LMS/MNT/S36988

2021 Annual Inspection Report for the DOE Monticello, Utah, Mill Tailings Site and Monticello Vicinity Properties

December 2021

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Abbreviations

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
GRO	Groundwater Remedy Optimization
GWRA	Groundwater Restricted Area
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
MVP	Monticello Vicinity Properties
NPL	National Priorities List
OU	Operable Unit
PL	photograph location
PRB	permeable reactive barrier
TSF	Temporary Storage Facility
UDEQ	Utah Department of Environmental Quality
UDOT	Utah Department of Transportation

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Executive Summary

The annual inspection of the U.S. Department of Energy (DOE) Monticello Mill Tailings Site (MMTS) and Monticello Vicinity Properties (MVP) site was conducted on September 13, 14, and 15, 2021. These sites, which are part of the Monticello, Utah, Disposal and Processing Sites, are inspected annually to ensure that the selected remedies remain protective of human health and the environment. Under those remedies, uranium mill tailings-related contamination remains in place at locations where use is restricted and exposure is limited. Annual inspections (1) verify that long-term surveillance and maintenance (LTS&M) activities implemented throughout the year are effective and appropriate, (2) confirm that the institutional controls (ICs) restricting land and groundwater use under the MMTS and MVP remedies remain effective, and (3) identify deficiencies and maintenance items and recommend corrective actions as needed. This report summarizes the results of the 2021 annual inspection. In accordance with the *Long-Term Surveillance and Maintenance Plan for the Monticello NPL Sites* (LMS/MNT/S00387), also known as the LTS&M Plan, the results will also be used to prepare the 2022 Comprehensive Environmental Response, Compensation, and Liability Act Five-Year Review.

Repository Findings. The repository site consists of the access area (including the Temporary Storage Facility [TSF]), the repository perimeter, repository runoff and run-on controls, Pond 4, the repository cover, and cover penetrations. The site is well-maintained and well-managed. Signs displaying information were in order. The TSF bin did not contain any soil or other materials. Within the TSF fenced area, approximately 1.5 cubic feet of used personal protective equipment and operating materials used at the repository were removed from properly designated containers and disposed of at the Grand Junction, Colorado Disposal Site. The repository cover did not show any evidence of settling, slumping, fracturing, seepage, ponding, or significant erosion. Repository vegetation is healthy and composed primarily of desirable species. Vegetation in the drainage channels was removed and stumps were treated in July 2021. Sediment in toe trenches does not impair their function. All perimeter signs were in good condition. The water in Pond 4 was approximately 6.4 feet deep, mostly from the operation of the Groundwater Remedy Optimization (GRO) system.

City-Owned Property Findings. There was no evidence that any ICs were violated on properties owned by the City of Monticello (City). Wetlands continue to be ecologically healthy and undamaged. No groundwater drilling applications were sought for the City-owned properties, and no drilling activities within the restricted area were noted or reported by onsite personnel. There was no evidence of recent fire pits or overnight camping. The existing mountain bike trails were in generally good condition, and they appeared to be regularly used by the public. Intermittent work, performed by other parties, on an additional bike trail showed no evidence that soil has been removed from the site.

City Streets and Utility Corridor Findings. No unplanned or unmonitored excavations related to city streets and utility corridors were identified. No new erosion of highway shoulders or along the U.S. Highway 191 embankment at Montezuma Creek was apparent. All planned excavations had been properly monitored by onsite personnel.

Private Property Findings. No changes in land use on restricted properties were apparent. No well-drilling permit applications were received by the Utah Division of Water Rights within the Montezuma Creek Restrictive Easement Area or the Groundwater Restricted Area. Onsite

personnel verified that no wells were drilled in the alluvial aquifer for domestic use within the Groundwater Restricted Area. No significant land-use changes in these areas were apparent.

Records Findings. Deed restrictions were verified at the San Juan County Recorder's Office, including those associated with the sale of properties. The Information Repository and the Operable Unit III Administrative Record were converted to electronic format in 2017. These collections were present and accessible electronically at the site. All site record books were correct and complete with only minor deficiencies, which were corrected before completion of the annual site inspection.

Operable Unit III Findings. Facilities related to the GRO system—including the pipeline access road, transfer building, and extraction well field—were intact and functioning. Water sampling teams noted no deficiencies during routine well inspections in October 2020 and April 2021.

Conclusions and Recommendations. The 2021 annual inspection confirmed that DOE LTS&M activities implemented throughout the year remain effective and appropriate, and ICs restricting land and groundwater use as part of the MMTS and MVP remedies remain effective. No corrective actions are necessary.

1.0 Introduction

The annual inspection of the U.S. Department of Energy (DOE) Monticello Mill Tailings Site (MMTS) and Monticello Vicinity Properties (MVP) was conducted on September 13, 14, and 15, 2021. These sites, which are part of the Monticello, Utah, Disposal and Processing Sites, are inspected annually to ensure that the selected remedies remain protective of human health and the environment. Under those remedies, uranium mill tailings–related contamination remains in place at locations where use is restricted, and exposure is limited. Annual inspections (1) verify that long-term surveillance and maintenance (LTS&M) activities implemented throughout the year are effective and appropriate, (2) confirm that the institutional controls (ICs) restricting land and groundwater use under the MMTS and MVP remedies remain effective, and (3) identify deficiencies and maintenance items and recommend corrective actions as needed. This report summarizes the results of the 2021 annual inspection. Photographs to support specific observations are identified in the text and in figures by photograph location (PL) numbers. This report summarizes the results of the 2021 annual inspection in accordance with the *Long-Term Surveillance and Maintenance Plan for the Monticello NPL Sites* (LMS/MNT/S00387), also known as the LTS&M Plan. The results will also be used to prepare the 2022 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Five-Year Review.

