LMS/MNT/S38141

Monticello, Utah, National Priorities List (NPL) Sites Federal Facility Agreement (FFA) Quarterly Report: October 1–December 31, 2021

January 2022

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Abbreviations

3D	three-dimensional
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
gpad	gallons per acre per day
gpm	gallons per minute
GRO	Groundwater Remedy Optimization
IC	institutional control
LCRS	Leachate Collection and Removal System
LDS	Leak Detection System
LM	Office of Legacy Management
LMS	Legacy Management Support
LTS&M	long-term surveillance and maintenance
MMTS	Monticello Mill Tailings Site
MNA	monitored natural attenuation
MVP	Monticello Vicinity Properties
OU	Operable Unit
PRB	permeable reactive barrier
QAPP	Quality Assurance Project Plan
SMP	Site Management Plan
TSF	Temporary Storage Facility
UDEQ	Utah Department of Environmental Quality
UDOT	Utah Department of Transportation
USC	*United States Code*
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), collectively called the LM Monticello, Utah, Disposal and Processing Sites, for October 1 through December 31, 2021. The MVP and MMTS are regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (Title 42 *United States Code* Section 9601 et seq. [42 USC 9601 et seq.]). Quarterly reports are submitted to EPA and UDEQ in February (for October through December), May (for January through March), August (for April through June), and November (for July through September).

LM assesses MVP and MMTS conditions and remedy protectiveness through (1) monthly, quarterly, and annual inspections of site infrastructure and operations as specified under the *Long-Term Surveillance and Maintenance Plan for Monticello NPL Sites* (DOE 2018a), also called the Long-Term Surveillance and Maintenance (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 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 called the Area of Attainment (AOA).

Annual groundwater reports present comprehensive data evaluation for the groundwater and surface water OU III remedy. LM has utilized the data presented in the most recent annual groundwater report to update the conceptual site model and develop a three-dimensional (3D) 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), also called the SMP. Section 5.0 of that document is updated annually.

1.1 Quarterly Site Status

In summary, the activities and observations for this quarter consist of the following:

- The Groundwater Remedy Optimization (GRO) system operated as planned from October through December and pumped approximately 1,030,000 gallons of water from the AOA. The GRO system was shut down on December 27 after the discovery of a small (pinhole size) leak in the piping. The leak produced a mist that dampened the immediate area around the pipe and was cleaned up in accordance with operating procedures. The piping was repaired in early January 2022.

- LM sent its response to comments from EPA and UDEQ on the *Quality Assurance Project Plan, Monticello, Utah, Disposal and Processing Sites* (LM-Plan-3-21-1.0, LMS/MNT/S27252), also called the QAPP, to those agencies on June 15, 2021. UDEQ responded with no further comments in July 2021, and EPA provided additional comments in September 2021. LM sent its response to EPA's comments on December 20, 2021.
- The previous period's Federal Facility Agreement (FFA) quarterly report was sent to EPA and UDEQ in November 2021.
- LM received no further comments from UDEQ on the draft *Monticello Mill Tailings Site Operable Unit III Groundwater Flow and Contaminant Transport Model Report* (DOE 2021c). LM received no further comments from EPA on the report on November 1, 2021.
- Comments on the draft *Monitored Natural Attenuation Demonstration Report, Operable Unit III, Monticello Mill Tailings Site, Monticello, Utah* (DOE 2021a), also called the monitored natural attenuation (MNA) demonstration report, were received from EPA last reporting period and from UDEQ on April 30, 2021. The Legacy Management Support (LMS) contractor prepared responses that were submitted to EPA and UDEQ in July 2021. LM received no further comments from EPA and UDEQ on November 1, 2021.
- The draft *Monticello Mill Tailings Site Operable Unit III Annual Groundwater Report May 2020–April 2021* (DOE 2021b) was submitted to EPA and UDEQ in October 2021.
- The LMS contractor submitted the draft CERCLA Five-Year Review reports to LM for review in December 2021.
- Weekly site inspections were performed by site personnel to verify the integrity of the site's systems and monitor activities that might occur in supplemental standards properties (e.g., city of Monticello streets and utility corridors).
- Site personnel continued working under Phase 3 of the coronavirus-related limited operations return-to-work procedures, which allowed people to work at the site every day except weekends and holidays (i.e., a continuation of the policy in effect since May 18, 2020).
- Site personnel performed monthly and quarterly site inspections in accordance with the LTS&M Plan.
- Routine surveillance noted no anomalous conditions for the MVP remedy.
- Routine surveillance noted no violations of MMTS ICs that restrict land and groundwater use.
- Routine surveillance noted no anomalous conditions for the surface features of the disposal cell and Pond 4, the engineered solar evaporation pond.
- The volume of water pumped from the Pond 4 Leachate Collection and Removal System (LCRS) did not exceed the action level this quarter.
- Routine surveillance noted no operational deficiencies for the Temporary Storage Facility (TSF).

