following the extraction of approximately 1 million gallons from the GRO system 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).

#### 3.3.2.1 GRO System Quarterly Performance Summary

The following summarize the performance of the GRO system:

- Groundwater extraction over the quarter was approximately 0.74 million gallons, equivalent to an average flow rate of 5.5 gallons per minute (gpm). Assuming the concentration of extracted water throughout the quarter was equal to the uranium concentration of the tank effluent on October 14, 2019, a total of 3.2 pounds of uranium were removed during this quarter.
- During the quarter, the volume of water stored in Pond 4 increased by approximately 0.64 million gallons. 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).

- 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 SOARS system.
- Cumulatively, the system has removed a total of approximately 21.2 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 6.4 and 8.8 pore volumes since system startup.
- From January 2015 through October 14, 2019, the GRO system removed approximately 111 pounds of uranium from the AOA aquifer (Table 2).

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 <sup>a</sup> (million gallons)		
October 2019	0.33	7.3	20.8		
November 2019	0.28	6.5	21.1		
December 2019 <sup>b</sup>	0.13	2.8	21.2		

#### Notes:

Table 2. Uranium Mass Removal from Groundwater in the AOA

Tank Effluent Sample Date <sup>a</sup>	Effluent Tank Uranium Concentration (µg/L)	Volume Removed Between Tank Samples (million gallons)	Uranium Removed (pounds) <sup>b</sup>	Cumulative Mass Uranium Removed <sup>c</sup> (pounds)
April 22, 2019	610	1.14	4.5	106
October 14, 2019	520	1.12	5.3	111

#### Notes:

#### 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 quarterly report but is provided in annual groundwater reports that are submitted to EPA and UDEQ.

<sup>&</sup>lt;sup>a</sup> Cumulative volume is based on the volume of groundwater extracted by the GRO system since system startup in January 2015.

<sup>&</sup>lt;sup>b</sup> Reporting end date is December 31, 2019.

<sup>&</sup>lt;sup>a</sup> Sampling occurs following the extraction of approximately 1 million gallons.

<sup>&</sup>lt;sup>b</sup> Based on median concentration between sampling dates.

<sup>&</sup>lt;sup>c</sup> Since GRO system startup in January 2015.

#### 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 2018b). 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. OU III closure strategy accomplishments this quarter are as follows:

• The Draft Groundwater Flow and Fate and Transport Model Quality Assurance Project Plan, Monticello Mill Tailings Site Operable Unit III was developed this quarter.

## 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								
Column tests using 5% nitric acid leach were conducted this quarter, and the data are being analyzed	Continues							
Monticello Mill Tailings Site Operable Unit III Annual Groundwater Report May 2018-April 2019 October 2019 (DOE 2019b)	Submitted to EPA and UDEQ October 31, 2019							
Monticello, Utah, National Priorities List Sites Federal Facility Agreement (FFA) Quarterly Report: July 1–September 30, 2019 (DOE 2019a)	Submitted to EPA and UDEQ November 15, 2019							
Monticello Mill Tailings Site Operable Unit III Geochemical Conceptual Site Model Update, November 2019	Submitted to EPA and UDEQ November 20, 2019							
Annual Site Inspection Report	Submitted to EPA and UDEQ December 19, 2019							
Near-	Term							
Monticello, Utah, National Priorities List Sites Federal Facility Agreement (FFA) Quarterly Report: October 1–December 31, 2019	Submit to EPA and UDEQ by February 15, 2020							
Monticello QAPP	Scheduled for February 2020							
Monticello Modeling QAPP	Scheduled for February 2020							
Meeting with LM, EPA, UDEQ, and LMS to discuss Fate and Transport Model and Performance Metrics	Scheduled for March 2020							
Spring Semiannual Sampling Event	Scheduled for the week of April 20, 2020							