1.1 Monticello Site Background Information

1.1.1 Site History

Between the early 1940s and 1960, uranium and vanadium ores were intermittently handled and processed at the mill and ore-buying station in Monticello. Mill tailings with low-level radioactivity were impounded at the former mill, and some were dispersed over time to nearby properties by wind and water or were used for construction throughout the City of Monticello (City). Drainage of liquids from the impounded tailings contaminated groundwater in the underlying shallow alluvial aquifer, which eventually discharges into Montezuma Creek.

The MVP and MMTS projects were placed on the National Priorities List (NPL) in 1986 and 1989, respectively, to address mill-related contamination. Figure 1 shows the locations of the Monticello NPL sites. In accordance with CERCLA, DOE completed remediation of soil contamination at the MMTS and MVP in August 1999. Radioactively contaminated materials were placed in an engineered disposal cell approximately 1 mile south of the former mill site. The disposal cell (which was completed in October 1999) and associated support facilities are known collectively as the repository site (Figure 2).

In some locations, radioactively contaminated material was left in place in compliance with supplemental standards, as codified in Title 40 *Code of Federal Regulations* Section 192.21 (40 CFR 192.21). These areas, referred to as supplemental standards areas (Figure 3 and Figure 4), are on City-owned and private properties, beneath city streets, and in utility corridors. ICs are applied to these properties as well as properties overlying contaminated groundwater.

Figure 3 identifies the locations of the Monticello properties subject to annual inspection. In this report, many of the inspection items refer to a specific property identifier, such as MS-00893. These identifiers were assigned during remedial actions for the purpose of tracking the scope and progress of remedial actions on individual land holdings.

1.1.2 Properties and ICs Included in the Annual Inspection

1.1.2.1 Repository Site

The repository site inspection includes the access area, the repository perimeter, the disposal cell, constructed features and support structures, and Pond 4.

The access area (field office) consists of a main office building, support structures, and the Temporary Storage Facility (TSF). Support structures include outbuildings, concrete walks and pads, parking lots, electrical boxes, a meteorological station, an 8-foot-high chain-link fence, and gates. The TSF is a restricted-access, fenced, gravel-surfaced area where newly excavated or operations-generated radioactively contaminated materials are stored before eventual disposal offsite.

The disposal cell surface consists of a soil-covered, vegetated cap and rock riprap side slopes (portions of which also contain surface soil). Around the base of the disposal cell are engineered, rock-lined runoff and run-on controls that collect and direct storm water and meltwater from the disposal cell. These include the West Drainage Channel, South Drainage Channel, East Toe Trench, and North Toe Trench. Cover penetrations include five manholes, two video ports, nine settlement plates, and structures associated with a large lysimeter, which measures water flow and is embedded in the eastern portion of the disposal cell (Figure 2). Manholes 1 and 3 enclose equipment for the repository Leachate Collection and Removal System (LCRS) and Leak Detection System (LDS).

Other constructed features and support structures for the repository site include fences, gates, signs, access roads, boundary survey markers, and site monuments. A barbed-wire stock fence containing several gates marks the repository site boundary and discourages human trespass and livestock entry. Forty numbered location-reference signs (e.g., E for "entrance" and P1–P39 for "perimeter signs" 1–39) are fixed to separate posts along the site perimeter, and additional signs, including an entrance sign with contact information, are posted on or near site gates. Between the site perimeter fence and the disposal cell is an 8-foot-high wire-mesh wildlife fence that contains two vehicle access gates and five narrow wildlife apertures. Gravel-covered roads access the disposal cell, Pond 4, and the Groundwater Remedy Optimization (GRO) system. Two-track roads access other parts of the site, including most of the perimeter. Six boundary survey markers are located along the site perimeter fence. There is one site monument along the access road to the disposal cell and one at the apex of the disposal cell.

Pond 4 is a lined, solar-evaporation pond that collects disposal cell leachate, effluent from the GRO system, and a small amount of precipitation. Pond 4 was constructed with its own separate LCRS and LDS. An 8-foot-high security fence surrounds Pond 4, and an appropriately posted rope barrier surrounds the radiological restricted area of the pond within the security fence. Water rescue equipment is also located around the pond. Two pedestrian gates and one vehicle gate are locked when not in use.