2.0 MVP

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 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 officials via telecommunications 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.
- Two excavations occurred in the city streets and utility corridors this quarter. Site personnel radiologically surveyed the removed soils from the excavations, and no radiologically contaminated materials were found.
- Neither excessive erosion nor unauthorized excavations were observed at the U.S. Highway 191 embankment at Montezuma Creek (supplemental standards property).
- A surveillance of property MS-00176-VL identified no excessive erosion of supplemental standards material or violation of the land-use restriction.

3.0 MMTS

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, (2) surveillance of properties affected by groundwater- and land-use ICs on the former Monticello mill (mill site) and peripheral properties, and (3) operation and maintenance of the OU III groundwater remediation system.

3.1 OU I

OU I consists of the property that contained the mill site and 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 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 the waste remains isolated from the environment.

Inspection observations and maintenance activities for the quarter consist of the following:

- No area of the cover showed 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. No further minor burrowing by voles and small ground squirrels was observed this quarter on the disposal cell and Pond 4 berm.
- 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 quarter include the following:
  - Leachate production from the disposal cell was approximately 1010 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.
  - 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 OU III GRO system resulted in increased water collection in the Pond 4 LCRS. LCRS and LDS action levels, approved by EPA and UDEQ, were formally developed in the *Repository and Pond 4 Groundwater Contingency Plan-Final* (DOE 1998) and are also found in Section D5.0 of the LTS&M Plan. The leakage rate established for the Pond 4 LCRS is 851 gallons per acre per day (gpad) (2000 gallons per day), and the leakage rate for the LDS is 20 gpad (47 gallons per day), which is averaged over a 7-day period. These leakage rates are based on the area of the floor of Pond 4, which is 2.35 acres. Currently, the LCRS and LDS monitoring and pumping systems are functioning as designed to recirculate water back into Pond 4.
- Findings for the Pond 4 LCRS and LDS this period are as follows:
  - Water collection at the Pond 4 LCRS continued but did not exceed the action levels this quarter (see Appendix B)
  - Water collection in the Pond 4 LDS remained below the action level (see Appendix B)

3.1.2 TSF

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 this quarter (see surveillance checklists in Appendix A) revealed that:

- 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. In summary, recent TSF activity consists of the following:

- The TSF stores no soils or excavation products from city street projects or supplemental standards properties

3.1.3 Mill Site

LM conducts surveillance of the mill site (properties MP-00181-VL and MS-00893-VL) to ensure compliance with ICs implemented to preserve the OU I remedy for soil and groundwater. ICs applicable to the mill site include prohibitions on installing domestic-use wells in the alluvial aquifer, constructing habitable structures, and camping, as well as preserving the properties for day use as a public park.

Surveillance results for this quarter revealed:

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

3.2 OU II

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

Surveillance results for this quarter are summarized below for the different components of OU II.

- **Montezuma Creek Restrictive Easement Area (supplemental standards properties, both city-owned and privately owned):** No evidence of nonconformance with land-use restrictions (soil removal or construction of habitable structures in supplemental standards properties) was observed.
- **Groundwater-use restrictions (e.g., prohibition on installing 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.
- **Property MP-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 resulted in more than 2.8 inches of precipitation in 24 hours, which would require surveillance of supplemental standards cleanup properties for excessive erosion.

3.3 OU III

OU III consists of groundwater and surface water contamination resulting from operation of the mill site. Routine monitoring of OU III (water quality and water level) is normally performed semiannually in April and October; the next semiannual sampling event is scheduled for April 2022.

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 restricting use. Montezuma Creek is used for limited irrigation and livestock watering. There are no ICs restricting surface water use.

The current groundwater remedy includes (1) MNA 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 are 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 (ICs)

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 State of Utah 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. These 22 wells are sampled following the extraction of approximately 1,000,000 gallons of water 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 GRO system performance for the quarter is summarized below.

- Groundwater extraction during the quarter was approximately 1,030,000 gallons, equivalent to an average flow rate of 7.76 gallons per minute (gpm). Assuming the concentration of extracted water throughout the quarter was equal to the uranium concentration of the tank effluent on November 9, 2021 (the date of the most recent sample collected), 5.0 pounds of uranium were removed during this quarter.
- During the quarter, the volume of water stored in Pond 4 increased by approximately 660,000 gallons. The GRO system operates by balancing the extraction rate and the Pond 4 evaporation rate while maintaining the Pond 4 storage volume between 5,000,000 and

8,000,000 gallons (the maximum storage volume of Pond 4 is approximately 15,600,000 gallons).