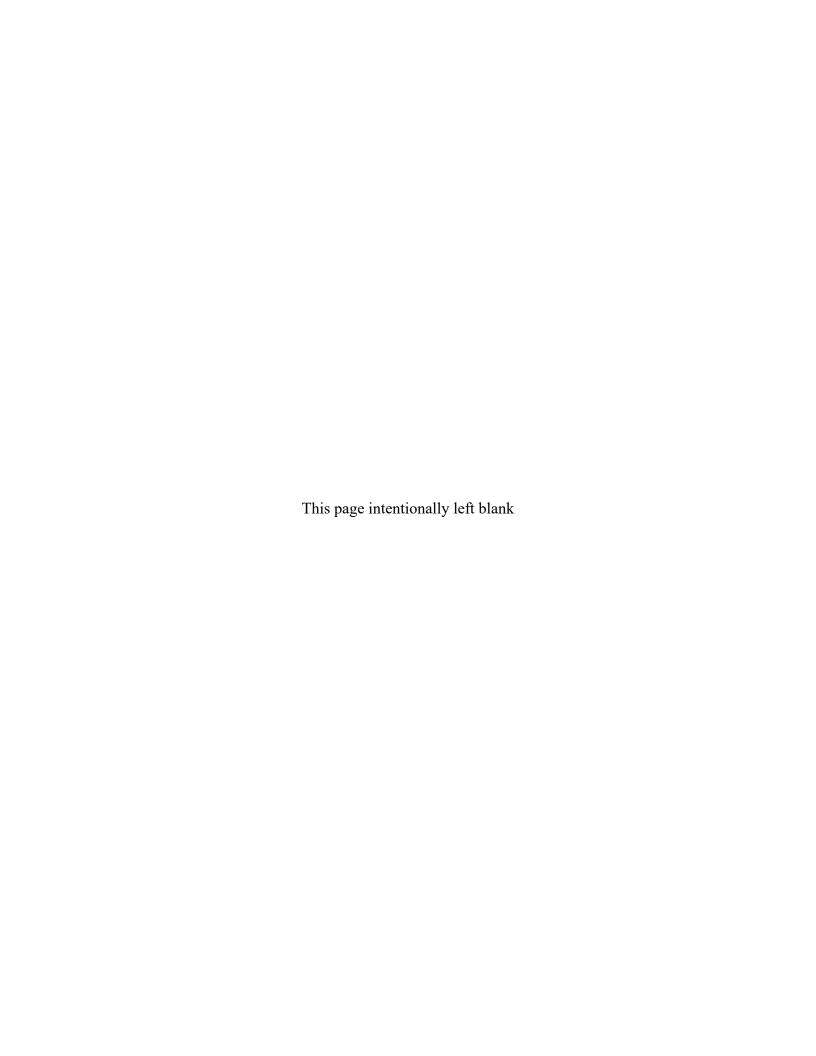
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- DOE (U.S. Department of Energy), 2003. *Monticello Site Management Plan*, GJO-2003-493-TAC, Section 5 (this section is continually updated), Office of Legacy Management, October.
- DOE (U.S. Department of Energy), 2004. Record of Decision for the 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. *OU III Closure Strategy for the Monticello Mill Tailings Site, Monticello, Utah*, LMS/MNT/S18146, Office of Legacy Management, May.
- DOE (U.S. Department of Energy), 2019a. *Monticello, Utah, National Priorities List Sites Federal Facility Agreement (FFA) Quarterly Report: July 1–September 30, 2019*, LMS/MNT/S27446, Office of Legacy Management, October.
- DOE (U.S. Department of Energy), 2019b. *Monticello Mill Tailings Site Operable Unit III Annual Groundwater Report May 2018-April 2019* (LMS/MNT/S26208), October 2019.

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# Appendix A

**Monthly and Quarterly Surveillance Checklists** 





# **Monthly Pond 4 Surveillance Checklist**

Inspection Item	Acce	ptable	Comments and Recommendation
	Yes	No	
Condition of:			
Fences, gates, and locks	$\boxtimes$		
Roads	$\boxtimes$		
Signs	$\boxtimes$		
Visible piping	$\boxtimes$		
Visible liner and anchors	$\boxtimes$		
Rescue equipment	$\boxtimes$		Boat remains at the pond.
Evidence of erosion of:			
Top of Pond 4 berm	$\boxtimes$		
Pond 4 sideslopes	$\boxtimes$		
Ditches	$\boxtimes$		
Surrounding area	$\boxtimes$		
Seepage from Pond 4	$\boxtimes$		
Overtopping of Pond 4	$\boxtimes$		
Evidence of:			
Vandalism	$\boxtimes$		
Intrusion by wildlife	$\boxtimes$		
Intrusion by humans	$\boxtimes$		
Accumulation of trash	$\boxtimes$		
Additional comments: The por not signed until 11-5-2019 due to			good condition. Inspection was completed on 10-30-2019 be
Monticello LM Representative:	Gary L. N	/lcKinn	on <sup>Gary L.</sup> McKinnon 2019.11.05 10:34:08 -07'00' Date: 10/30/2019