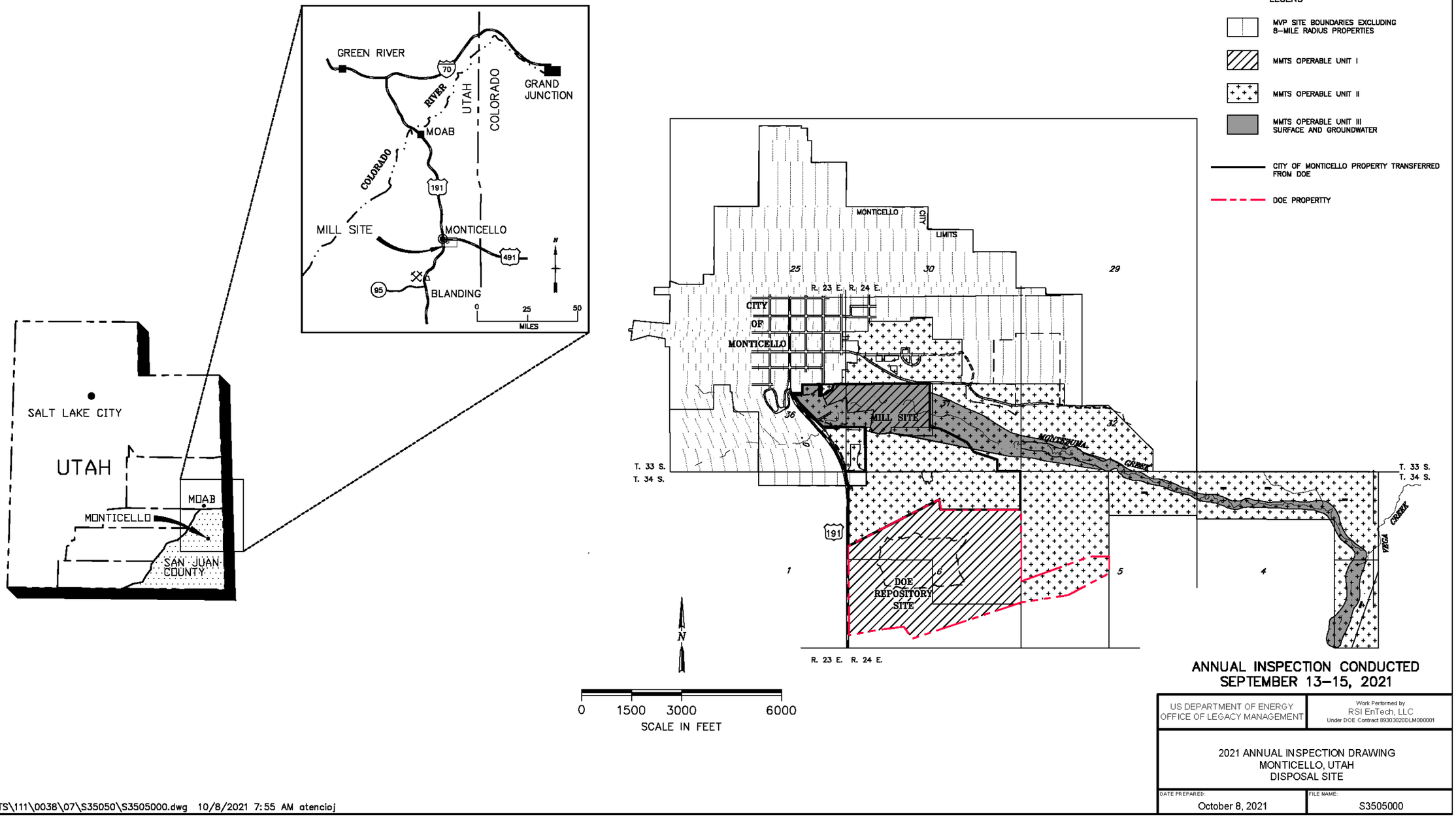


Figure 1. Location of Monticello MMTS and MVP Sites

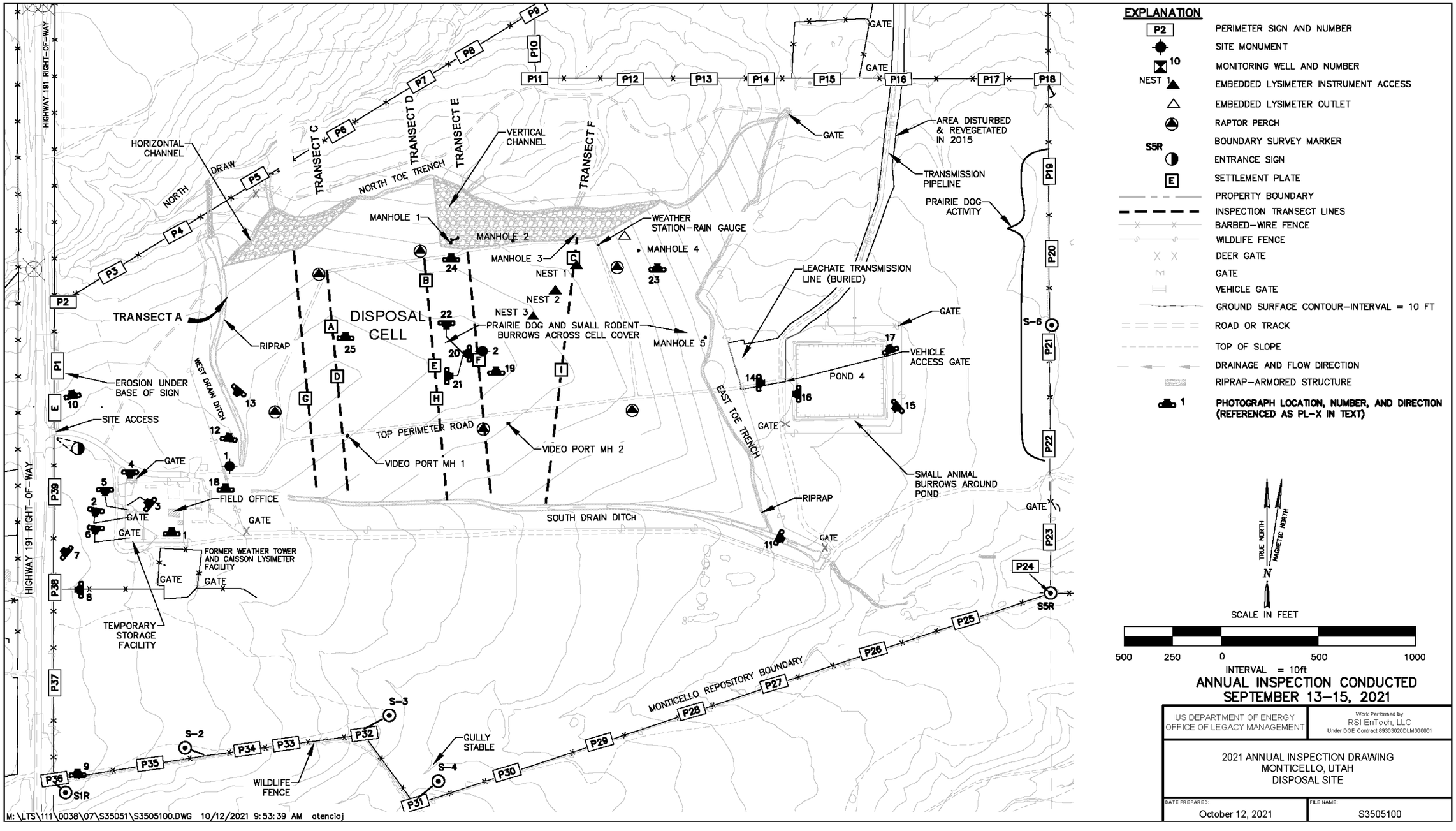


Figure 2. Monticello, Utah, Repository Site

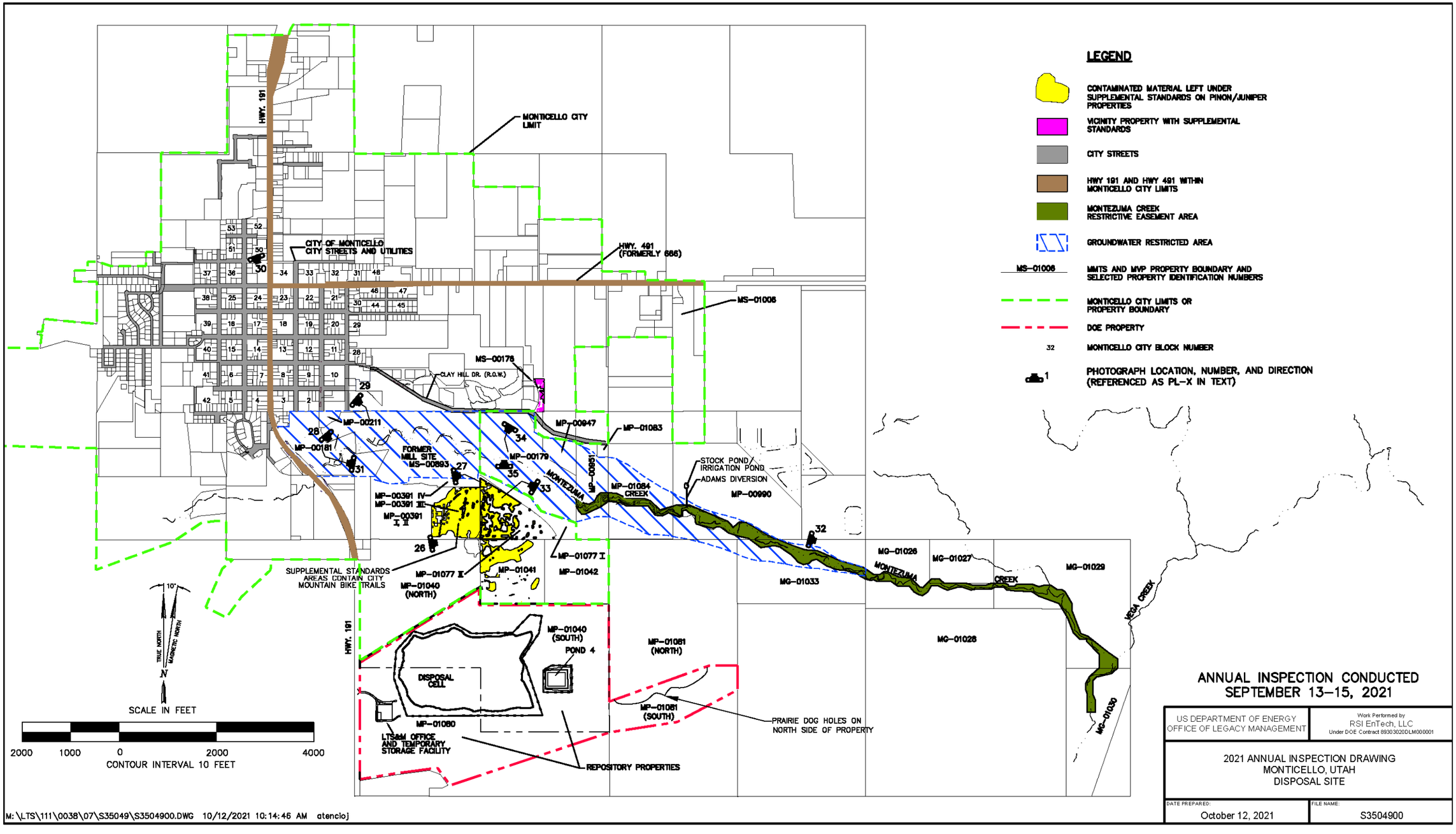


Figure 3. MMTS and MVP Supplemental Standards and Groundwater Restricted Areas

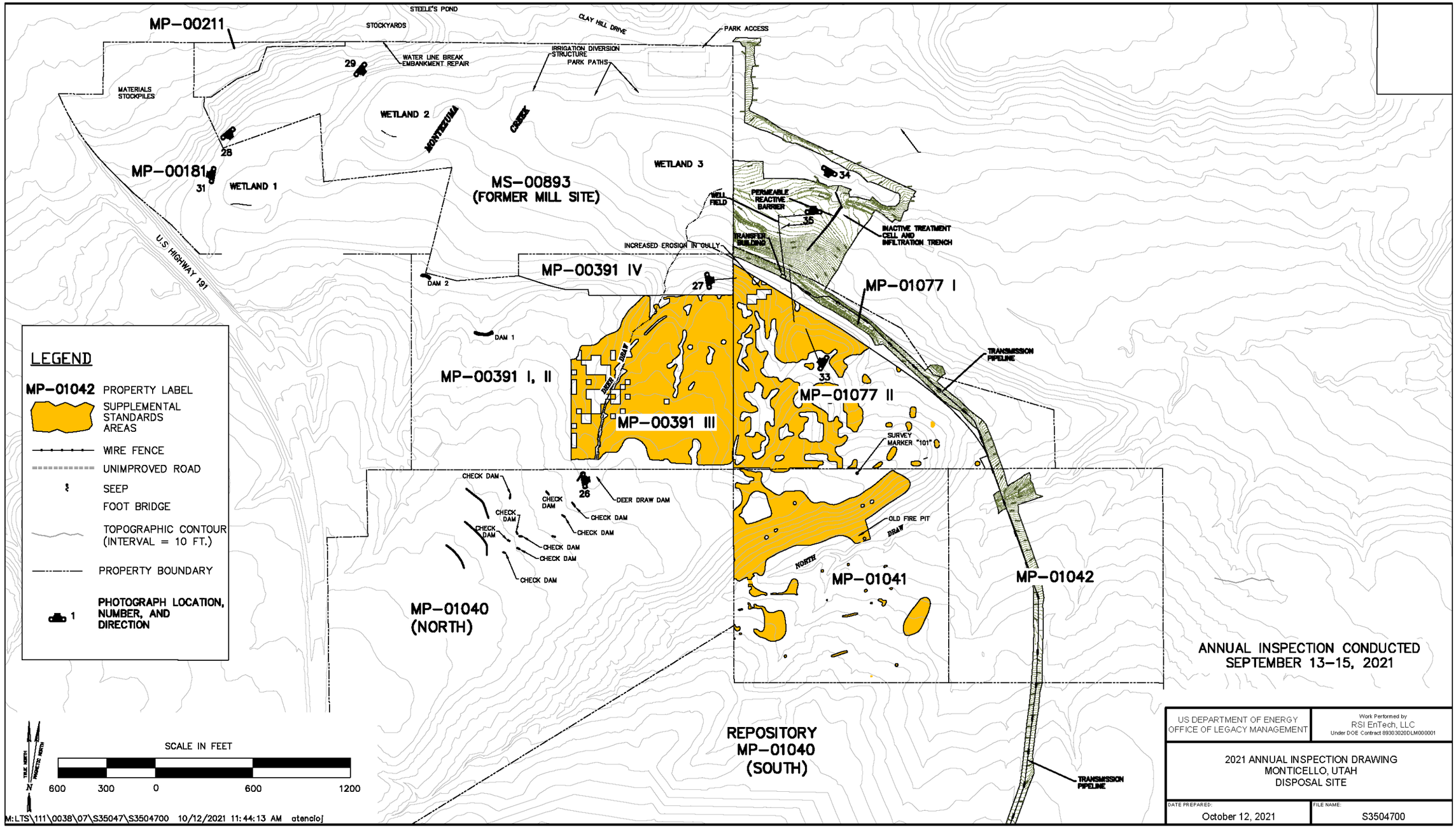


Figure 4. Monticello, Utah, Former Mill Site and Surrounding Area

1.1.2.2 City-Owned and Private Properties

Figure 3 shows City-owned and private properties included in the annual inspection and subject to ICs. Supplemental standards areas are located on private property MS-00176 and properties in the Montezuma Creek Restrictive Easement Area (also known as the Montezuma Creek Soil and Sediment Properties: MP-00951, MP-00990, MG-01026, MG-01027, MG-01029, MG-01030, MG-01033, and MP-01084). Groundwater restriction ICs are applied to properties in the Groundwater Restricted Area (GWRA) (also known as the Groundwater Management Area: MP-00179, MP-00181, MP-00211, MS-00893, MP-00947, MP-00951, MP-00990, MG-01033, and MP-01084).

DOE transferred several remediated properties to the City of Monticello in 2000 for use as a public park. The properties include the former mill site (MP-00181 and MS-00893), three nearby properties with supplemental standards areas (also