- Water-level monitoring during the quarter consisted of:
  - Continuous water-level monitoring in AOA extraction and monitoring wells using pressure transducers and dataloggers (programmed to record at 5-minute intervals) connected to the LM System Operation and Analysis at Remote Sites (SOARS) system.
- Cumulatively, the system has removed 26,400,000 gallons of contaminated groundwater from the aquifer since system startup in January 2015 (Table 1). Assuming a minimum AOA uranium plume pore volume of 2,400,000 gallons and a maximum pore volume of 3,300,000 gallons, the GRO system has removed between 8.0 and 11.0 pore volumes since system startup.
- From January 2015 through November 9, 2021, the GRO system removed approximately 133 pounds of uranium from the AOA aquifer (Table 2). Estimates of cumulative uranium mass removed are updated only at sampling events.

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

Calendar Month	Approximate Volume Pumped (Millions of Gallons)	Effective Pumping Rate (gpm)	Approximate Cumulative Volume[a] (Millions of Gallons)
October 2021	0.40	8.88	25.8
November 2021	0.37	8.54	26.1
December 2021	0.26	5.88	26.4

Note:
[a] Cumulative volume is based on the volume of groundwater extracted by the GRO system since system startup in January 2015.

Table 2. Uranium Mass Removal from Groundwater in the AOA

Tank Effluent Sample Date[a]	Effluent Tank Uranium Concentration (µg/L)	Volume Removed Between Tank Samples (Millions of Gallons)	Uranium Removed (Pounds)[b]	Cumulative Mass of Uranium Removed[c] (Pounds)
April 14, 2021	490	1.15	4.7	123
November 9, 2021	577	2.19	9.8	133

Notes:
[a] Sampling occurs following the extraction of approximately 1,000,000 gallons.
[b] Uranium removed since last sampling event. Estimate is based on the median concentration between sampling dates.
[c] Since GRO system startup in January 2015. Estimates of cumulative mass removed are updated every sampling event.

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 FFA quarterly report but is provided in annual groundwater reports submitted to EPA and UDEQ.

3.3.3 OU III Closure Strategy

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

With regard to the OU III closure strategy, the LMS contractor completed the following this quarter:

- A revised draft of the *Monticello Mill Tailings Site Operable Unit III Technical Basis for Groundwater Remedy Optimization System Termination* (DOE 2021d) and responses to regulator comments were submitted to EPA and UDEQ
- Preparation of a draft feasibility study for OU III began

4.0 Schedule of Activities and Deliverables

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

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

Activity or Deliverable	Schedule
Recent	
Revised QAPP (LM-Plan-3-21-1.0, LMS/MNT/S27252)	Comments received from EPA September 14, 2021 Response to comments sent to EPA and UDEQ December 20, 2021
Monticello, Utah, National Priorities List (NPL) Sites Federal Facility Agreement (FFA) Quarterly Report: July 1–September 30, 2021 (DOE 2021e)	Submitted to EPA and UDEQ November 15, 2021
Monticello Mill Tailings Site Operable Unit III Groundwater Flow and Contaminant Transport Model Report (DOE 2021c)	Received response of "no further comments" from EPA and UDEQ November 1, 2021
Monitored Natural Attenuation Demonstration Report, Operable Unit III, Monticello Mill Tailings Site, Monticello, Utah (DOE 2021a)	Received response of "no further comments" from EPA and UDEQ November 1, 2021
Fall semiannual ground, surface water, and seep 6 sampling event	Completed the week of October 4, 2021
Monticello Mill Tailings Site Operable Unit III Annual Groundwater Report, May 2020–April 2021 (DOE 2021b)	Submitted to EPA and UDEQ October 13, 2021
2020 Annual Inspection Report for the DOE Monticello, Utah, Mill Tailings Site and Monticello Vicinity Properties (DOE 2020)	Submitted to EPA and UDEQ December 20, 2021
Monticello Mill Tailings Site Operable Unit III Technical Basis for Groundwater Remedy Optimization System Termination (DOE 2021d)	Submitted response to EPA and UDEQ comments October 13, 2021
Near-Term	
Monticello, Utah, National Priorities List (NPL) Sites Federal Facility Agreement (FFA) Quarterly Report: October 1–December 31, 2021 (DOE 2022)	Will submit to EPA and UDEQ before February 15, 2022, deadline
Sixth CERCLA Five-Year Reviews for the MVP and MMTS	Started summer 2021
Draft *Feasibility Study Operable Unit III, Monticello Mill Tailings Site, Monticello, Utah*	Anticipate submitting to EPA and UDEQ March 2021

5.0 References

42 USC 9601 et seq. "Comprehensive Environmental Response, Compensation, and Liability Act" as amended, *United States Code.*

DOE (U.S. Department of Energy), 1998. *Repository and Pond 4 Groundwater Contingency Plan-Final*, MAC-MRAP 3.5.8, February.