# Repository Area Surveillance Checklist

Monthly surveillance	☐ Qua	rterly s	urveillance: 🔲 February 🔲 May 🔲 August 🔲 November				
Storm event triggered su	ırveillan	ce due	to inches of rainfall over the past 24 hours.				
Inspection Item	Acce Yes	<b>ptable</b> No	Comments and Recommendation				
Condition of:							
Fences, gates, and locks	$\boxtimes$		One strand of barbed wire on the perimeter fence was repaired.				
Roads <sup>a</sup>	$\boxtimes$						
Signs	$\boxtimes$						
Site monuments	$\boxtimes$		*				
Drainage ditches <sup>a</sup>	$\boxtimes$						
Manholes	$\boxtimes$						
Vegetation	$\boxtimes$						
Evidence of erosion of:							
Top of disposal cella	$\boxtimes$						
Disposal cell sideslopes <sup>a</sup>	$\boxtimes$						
Ditches	$\boxtimes$						
Surrounding area	$\boxtimes$						
Evidence of:							
Vandalism	$\boxtimes$						
Intrusion by livestock	$\boxtimes$		·				
Burrowing animal damage	$\boxtimes$						
Intrusion by humans	$\boxtimes$						
Accumulation of trash	$\boxtimes$						
Additional Quarterly Surve Note: All transects, shown in F	illance igure 3-1	Requir , must b	rements be walked during this inspection.				
Condition of:							
Settlement plate structures							
Manholes <sup>b</sup>							
Sediment ponds							
Evidence of:							
Structural instability							
<b>Additional comments:</b> The repository appears to be in good condition. Inspection was completed on 10-31-2019 but not signed untill 11-5-2019 due to work schedule.							
Signature: Gary L.	McI		Gary L. McKinnon 2019.11.05 11:12:30 -07'00'  Date: 10/31/2019				
alnspections required following a significant storm event							

Open to inspect quarterly

LMS 5502MON

#### MONTHLY CLIMATOLOGICAL SUMMARY for OCT. 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	57.2	67.5	4:30p	49.5	8:00a	8.1	0.2	0.00	12.1	35.0	2:30p	S
2	50.5	63.7	5:00p	36.8	5:30a		0.0	0.00	7.1	24.0	11:00a	SSW
3	55.7	70.0	4:00p	40.7	2:30a		0.8	0.00	7.3	28.0	12:00p	SSE
4	56.3	70.2	4:00p	43.6	1:30a		0.7	0.00	9.0	45.0	12:30p	S
5	52.9	67.4	4:00p	42.0	5:30a		0.2	0.00	6.0	26.0	5:30p	MNM
6	49.9	59.6	5:00p	41.3	12:00m		0.0	0.00	10.6	30.0	6:30a	WNW
7	50.3	65.6	5:00p	33.3	7:00a		0.0	0.00	7.0	21.0	2:00p	SSE
8	56.0	69.6	3:30p	41.5	1:00a		0.8	0.00	6.7	25.0	1:30p	SSE
9	56.4	67.9	4:30p	45.3	12:00m		0.2	0.00	11.0	33.0	2:30p	SSE
10	34.3	45.3	12:30a	21.5	12:00m		0.0	0.00	14.9	36.0	3:00a	NM
11	34.8	51.2	4:30p	22.1	7:00a		0.0	0.00	5.4	15.0	1:30p	WNW
12	41.3	58.3	4:00p	25.3	6:00a	23.7	0.0	0.00	4.3	16.0	11:00a	W
13	46.5	62.0	3:00p	29.3	5:30a		0.0	0.00	6.3	25.0	2:00p	SSE
14	51.1	65.4	3:30p	39.0	5:00a		0.0	0.00	6.6	25.0	2:30p	WSW
15	52.1	65.0	3:00p	39.9	8:00a	12.9	0.0	0.00	6.6	21.0	1:30p	WSW
16	53.0	67.5	3:30p	39.8	7:30a	12.3	0.2	0.00	4.3	15.0	4:00p	SE
17	54.8	65.5	5:00p	44.0	2:30a	10.2	0.0	0.00	9.9	33.0	4:00p	S
18	47.1	52.8	12:30a	36.7	12:00m	17.9	0.0	0.00	10.9	28.0	7:30a	NM
19	46.1	56.3	3:30p	29.0	7:00a	18.9	0.0	0.00	8.3	28.0	1:00p	S
20	35.9	50.6	12:30a	26.9	11:00p	29.1	0.0	0.00	12.1	32.0	4:30a	NW
21	37.7	49.0	3:30p	24.2	7:00a	27.3	0.0	0.00	8.6	35.0	12:30p	NW
22	44.0	57.3	4:00p	32.3	1:00a	21.0	0.0	0.00	8.3	26.0	3:00p	NW
23	46.5	58.5	4:00p	35.2	12:00m		0.0	0.00	8.6	34.0	10:30p	NW
24	34.9	42.3	3:30p	27.7	7:30a	30.1	0.0	0.00	14.0	30.0	5:30a	NW
25	43.5	57.5	3:30p	34.3	3:30a	21.5	0.0	0.00	7.0	18.0	6:30a	NW
26	45.9	58.0	3:30p	32.7	5:00a	19.1	0.0	0.00	8.6	30.0	3:00p	SE
27	41.9	57.0	2:30p	25.9	12:00m	23.1	0.0	0.00	12.9	38.0	q00:8	NW
28	26.5	36.2	4:00p	19.0	7:30a	38.5	0.0	0.00	12.6	36.0	6:30a	NW
29	28.5	40.2	3:00p	17.3	12:00m		0.0	0.00	12.9	35.0	7:00p	S
30	15.0	25.2	4:00p		7:00a		0.0	0.00	13.2	40.0	1:30a	NW
31	25.7	42.5	4:30p	13.2	3:00a	39.3	0.0	0.00	3.6	14.0	1:00p	SE
	44.3	70.2	4	6.5	30	645.8	3.1	0.00	8.9	45.0	4	NW