known as Piñon/Juniper properties: MP-00391, MP-01041, and MP-01077), and two nearby properties without supplemental standards areas (MP-01040 and MP-01042). Property MP-00211, adjacent to the former mill site, was always City-owned. The transferred City-owned properties were annexed in 2007 and are now within city limits, where bow hunting is allowed but hunting with firearms is prohibited. Pedestrian and mountain bike trails are used throughout the properties.

Land and groundwater use restrictions apply to City-owned and private properties as follows:

- City-owned properties transferred from DOE are restricted to recreational day use. Overnight camping and the building of habitable structures are prohibited.
- City-owned supplemental standards properties (Piñon/Juniper properties) have an additional restriction that no soil be removed from the properties.
- In addition to the restrictions cited above, damage to Wetlands 1, 2, and 3 is prohibited on the former mill site properties.
- Within the Montezuma Creek Restrictive Easement Area, portions of the properties where supplemental standards have been applied have restrictive easements to prohibit soil removal or the construction of habitable structures.
- Within the GWRA, drilling for and appropriation of groundwater from the alluvial aquifer for domestic use is prohibited. This IC is administered by the Utah Division of Water Rights (Office of the State Engineer) through the well permitting and water rights processes.
- Special zoning ordinances affect properties MP-00211 and MS-00176; the ordinances require radiological scanning for certain ground-disturbing activities such as the construction of habitable structures.

1.1.2.3 City Streets and Utility Corridors

Radioactively contaminated soil remains in some places beneath city streets and utility corridors in Monticello, in the U.S. 191 embankment over Montezuma Creek, and in Utah Department of Transportation (UDOT) rights-of-way along U.S. 191 and U.S. 491 within city limits. Supplemental standards have been applied to these areas. Through a cooperative agreement with the City, onsite personnel monitor excavations in supplemental standards areas for radioactively contaminated material, and the City transports any such material to the TSF under direction of the onsite personnel. Onsite personnel also monitor excavations of U.S. 191 and U.S. 491 within

city limits. Through a Memorandum of Understanding between UDOT and DOE, UDOT has the option of returning contaminated material to the excavation as backfill or having City workers, under the direction of onsite personnel, haul the material to the TSF.