DOE (U.S. Department of Energy), 2003. *Monticello Site Management Plan*, GJO-2003-493-TAC, Section 5.0 (this section is continually updated), Grand Junction Office, Grand Junction, Colorado, 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, Office of Legacy Management, 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 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), 2020. *2020 Annual Inspection Report for the DOE Monticello, Utah, Mill Tailings Site and Monticello Vicinity Properties*, LMS/MNT/S31901, Office of Legacy Management, December.

DOE (U.S. Department of Energy), 2021a. *Monitored Natural Attenuation Demonstration Report, Operable Unit III, Monticello Mill Tailings Site, Monticello, Utah*, LMS/MNT/S32631, Office of Legacy Management, December.

DOE (U.S. Department of Energy), 2021b. *Monticello Mill Tailings Site Operable Unit III Annual Groundwater Report, May 2020–April 2021*, LMS/MNT/S35992, Office of Legacy Management, October.

DOE (U.S. Department of Energy), 2021c. *Monticello Mill Tailings Site Operable Unit III Groundwater Flow and Contaminant Transport Model Report*, LMS/MNT/S30707, Office of Legacy Management, June.

DOE (U.S. Department of Energy), 2021d. *Monticello Mill Tailings Site Operable Unit III Technical Basis for Groundwater Remedy Optimization System Termination*, LMS/MNT/S33213, Office of Legacy Management, October.

DOE (U.S. Department of Energy), 2021e. *Monticello, Utah, National Priorities List (NPL) Sites Federal Facility Agreement (FFA) Quarterly Report: July 1–September 30, 2021*, LMS/MNT/S36977, Office of Legacy Management, October.

DOE (U.S. Department of Energy), 2022. *Monticello, Utah, National Priorities List (NPL) Sites Federal Facility Agreement (FFA) Quarterly Report: October 1–December 31, 2021*, LMS/MNT/S38141, Office of Legacy Management, January.

Quality Assurance Project Plan, Monticello, Utah, Disposal and Processing Sites, LM-Plan-3-21-1.0, LMS/MNT/S27252, continually updated, prepared by the LMS contractor for the U.S. Department of Energy Office of Legacy Management.

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Appendix A

Monthly and Quarterly Surveillance Checklists

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Monthly Pond 4 Surveillance Checklist

Level of water in Pond 4 6.71

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	☒	☐	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 condition. Vegatation around pond area still looks good.

Monticello LM Representative: Gary L. McKinnon Digitally signed by Gary L. McKinnon Date: 2021.10.27 10:14:17 -06'00' Date: 10/27/2021

Monticello City and Repository Site Routine Inspection, Surveillance, and Monitoring Procedures, Monticello, Utah (LMS/MNT/S10320)
LMS 5501 MNT

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 repository appears to be in good condition. Vegatation looks very healthy.

Signature: Gary L. McKinnon Digitally signed by Gary L. McKinnon Date: 2021.10.27 14:04:04 -06'00' Date: 10/27/2021