Max >= 90.0: 0Max <= 32.0: 1

Min <= 32.0: 13

Min  $\leq 0.0:0$ 

Max Rain: 0.00 ON 10/01/19

Days of Rain: 0 (>.01 in) 0 (>.1 in) 0 (>1 in)

Heat Base: 65.0 Cool Base: 65.0 Method: Integration



# **Monthly Pond 4 Surveillance Checklist**

Level of water in Pond 4	7.75						
Inspection Item	Acceptable		Comments and Recommendation				
	Yes	No					
Condition of:							
Fences, gates, and locks	$\boxtimes$						
Roads	$\boxtimes$						
Signs	$\boxtimes$		One Radcon posting was changed out on the pond rope.				
Visible piping	$\boxtimes$		Pipe stub outs are only visible and they are okay.				
Visible liner and anchors	$\boxtimes$						
Rescue equipment	$\boxtimes$		Boat remains at the pond.				
Evidence of erosion of:							
Top of Pond 4 berm	$\boxtimes$						
Pond 4 sideslopes	$\boxtimes$						
Ditches	$\boxtimes$						
Surrounding area	$\boxtimes$						
Seepage from Pond 4							
Overtopping of Pond 4							
Evidence of:							
Vandalism			P				
Intrusion by wildlife	$\boxtimes$						
Intrusion by humans	$\boxtimes$						
Accumulation of trash	$\boxtimes$						
Additional comments: A be in good condition.	section of Rad-Ro	oe was rep	placed on the east side of the pond. Everything else appears to				
Monticello LM Representative: Gary L. McKinnon Date: 2019.11.27 09:42:03 -07'00' Date: 11/27/2019							



# **Repository Area Surveillance Checklist**

	⊠ Qua	rterly sur	veillance:         February					
Storm event triggered sur	veillan	ce due to	inches of rainfall over the past 24 hours.					
Inspection Item	Acce Yes	<b>ptable</b> No	Comments and Recommendation					
Condition of:								
Fences, gates, and locks	$\boxtimes$							
Roads <sup>a</sup>	$\boxtimes$							
Signs	$\boxtimes$							
Site monuments	$\boxtimes$							
Drainage ditches <sup>a</sup>	$\boxtimes$							
Manholes	$\boxtimes$							
Vegetation	$\boxtimes$							
Evidence of erosion of:								
Top of disposal cella	$\boxtimes$							
Disposal cell sideslopes <sup>a</sup>	$\boxtimes$							
Ditches	$\boxtimes$							
Surrounding area	$\boxtimes$							
Evidence of:								
Vandalism	$\boxtimes$							
Intrusion by livestock	$\boxtimes$							
Burrowing animal damage	$\boxtimes$							
Intrusion by humans	$\boxtimes$							
Accumulation of trash	$\boxtimes$							
Additional Quarterly Surve Note: All transects, shown in Fig.								
Condition of:								
Settlement plate structures	$\boxtimes$							
Manholes <sup>b</sup>	$\boxtimes$							
Sediment ponds	$\boxtimes$							
Evidence of:	$\boxtimes$							
Structural instability	$\boxtimes$							
Additional comments: The	Additional comments: The site appears to be in good condition.							
Signature: Gary L. Mo	Kinr		Digitally signed by Gary L. McKinnon  Date: 2019.11.27 09:31:07 -07'00'  Date: 11/27/2019					
Monticello LM Representative  alno required following a significant storm event bopen to inspect quarterly								