1.1.2.4 Operable Unit III

Surface components of the Operable Unit (OU) III GRO system and groundwater well surface completions are inspected annually. The system is located on the DOE repository site, City-owned properties, and private property MP-00179.

In 2014, facilities related to the GRO system were installed on property MP-00179, City-owned properties MP-01077 and MP-01042, and the repository site. Facilities include extraction wells, monitoring wells, utility vaults, a groundwater transfer building, and a groundwater transmission pipeline. The system became functional in January 2015. Areas disturbed by the project were revegetated in 2015.

A groundwater treatment system comprising the permeable reactive barrier (PRB) and ex situ treatment cells is on property MP-00179. With the operation of the GRO system, the treatment cells were deactivated in December 2014 and are no longer inspected. The PRB is a subsurface structure and cannot be inspected.

OU III water quality is monitored through a network of active groundwater monitoring wells and surface water monitoring sites. There are 69 PRB wells located on property MP-00179. The wells are listed as inactive and are not included in the monitoring program. However, water levels are collected from these locations annually in the fall.

1.2 Long-Term Surveillance and Maintenance

The DOE Office of Legacy Management (LM) administers the long-term stewardship of the Monticello NPL sites to ensure that the selected remedies continue to be protective of human health and the environment. The U.S. Environmental Protection Agency (EPA) Region 8 and the Utah Department of Environmental Quality (UDEQ) provide oversight. Annual inspections are one component of LTS&M at the Monticello NPL sites. Other primary components include operating and maintaining the disposal cell's leachate management system (LCRS and LDS), inspecting the repository site and properties affected by ICs on a monthly or quarterly basis, and monitoring and managing radioactively contaminated materials encountered at City and UDOT excavations inside Monticello city limits. Long-term procedures related to OU III are included in the *Long-Term Surveillance and Maintenance Plan for Monticello NPL Sites* (DOE 2018), hereafter called the LTS&M Plan, and several items are inspected annually (Section 2.7).

Part of the Annual Site Inspection Checklist does include items associated with the GRO system, as the GRO is associated with OU III and the disposal site.

Items inspected annually include the following:

- **Onsite record books:** Document emergency system shutdown drills, maintenance of the GRO system and the GRO building, work in the Area of Attainment (e.g., transducer replacement), property owner concerns, and so on.
- **Surveillance checklists:** Particularly Pond 4, which is part of the GRO system.
- **Deed annotations:** Inspection confirms that deed annotations applicable to restricted properties remain accurately filed and accessible at the San Juan County courthouse. This includes OU III properties.
- **Well applications:** Contact with the Utah Division of Water Rights is documented on the Annual Site Inspection Checklist to verify that no well drilling applications or water rights have been granted for domestic use in the alluvial aquifer of the OU III restrictive easement area.

CERCLA Five-Year Reviews (begun in 1997) are also conducted in parallel every 5 years with the annual inspection to monitor and document the protectiveness of the MMTS and MVP remedies.

LTS&M activities, including annual inspection and reporting, are conducted by onsite personnel (the Legacy Management Support [LMS] contractor site operations lead and site representatives) and offsite personnel (LM and LMS contractor employees) in accordance with the procedures provided in the LTS&M Plan.

1.3 Annual Site Inspection Scope

Annual inspections of the MMTS and MVP focus on five general topics: recordkeeping and administrative review, DOE repository site, City-owned and private properties, city streets and utility corridors, and OU III. The "Annual Inspection Checklist" (Appendix A) records the items inspected; Appendix A contains the completed checklist for the 2021 annual inspection.[1]

Inspectors review site recordkeeping to ensure that day-to-day activities are properly documented. Findings are recorded in Section II of Appendix A. Onsite record books, surveillance checklists, and radiological as-built drawings are verified. Radiological as-built drawings, in addition to onsite record books, document the location and findings of radiological surveys provided by onsite personnel during municipal and State of Utah construction activities inside Monticello city limits in accordance with the LTS&M Plan. The inspection confirms that deed annotations applicable to restricted properties remain accurately filed and accessible at the San Juan County courthouse, updated copies of relevant LTS&M documents are available to onsite personnel, and workers accessing the TSF are Rad Worker II certified as required. Workers without Rad Worker II certification must be escorted. Inspectors also verify that the Monticello copies of the Information Repository and OU III Administrative Record documents are accessible to the public.[2]

[1] Revised in 2018, this checklist was taken from the revised LTS&M Plan (DOE 2018).
[2] The MMTS OU I and II and MVP Administrative Record documents were archived in accordance with CERCLA guidelines in 2008. The MMTS OU III Administrative Record and the sites' Information Repository are available electronically onsite and on LM's website.

The repository site is inspected for the integrity of constructed features, support facilities, the perimeter, the disposal cell cover, and cover penetrations. The disposal cell cover is monitored for evidence of erosion, slumping or settlement. The health and composition of vegetation, an integral part of vegetated cover performance, is assessed. The Pond 4 and TSF inspection are included in the repository site inspection. Observations are recorded in Section III of Appendix A.

City-owned and private properties related to MMTS and MVP are inspected annually to confirm that ICs, as described in the LTS&M Plan, remain effective and to document changes in conditions that may affect the protectiveness of the remedies. Properties are inspected for evidence of violations of applicable restrictions, and findings are recorded in Sections IV, V, VI, and VIII-C of Appendix A.

During the annual inspection, the supplemental standards areas within city streets and utility corridors and UDOT rights-of-way for U.S. 191 and U.S. 491 are inspected for evidence of unmonitored excavations or soil movement. Results are recorded in Sections VIII-A and VIII-B of Appendix A.

Surface components of the OU III GRO system and groundwater well surface completions are inspected annually and recorded in Section VII of Appendix A. Facilities related to the GRO system are regularly inspected and maintained by onsite personnel. Facilities include surface features of extraction and monitoring wells, utility vaults, the groundwater-transfer building, and the groundwater transmission pipeline. Water sampling teams inspect groundwater wells during sampling in April and October of each year; onsite personnel also note any deficiencies during routine inspections.