Monticello LM Representative

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

MONTHLY CLIMATOLOGICAL SUMMARY for OCT. 2021

NAME: UT Monticello CITY: STATE:
ELEV: 7069 ft LAT: 37° 06' 00" N LONG: 109° 06' 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	49.1	59.0	4:30p	45.0	12:00m	15.9	0.0	0.03	2.9	11.0	12:30p	SW
2	53.3	66.0	5:30p	42.6	5:30a	11.7	0.0	0.00	3.3	16.0	12:30p	WSW
3	55.7	68.3	5:30p	44.5	6:30a	9.5	0.2	0.00	4.5	14.0	10:30a	SW
4	57.6	69.6	4:00p	46.6	6:00a	8.1	0.7	0.00	5.8	23.0	1:00p	SW
5	54.6	63.1	1:30p	47.5	8:00a	10.4	0.0	0.31	6.1	26.0	8:00p	S
6	50.9	60.2	3:30p	46.6	7:00a	14.1	0.0	0.04	6.4	19.0	12:30a	SSE
7	53.8	62.9	3:00p	44.7	3:00a	11.2	0.0	0.00	4.7	19.0	2:00p	S
8	53.6	59.1	2:00p	49.8	7:00a	11.4	0.0	0.05	6.9	27.0	12:00m	S
9	49.8	59.2	3:30p	42.1	7:00a	15.2	0.0	0.00	9.1	26.0	1:00a	SSW
10	44.5	54.2	4:30p	37.9	2:30a	20.5	0.0	0.00	10.7	29.0	10:00a	NW
11	47.7	58.4	5:00p	35.5	3:30a	17.3	0.0	0.00	11.1	36.0	2:00p	SSE
12	34.0	48.1	1:30a	28.6	12:00m	31.0	0.0	0.12	10.4	33.0	3:00a	SSE
13	33.2	41.2	5:00p	24.8	4:30a	31.8	0.0	0.04	4.1	17.0	1:30p	SSE
14	36.8	45.4	3:00p	30.0	2:30a	28.2	0.0	0.00	5.5	28.0	2:30p	WNW
15	35.9	46.5	4:30p	27.1	8:00a	29.1	0.0	0.00	7.4	23.0	2:00a	WNW
16	44.5	59.5	4:00p	33.7	6:30a	20.5	0.0	0.00	3.8	11.0	4:30p	WNW
17	49.4	61.9	4:00p	37.7	1:30a	15.6	0.0	0.00	5.3	22.0	12:30p	SSE
18	48.9	58.4	4:00p	37.6	8:00a	16.1	0.0	0.07	12.8	40.0	9:00p	SSE
19	38.7	49.8	4:00p	29.0	7:30a	26.3	0.0	0.00	7.8	24.0	9:00a	SSE
20	42.2	55.4	4:30p	31.0	5:00a	22.8	0.0	0.00	4.5	23.0	4:00p	WSW
21	45.5	59.6	5:00p	35.0	1:00a	19.5	0.0	0.00	4.4	14.0	12:30p	WSW
22	48.3	61.1	3:30p	35.3	8:00a	16.7	0.0	0.00	6.5	21.0	1:30p	SSE
23	48.7	57.3	2:00p	43.5	6:30a	16.3	0.0	0.00	7.7	27.0	1:30p	SSE
24	48.6	58.2	3:00p	37.7	8:00a	16.4	0.0	0.00	7.4	24.0	3:00p	S
25	54.3	65.2	4:00p	43.7	6:00a	10.7	0.0	0.00	12.8	37.0	3:00p	SSE
26	40.7	52.8	1:30a	33.9	11:30a	24.3	0.0	0.20	13.6	38.0	4:30a	NW
27	36.3	45.8	4:00p	27.6	4:30a	28.7	0.0	0.00	9.4	30.0	2:00p	NW
28	44.1	53.6	3:30p	33.2	12:30a	20.9	0.0	0.00	10.0	25.0	4:00p	NW
29	46.6	59.2	3:00p	34.1	6:00a	18.4	0.0	0.00	6.1	19.0	2:00p	SSE
30	48.2	61.1	4:30p	37.9	8:00a	16.8	0.0	0.00	4.3	15.0	2:00p	WSW
31	47.9	58.8	3:30p	40.2	2:00a	17.1	0.0	0.00	6.0	20.0	11:00a	SSE
	46.6	69.6	4	24.8	13	572.5	0.9	0.86	7.1	40.0	18	SSE

Max >= 90.0: 0
Max <= 32.0: 0
Min <= 32.0: 7
Min <= 0.0: 0
Max Rain: 0.31 ON 10/05/21
Days of Rain: 8 (>.01 in) 3 (>.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 6.85

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	☒	☐	Boat remains at 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 condition.

Monticello LM Representative: Gary L. McKinnon Digitally signed by Gary L. McKinnon Date: 2021.11.30 10:38:18 -07'00' Date: 11/30/2021

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: Things appear to be in good condition.

Signature: Gary L. McKinnon Digitally signed by Gary L. McKinnon Date: 2021.11.30 08:28:38 -07'00' Date: 11/30/2021