LMS 5502MON

Page 1 of 1

January 2019

#### MONTHLY CLIMATOLOGICAL SUMMARY for NOV. 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	34.0	47.6	4:00p	19.9	1:00a	31.0	0.0	0.00	7.4	23.0	12:00p	WNW
2	37.5	53.7	4:30p	27.5	8:00a	27.5	0.0	0.00	3.8	17.0	1:30p	WSW
3	41.2	57.0	q00:E	27.0	6:30a	23.8	0.0	0.00	4.1	12.0	10:30a	WSW
4	45.0	59.8	1:30p	31.9	6:00a	20.0	0.0	0.00	5.1	26.0	11:30a	WSW
5	45.3	59.3	2:30p	33.9	7:00a		0.0	0.00	4.4	17.0	1:00p	WSW
6	44.7	59.1	2:30p	31.8	6:30a		0.0	0.00	4.8	18.0	1:30p	SW
7	45.8	58.6	1:30p	35.3	6:30a	19.2	0.0	0.00	5.6	19.0	2:30p	W
8	46.4	57.5	1:30p	35.0	6:00a	18.6	0.0	0.00	6.9	22.0	12:30p	WSW
9	48.6	62.8	2:00p	35.8	5:30a	16.4	0.0	0.00	3.8	12.0	3:30p	MNM
10	45.7	60.8	3:00p	33.8	7:30a	19.3	0.0	0.00	2.7	11.0	3:00p	SW
11	44.2	52.2	1:00p	33.0	12:00m	20.8	0.0	0.00	9.5	23.0	12:30p	NM
12	36.4	49.6	3:30p	24.0	6:30a	28.6	0.0	0.00	4.7	18.0	10:00a	SE
13	40.8	56.0	1:00p	27.0	3:30a	24.2	0.0	0.00	5.5	22.0	1:30p	MNM
1.4	44.3	57.2	3:00p	33.1	6:30a	20.7	0.0	0.00	3.7	13.0	12:00m	M
15	44.7	54.0	2:30p	37.1	11:30p	20.3	0.0	0.00	7.7	24.0	1:30p	SSE
16	45.0	56.9	2:00p	34.1	q00:8	20.0	0.0	0.00	5.8	24.0	1:30p	MNM
17	43.1	54.4	3:30p	33.7	4:30a	21.9	0.0	0.00	7.4	23.0	12:00p	NNM
18	46.2	59.4	2:30p	33.9	7:30a	18.8	0.0	0.00	5.7	19.0	1:30p	NNM
19	44.6	54.1	3:30p	34.1	7:30a	20.4	0.0	0.17	8.6	26.0	12:30p	SSE
20	41.3	43.6	2:30a	38.4	12:00m	23.7	0.0	0.87	11.4	33.0	8:30p	SSE
21	35.7	39.1	3:00p	32.4	12:00m	29.3	0.0	0.19	6.0	30.0	12:30a	SSE
22	33.0	40.8	3:00p	29.1	7:30a	32.0	0.0	0.01	3.3	17.0	3:30p	WNW
23	33.8	42.9	1:30p	25.2	10:30p	31.2	0.0	0.00	5.8	18.0	6:00a	NNW
24	32.9	45.1	3:30p	22.7	7:30a	32.1	0.0	0.00	2.9	10.0	10:30a	W
25	30.8	38.9	3:00p	25.3	11:30p	34.2	0.0	0.00	11.0	33.0	12:00m	SSE
26	20.8	26.3	2:30p	12.6	8:30p	44.2	0.0	0.00	12.1	37.0	12:30a	WNW
27	28.5	35.0	9:00p	18.3	12:30a	36.5	0.0	0.00	12.1	35.0	11:00a	SSE
28	33.0	35.3	8:00p	30.3	11:30a		0.0	0.00	7.6	27.0	6:00a	S
29	30.1	37.4	6:00a	20.2	10:30p		0.0	0.59	5.3	30.0	6:30a	SE
30	20.4	31.5	4:30p	12.7	7:30a	44.6	0.0	0.10	1.9	11.0	8:00p	SSE
	38.8	62.8	9	12.6	26	786.2	0.0	1.93	6.2	37.0	26	SSE