1.4 2021 Annual Site Inspection Participants and Schedule

Inspection team members and affiliations are listed on page A-1 of Appendix A. D. Marshall and P. Wetherstein conducted the physical site inspection on September 13, 14, and 15, 2021. H. Petrie, D. Dille, G. McKinnon, C. Oliver, and P. Gallo also participated in the inspection. M. Stilson, regional engineer with the Utah Division of Water Rights, was contacted in conjunction with the inspection.

Monday, September 13, 2021

Inspection team members convened at the DOE Monticello field office to review the inspection procedure, inspection checklist, and safety and health documents. Inspectors completed an inspection of the onsite records and the disposal cell cover and penetrations.

Tuesday, September 14, 2021

Field inspection included the TSF, Pond 4, repository site access area, field office facilities, runoff and run-on controls, perimeter, site monuments, boundary survey markers, and repository perimeter fence and signs.

Wednesday, September 15, 2021

The former mill site properties and supplemental standards areas on City-owned properties were inspected.

Property deed restrictions were verified at the San Juan County Recorder's Office. ICs in the Montezuma Creek Restrictive Easement Area were verified with the onsite personnel, and portions of Montezuma Canyon were inspected from observation points above the area.

The disposal cell's top cover, side slopes, diversion ditches, and swales were inspected by the geotechnical engineer.

1.4.1 Additional Inspection-Related Activities

In 2021, areas associated with OU III were inspected by water sampling crews in conjunction with maintenance and sampling activities at the OU III groundwater wells and surface water locations. Structures associated with the GRO system were regularly inspected and maintained by onsite personnel. Compliance with drilling and water use ICs in the GWRA was verified in an email with M. Stilson of the Utah Division of Water Rights on September 7, 2021. The elevation surveys of the settlement plates were performed on September 16, 2021, as part of the CERCLA Five-Year Review.

2.0 Site Inspection Results

2.1 DOE Repository Site and Disposal Cell

The repository site consists of the access area (support buildings and the TSF), the repository perimeter, runoff and run-on controls, Pond 4, the repository cover, and cover penetrations (manholes, settlement plates, and structures associated with the embedded lysimeter). Results of the 2021 repository site inspection are summarized below and in Appendix A, Section III.

2.1.1 Access Area

The Monticello field office buildings and associated structures were in excellent condition and well-maintained (PL-1, PL-2, PL-3, PL-4). New video surveillance cameras were installed inside and outside of the main office building. Site access signs displaying contact information were visible, and the new signs containing updated information were in place and in good condition. The site's paved access road was in very good condition.

During the 2021 annual inspection, the TSF fence was appropriately posted with access control signs, and there was no evidence of vandalism or trespassing (PL-5). The TSF bin was not opened during the inspection, but the site operations lead opened a side panel of the bin and it did not contain any soil (PL-6). The TSF yard was well-maintained. The lay-down area for potential mixed waste was in good working order, as were empty clamshell containers. The TSF was also inspected quarterly by site personnel in 2021, and inspection results were presented in quarterly reports to EPA and UDEQ.

2.1.2 Repository Perimeter

Perimeter Fence

The southwestern perimeter wildlife-friendly fence was in good condition (PL-7). There was no evidence of vandalism or areas of excessive vegetation or debris buildup.

Location-Reference Signs

All perimeter signs were in good condition (PL-8). Black-numbered decals to identify sign numbers were in good condition.

Boundary Survey Markers

All six boundary markers were located during the inspection, and all were in good condition (PL-9). PL-9 is a photograph of one of the boundary survey markers. Photographs of all six boundary markers are kept in the annual inspection photograph log.

Erosion and Gullies

Erosion channels and drainages around the site perimeter were generally well-vegetated and had not significantly changed since the 2020 annual inspection. Erosion controls and revegetated areas related to the GRO system were in good condition, and no major erosional areas were noted. The deep gully on the west edge of the disposal site described in previous inspection reports has not changed since 2020 (PL-10), as increased vegetation from a high precipitation year has stabilized much of it. The gully does not threaten the integrity of site features but will continue to be monitored.

Perimeter Vegetation

Vegetation between the perimeter fence and the wildlife fence (inner fence) was healthy and composed primarily of desirable species. Two small populations of spotted knapweed and common mullein were treated with herbicide after the annual inspection on September 28, 2021. Prairie dog activity was observed along the eastern portion of the site. That activity, which had declined significantly over the past few years, had not changed significantly in 2021.

2.1.3 Repository Runoff and Run-On Controls

Siltation in the channels has been photographed and noted in prior inspections. LMS engineers have noted that sedimentation is minor and collects naturally over time. The deposition is monitored during the annual inspection. No substantial change has been identified since the last annual inspection (see Appendix B).

South Drainage Channel and West Drainage Channel

The South and West Drainage Channels were in very good condition (PL-11 and PL-12). Small erosion rills, repaired in October of 2020, on the West Drainage Channel were in good condition (PL-13). Shrubs observed in portions of the channels were removed and treated in July 2021. Burrows from small rodents that are found in places along the margin of the channels do not threaten their integrity.

East Toe Trench and North Toe Trench

The East Toe Trench and North Toe Trench were in good condition. No erosion of these trenches was evident. Beginning in 2013, inspectors observed increased siltation from the repository side slope into both toe trenches during heavy rainfall events. The siltation does not impair the functioning of the trenches.

2.1.4 Pond 4

The Pond 4 area is inspected annually and also inspected monthly by site personnel. The results of the inspections are presented in quarterly reports to EPA and UDEQ. No findings have been observed or recorded since the last annual inspection.