Monticello LM Representative

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

MONTHLY CLIMATOLOGICAL SUMMARY for NOV. 2021

NAME: UT Monticello CITY: STATE:
ELEV: 7069 ft LAT: 37° 06' 00" N LONG: 109° 06' 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	48.2	59.0	3:30p	38.2	7:30a	16.8	0.0	0.00	6.3	24.0	1:30p	S
2	47.9	57.0	2:30p	39.7	8:30a	17.1	0.0	0.00	4.7	21.0	5:30a	NW
3	44.5	54.2	2:00p	36.7	4:00a	20.5	0.0	0.00	6.9	20.0	3:30p	WNW
4	45.5	59.2	4:00p	34.3	1:00a	19.5	0.0	0.00	4.5	18.0	1:00p	SE
5	47.7	62.2	4:00p	34.2	6:00a	17.3	0.0	0.00	3.9	13.0	12:00m	SSW
6	50.5	61.2	4:00p	38.7	2:00a	14.5	0.0	0.00	7.7	23.0	10:00a	S
7	50.6	61.7	2:00p	39.5	7:00a	14.4	0.0	0.00	8.8	27.0	2:00p	SSE
8	47.7	58.6	2:30p	34.3	4:00a	17.3	0.0	0.00	6.2	26.0	2:30p	S
9	43.8	52.6	1:00p	36.0	12:00m	21.2	0.0	0.03	7.2	27.0	3:00p	S
10	38.9	47.8	2:30p	30.5	12:00m	26.1	0.0	0.03	6.4	31.0	5:30a	NW
11	39.6	50.1	2:30p	28.3	7:30a	25.4	0.0	0.00	8.0	24.0	3:30p	NW
12	43.7	53.4	3:00p	37.4	8:30p	21.3	0.0	0.00	9.4	25.0	6:00a	NW
13	45.8	60.0	2:30p	35.0	7:30a	19.2	0.0	0.00	5.5	17.0	11:30a	WSW
14	46.2	61.5	2:30p	36.0	4:30a	18.8	0.0	0.00	4.0	16.0	2:00p	WSW
15	48.6	61.1	1:00p	36.7	5:30a	16.4	0.0	0.00	4.6	17.0	9:30p	SE
16	44.4	55.4	1:30p	33.0	12:00m	20.6	0.0	0.00	8.5	26.0	10:00a	SE
17	39.0	46.5	1:00p	29.0	12:00m	26.0	0.0	0.00	9.2	24.0	11:00a	WNW
18	37.8	47.6	2:30p	25.2	7:00a	27.2	0.0	0.00	7.9	27.0	11:00a	SSE
19	43.0	52.0	2:30p	38.1	8:30a	22.0	0.0	0.00	10.0	29.0	11:30a	S
20	40.6	50.9	1:00p	33.4	11:30p	24.4	0.0	0.00	8.5	29.0	4:30p	NW
21	36.0	46.7	3:00p	28.6	12:00m	29.0	0.0	0.00	8.2	23.0	10:00a	NW
22	38.1	53.7	2:00p	26.9	7:30a	26.9	0.0	0.00	4.2	11.0	2:00p	W
23	37.1	42.5	1:00p	30.9	3:00a	27.9	0.0	0.00	10.9	27.0	2:00p	SSE
24	31.7	35.9	12:30a	26.4	12:00m	33.3	0.0	0.00	14.3	31.0	9:00a	NW
25	32.0	42.6	1:30p	23.0	7:30a	33.0	0.0	0.00	7.4	25.0	1:00a	NNW
26	37.5	52.0	3:00p	23.5	7:00a	27.5	0.0	0.00	3.3	14.0	4:00p	WNW
27	44.2	54.7	3:00p	29.6	12:30a	20.8	0.0	0.00	7.8	23.0	11:00a	NW
28	43.7	55.8	1:30p	33.0	6:30a	21.3	0.0	0.00	4.7	15.0	1:30p	NNW
29	45.3	59.6	2:00p	34.3	5:30a	19.7	0.0	0.00	3.6	13.0	2:30p	NNW
30	44.4	54.1	1:00p	31.9	7:30a	20.6	0.0	0.00	8.5	21.0	12:00p	NW
	42.8	62.2	5	23.0	25	666.0	0.0	0.06	7.0	31.0	10	NW

Max >= 90.0: 0
Max <= 32.0: 0
Min <= 32.0: 12
Min <= 0.0: 0
Max Rain: 0.03 ON 11/09/21
Days of Rain: 2 (>.01 in) 0 (>.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

Are these areas acceptable?		
Yes	**No**	
☒	☐	Was the gate locked upon arrival?
☒	☐	Are signs posted in accordance with 10 CFR 835.602[a]?
☒	☐	Are all postings 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 10 CFR 835.405[d]?
☒	☐	Is the security fence in good condition?

Comments:

There is no radiologically contaminated material in the concrete bin.

Signature of Monticello LM Representative

11/23/2021
Date of Inspection

Monthly Pond 4 Surveillance Checklist

Level of water in Pond 4 7.20

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	☒	☐	Boat remains at 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: There is about one inch of snow on the ground but things appear to be in good condition.

Monticello LM Representative: Gary L. McKinnon Digitally signed by Gary L. McKinnon Date: 2021.12.29 13:13:09 -07'00' Date: 12/29/2021

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: There is about one inch of snow on the ground but things appear to be in good condition.

Signature: Gary L. McKinnon Digitally signed by Gary L. McKinnon Date: 2021.12.29 13:54:52 -07'00' Date: 12/29/2021

Monticello LM Representative

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

MONTHLY CLIMATOLOGICAL SUMMARY for DEC. 2021

NAME: Montucello, UT CITY: STATE:
ELEV: 0 ft LAT: LONG:

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	47.9	59.6	12:30p	33.4	7:00a	17.1	0.0	0.00	6.8	17.0	10:00a	WNW
2	42.8	54.6	2:30p	31.4	7:30a	22.2	0.0	0.00	4.6	15.0	10:30a	W
3	42.8	56.2	3:00p	34.4	4:00a	22.2	0.0	0.00	3.6	11.0	12:30p	WSW
4	40.9	55.6	3:30p	29.7	7:00a	24.1	0.0	0.00	3.2	15.0	12:30p	SW
5	41.2	55.4	2:00p	31.1	9:30p	23.8	0.0	0.00	6.1	26.0	12:30p	NW
6	39.1	48.0	1:30p	27.6	7:00a	25.9	0.0	0.00	6.5	24.0	2:30p	NW
7	33.0	40.3	2:30p	25.8	12:00m	32.0	0.0	0.01	2.0	15.0	12:30a	NNW
8	32.0	36.2	3:30p	23.6	1:30a	33.0	0.0	0.03	7.1	26.0	9:30p	S
9	33.8	36.9	4:30p	32.0	9:00a	31.2	0.0	0.41	9.1	28.0	4:30p	SSE
10	21.8	32.2	12:30a	10.1	11:00p	43.2	0.0	0.00	5.8	39.0	8:30a	SSE
11	17.0	26.2	3:00p	5.6	7:00a	48.0	0.0	0.00	4.6	19.0	11:30a	SSE
12	29.6	36.5	3:00p	17.9	1:30a	35.4	0.0	0.00	0.0	0.0	---	---
13	36.0	43.0	3:00p	30.5	10:30p	29.0	0.0	0.00	4.4	22.0	12:00m	SSE
14	38.8	40.6	9:00p	37.0	3:00a	26.2	0.0	0.03	16.7	39.0	10:30a	SSE
15	26.4	40.7	1:00a	15.1	9:30p	38.6	0.0	0.03	10.4	52.0	1:30a	S
16	24.5	30.4	3:00p	18.7	4:30a	40.5	0.0	0.00	11.1	28.0	6:30a	SSE
17	24.6	30.6	1:00p	18.3	2:30a	40.4	0.0	0.00	9.1	27.0	11:00a	NW
18	24.1	36.0	2:00p	15.6	12:00m	40.9	0.0	0.00	5.6	17.0	4:30a	WNW
19	24.6	35.6	2:00p	15.4	5:00a	40.4	0.0	0.00	3.1	14.0	2:00p	SSW
20	27.3	38.9	3:00p	17.5	7:00a	37.7	0.0	0.00	2.4	13.0	2:00p	SSW
21	30.8	43.3	2:00p	19.9	3:30a	34.2	0.0	0.00	2.4	13.0	1:30p	SSW
22	31.5	41.0	2:00p	20.8	5:30a	33.5	0.0	0.00	8.1	29.0	12:30p	SE
23	37.9	43.4	12:30p	31.3	8:00a	27.1	0.0	0.07	11.3	36.0	12:00m	S
24	34.6	38.1	1:00a	32.9	10:30p	30.4	0.0	0.66	13.8	37.0	3:00a	S
25	33.0	36.7	3:30p	30.3	9:00a	32.0	0.0	0.03	10.3	32.0	11:30p	S
26	30.5	33.6	2:30p	23.4	12:00m	34.5	0.0	0.00	14.9	43.0	3:00p	SSW
27	27.5	31.4	3:30p	23.2	12:30a	37.5	0.0	0.00	14.0	40.0	9:30a	S
28	24.9	27.0	12:30p	22.5	7:30p	40.1	0.0	0.00	9.3	26.0	3:00a	SSE
29	24.4	27.7	4:00p	19.3	7:00a	40.6	0.0	0.00	8.1	23.0	11:00p	SSE
30	27.1	30.5	3:30p	22.4	6:00a	37.9	0.0	0.00	13.0	33.0	9:30p	S
31	28.3	33.0	6:00p	22.6	12:00m	36.7	0.0	0.00	10.6	33.0	9:00a	S
	31.6	59.6	1	5.6	11	1036.3	0.0	1.27	7.7	52.0	15	S

Max >= 90.0: 0
Max <= 32.0: 7
Min <= 32.0: 27
Min <= 0.0: 0
Max Rain: 0.66 ON 12/24/21
Days of Rain: 7 (>.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