Max >= 90.0: 0Max <= 32.0: 2

Min <= 32.0: 16

Min  $\leq 0.0: 0$ 

Max Rain: 0.87 ON 11/20/19

Days of Rain: 5 (>.01 in) 4 (>.1 in) 0 (>1 in)

Heat Base: 65.0 Cool Base: 65.0 Method: Integration



# **Repository Area Surveillance Checklist**

	∐ Qua	rterly s	surveillance:				
Storm event triggered surveillance due to inches of rainfall over the past 24 hours.							
Inspection Item	Acce Yes	ptable No	Comments and Recommendation				
Condition of:							
Fences, gates, and locks	$\boxtimes$						
Roads <sup>a</sup>	$\boxtimes$		Snow packed.				
Signs	$\boxtimes$						
Site monuments	$\boxtimes$						
Drainage ditches <sup>a</sup>	$\boxtimes$						
Manholes	$\boxtimes$						
Vegetation	$\boxtimes$						
Evidence of erosion of:							
Top of disposal cella	$\boxtimes$						
Disposal cell sideslopes <sup>a</sup>	$\boxtimes$						
Ditches	$\boxtimes$						
Surrounding area	$\boxtimes$						
Evidence of:							
Vandalism	$\boxtimes$						
Intrusion by livestock	$\boxtimes$						
Burrowing animal damage	$\boxtimes$		·				
Intrusion by humans	$\boxtimes$						
Accumulation of trash	$\boxtimes$						
Additional Quarterly Surve Note: All transects, shown in Fi			irements be walked during this inspection.				
Condition of:							
Settlement plate structures							
Manholes <sup>b</sup>							
Sediment ponds							
Evidence of:							
Structural instability							
Additional comments: The repository is covered with snow but appears to be in good condition.							
			Contract to the contract of th				
Signature: Gary L.	Mck	(inr	Digitally signed by Gary L. McKinnon Date: 2019,12,31 11:52:37 -07'00' Date: 12/31/2019				
Monticello LM Representative							

<sup>a</sup>Inspections required following a significant storm event <sup>b</sup>Open to inspect quarterly

LMS 5502MON



# **Monthly Pond 4 Surveillance Checklist**

Level of water in Pond 4	8.455						
Inspection Item	Ace	ceptable	Comments and Recommendation				
	Yes	No					
Condition of:							
Fences, gates, and locks	$\boxtimes$						
Roads	$\boxtimes$		Snow packed.				
Signs	$\boxtimes$		·				
Visible piping	$\boxtimes$						
Visible liner and anchors	$\boxtimes$						
Rescue equipment	$\boxtimes$		Boat remains at the pond.				
Evidence of erosion of:							
Top of Pond 4 berm	$\boxtimes$						
Pond 4 sideslopes	$\boxtimes$		·				
Ditches	$\boxtimes$						
Surrounding area	$\boxtimes$						
Seepage from Pond 4	$\boxtimes$						
Overtopping of Pond 4	$\boxtimes$						
Evidence of:							
Vandalism	$\boxtimes$						
Intrusion by wildlife	$\boxtimes$						
Intrusion by humans	$\boxtimes$						
Accumulation of trash	$\boxtimes$						
Additional comments: The pond is frozen over with several inches of snow on the ground but things appears to be in good condition.							
	Gary I	McKinn	On Digitally signed by Gary L. McKinnon				
Monticello LM Representative:  Gary L. McKinnon Digitally signed by Gary L. McKinnon Date: 2019.12.31 09:49:21 -07'00'  Date: 12/31/2019							