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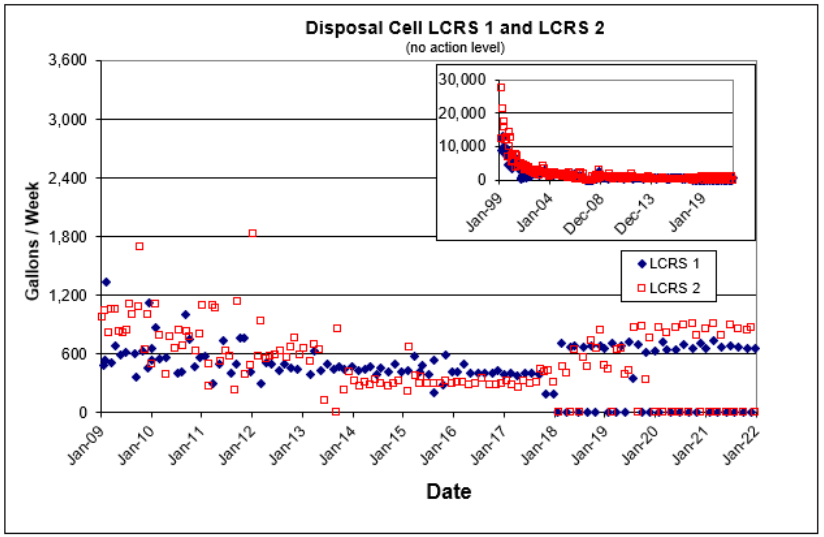
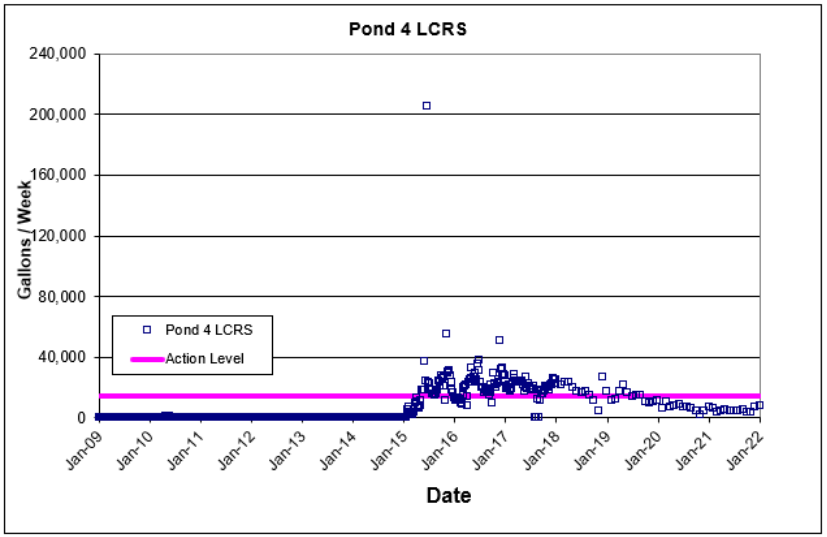
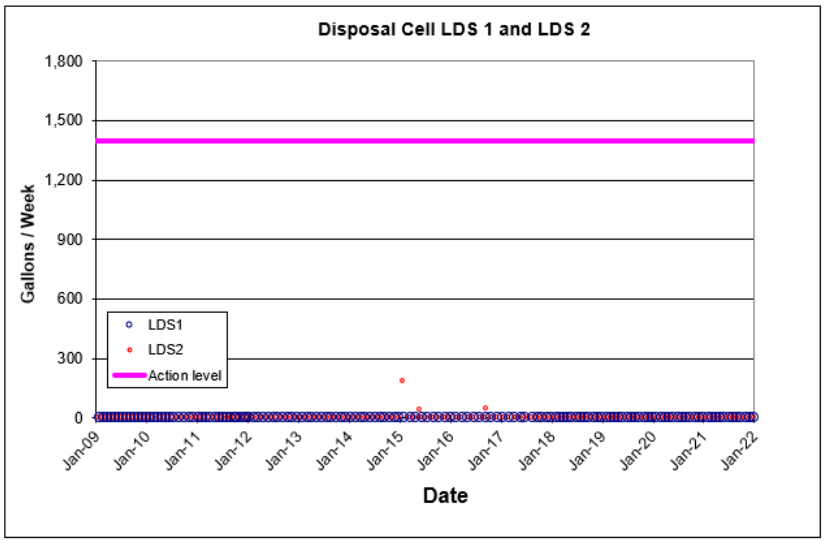
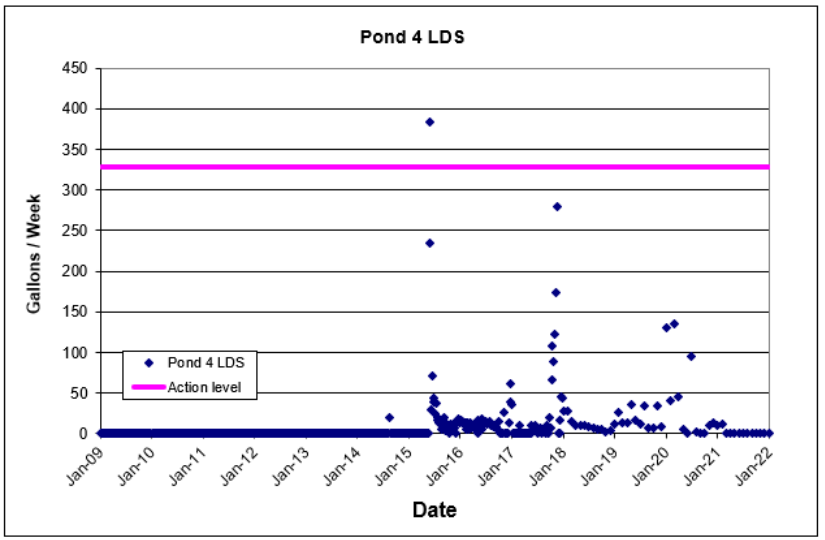
Graphs Showing Performance History for Disposal Cell and Pond 4 LCRS and LDS









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