#### MONTHLY CLIMATOLOGICAL SUMMARY for DEC. 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	22.6	33.4	12:30p	12.4	6:00a	42.4	0.0	0.00	3.6	11.0	11:00p	SSE	-
2	29.9	40.4	3:00p	21.2	1:30a	35.1	0.0	0.03	4.2	18.0	11:00a	SE	
3	33.4	45.3	2:30p	22.5	3:00a	31.6	0.0	0.00	2.4	8.0	1:30a	W	
4	35.8	41.8	2:30p	28.8	5:30a	29.2	0.0	0.36	6.1	22.0	12:00p	SSE	
5	34.6	41.3	1:00p	27.6	11:30p	30.4	0.0	0.13	3.9	26.0	12:30a	W	
6	32.2	41.4	2:30p	24.0	5:30a	32.8	0.0	0.01	4.0	14.0	10:30a	W	
7	36.5	41.2	1:00p		1:30a	28.5	0.0	0.00	10.2	27.0	9:00a	SSE	
8	35.4	40.7	1:30p	30.5	11:30p	29.6	0.0	0.05	6.9	22.0	3:30a	SSE	
9	30.5	36.8	2:00p		7:30a	34.5	0.0	0.06	6.8	21.0	12:00p	WNW	
10	31.0	42.3	4:30p	21.7	5:30a	34.0	0.0	0.00	3.4	11.0	1:00a	SW	
11	29.2	36.6	3:30p	24.5	3:30a	35.8	0.0	0.00	7.0	26.0	8:30a	SSE	
12	31.0	41.1	2:00p		6:30a	34.1	0.0	0.00	3.8	13.0	12:30p	SE	
13	36.2	42.6	12:30p	28.8	2:00a	28.8	0.0	0.00	6.0	28.0	11:30a	ИМ	
1.4	34.6	44.1	2:30p	28.5	11:30p	30.4	0.0	0.00	7.8	28.0	4:00a	MMM	
15	25.5	29.1	12:30a		11:30p	39.5	0.0	0.00	8.9	31.0	11:30p	NW	
16	19.4	23.4	3:30p	15.0	11:00p	45.6	0.0	0.00	13.1	29.0	12:30a	NW	
17	20.3	30.5	3:00p	11.9	8:00a	44.7	0.0	0.00	5.9	15.0	12:30a	MNM	
18	26.9	37.3	2:30p	14.7	4:30a	38.1	0.0	0.00	6.4	20.0	2:30p	S	
19	29.1	35.5	1:00p	21.1	12:30a	35.9	0.0	0.00	6.4	19.0	11:30p	S	
20	30.4	39.8	1:30p	22.7	8:00a	34.6	0.0	0.00	6.3	18.0	10:30a	WNW	
21	30.5	41.8	2:30p	24.1	7:30a	34.5	0.0	0.00	3.2	11.0	12:00p	M	
22	38.5	47.0	12:30p		1:00a	26.5	0.0	0.00	7.0	21.0	11:00a	S	
23	38.0	41.8	11:30a		6:00a	27.0	0.0	0.00	8.6	24.0	12:30p	S	
24	33.4	37.5	12:30a	31.1	9:30p	31.6	0.0	0.04	9.8	26.0	2:00a	SSE	
25	28.0	31.9	1:00a	25.9	7:30p	37.0	0.0	0.04	8.2	28.0	8:00a	SSE	
26	24.0	30.6	4:00p	16.6	7:30a	41.0	0.0	0.12	4.5	18.0	2:00a	SSE	
27	26.8	31.5	10:00a	22.4	6:30p	38.2	0.0	0.04	2.0	12.0	9:00a	S	
28	19.1	24.7	12:30a	13.9	12:00m		0.0	0.00	15.1	36.0	10:00p	ИМ	
29	13.5	19.0	3:00p	7.8	6:30p	51.5	0.0	0.00	10.4	34.0	3:30a	MNM	
30	17.0	25.2	2:30p		12:00m		0.0	0.00	3.7	11.0	9:30p	ИМ	
31	15.3	27.9	3:00p	8.1	12:30a	49.7 	0.0	0.03	2.6	9.0	1:30a	WWW	
	28.7	47.0	22	7.8	29 1	126.5	0.0	0.91	6.4	36.0	28	SSE	

Max >= 90.0: 0Max <= 32.0: 10

 $Min \le 32.0: 30$ 

Min  $\leq 0.0: 0$ 

Max Rain: 0.36 ON 12/04/19

Days of Rain: 10 (>.01 in) 3 (>.1 in) 0 (>1 in)

Heat Base: 65.0 Cool Base: 65.0 Method: Integration



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

Acceptable?								
Yes	No							
$\boxtimes$		Was the gate locked upon arrival?						
$\boxtimes$		Are signs posted in accordance with Section 3.4.4?						
$\boxtimes$		Are all posting legible?						
$\boxtimes$		Are enclosures on the concrete bin and stored drum containers tight?						
$\boxtimes$		Are containers in good physical condition (no rust, no holes, no bulges, etc.)?						
$\boxtimes$		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.)?						
$\boxtimes$		Has radiological monitoring been conducted in accordance with Section 3.4.5?						
$\boxtimes$		Is the security fence in good condition?						
Com	ments	: There is no radiologically contaminated material in the concrete bin.						

Colton M. Berube Berube

Digitally signed by Colton M.

Date: 2019.11.25 14:47:24 -07'00'

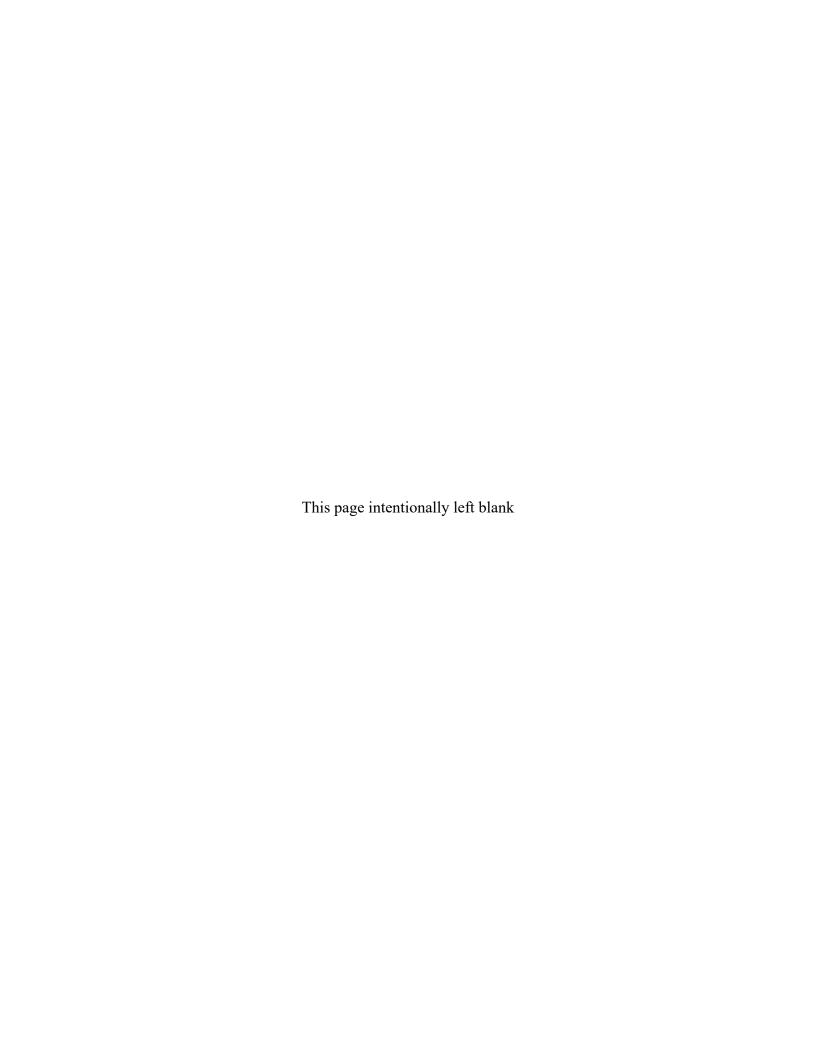
11/25/2019

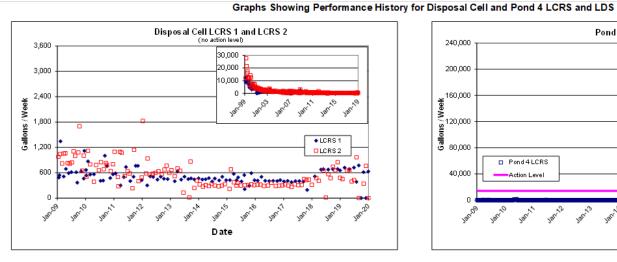
Signature of Monticello LM Representative

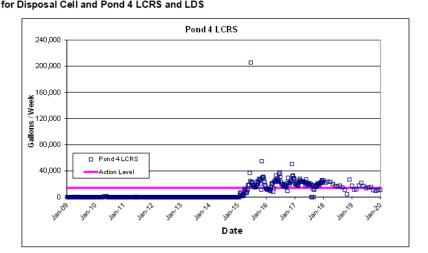
Date of Inspection

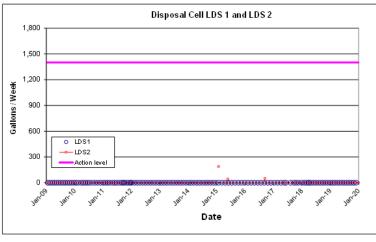
# Appendix B

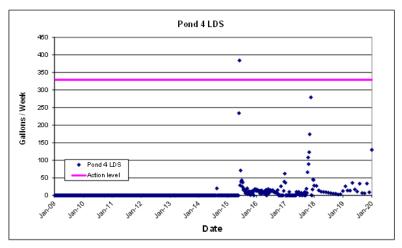
Graphs Showing Performance History for Disposal Cell and Pond 4 LCRS and LDS











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