Gate, Fence, Entrance, and Perimeter Signs

All gates were in good working condition. The name of the former LMS contractor, Navarro Research and Engineering, Inc., was replaced by the name of the current contractor, RSI EnTech, LLC on the sign at the entrance of the site. Warning signs on the perimeter fence were easily visible and legible. There was no evidence of vandalism or trespass, and all gates were locked at the time of the inspection (PL-14).

Pond Perimeter and Berm

The pond's radiological rope barrier was intact and in good condition. The excess vegetation along the pond's access road was mowed in September 2021. This year, animal burrows made by voles and other small rodents were visible on and below the pond's berm on all sides. However, no large burrows that might threaten the berm's integrity were found. Vegetation on the slopes of the berm was well-established and healthy. Pond 4 is shown in PL-15. The fence around Pond 4 was in good condition.

Lifesaving Equipment

Lifesaving rings and a rescue and work skiff were present and easily accessible near the pond. Cabinets containing water rescue equipment were also highly visible, adequately labeled, and in good condition (PL-16).

Pond 4 LCRS/LDS Control Cabinet

The weatherproof LCRS and LDS control cabinet was in good condition (PL-17). Operation of the Pond 4 LCRS and LDS is described in Section 2.1.6.

Liner and Pond Interior

The water in Pond 4 was approximately 6.4 feet deep at the time of the inspection, due mostly to the operation of the GRO system. Only the exposed liner is inspected. No visible evidence of holes or other damage to the pond liner was observed.

2.1.5 Repository Cover

The repository cover is inspected annually and also monthly by site personnel. Results of the monthly inspections are provided in quarterly reports to EPA and UDEQ.

Roads, Wildlife Fence, Site Monuments, and Raptor Perches

The gravel road surrounding the disposal cell and the road to Pond 4 were in very good condition. Water bars on the access road to the transfer building were in good condition. The wildlife fence and gate apertures were functional and showed no evidence of vandalism. All gates in the wildlife fence were open. Both site monuments—one at the west access gate inside the wildlife fence (PL-18) and one at the apex of the disposal cell (PL-19)—were present and intact. Six raptor perches, installed near the disposal cell cover in 2007, were also in good condition.

Vegetation

Desirable plants remained well-established on the cover, and no significant barren or eroded areas were identified (PL-20, PL-21, and PL-22). No damage to vegetation or soils from rainstorms was apparent, and no species of phreatophyte shrubs were growing on the cover. As in recent years, there were many healthy young sagebrush (*Artemisia tridentata*) plants. The small quantity of field bindweed (*Convolvulus arvensis*), which the State of Utah lists as a Class C noxious weed, was still present on the cover, but control was not necessary.

The Repository Cover Vegetation Index, developed in 2009 for use during annual inspections (Appendix A), indicated that the cover vegetation remains healthy. The vegetation condition score, used to detect trends in the health of the vegetation community, was 4.3 in 2021, same as the score in 2020. Dominant species identified on the cover in 2021 included sagebrush (*Artemisia tridentata*), rubber rabbitbrush (*Ericameria nauseosa*), western wheatgrass (*Pascopyrum smithii*), crested wheatgrass (*Agropyron cristatum*), intermediate wheatgrass (*Thinopyrum intermedium*), smooth brome (*Bromus inermis*), and cheatgrass (*Bromus tectorum*). Three of these species are native, and one is weedy (cheatgrass).

Vegetation on the repository's soil-covered side slopes, rock slopes, and outlying areas, similar in composition to that on the repository cover, was also healthy.

Burrowing Animals

Evidence of small burrowing animals has been observed on the repository cover for years. Raptors and other predators have kept these populations at low to moderate levels since a vole outbreak in 2006. In 2013, prairie dog burrows were found on the repository cover for the first time. The burrows appeared to be abandoned in 2015, and there was no evidence of prairie dog activity in 2021. Because the repository cover was engineered to withstand prairie dog and small rodent activity, populations are not a concern, but burrows will continue to be monitored. Inspectors and onsite personnel will continue to look for evidence of gray-colored soils being cast to the surface, as this would indicate excavation into the biointrusion layer. No such soils have been observed on the surface to date.

Stability

No area of the cover indicated settling, slumping, fracturing, seepage, ponding, or significant erosion. The 2021 repository inspection on September 15 included an evaluation of geotechnical activity by the site engineer. The repository was observed to be in good to excellent condition. No settlement, erosion, slope stability, or foundation conditions that present problems were observed. The site engineers' full report is attached as Appendix B.

2.1.6 Cover Penetrations

Manholes and Video Ports

The manholes are restricted areas and were not entered during the annual inspection, but the exteriors were observed (PL-23). Manhole 1 was opened, and the interior observed from the outside (PL-24). The other four manhole covers were secure and operable. Appropriate safety warnings and entry procedures were posted on all the manholes, exterior pump access ports were undamaged, telemetry surface installations were in good condition, and no leakage or drainage was evident. Covers of the inoperable video ports were locked and secure.

Settlement Plates

Nine settlement plates, identified by the letters A–I, are on the disposal cell. The outer protective casings (8-inch PVC pipe) and the inner plates were intact and undamaged (PL-25). Elevation surveys on the settlement plates are performed every 5 years in preparation for the CERCLA Five-Year Review. Settlement plates were surveyed on September 16. No significant settlement was measured in 2021, and the next scheduled survey is in 2026.

Embedded Lysimeter

External features of the embedded lysimeter were inspected. Along lysimeter cover penetrations, no seepage was evident, and instrumentation installations were in good condition.

Operation of Repository and Pond 4 LCRS and LDS

Monitoring of leachate production is performed automatically via the repository telemetry system, which relays data to the LM System Operation and Analysis at Remote Sites (SOARS) system for offsite viewing, evaluation, and management. Onsite personnel routinely monitor infrastructure and leachate production in accordance with specifications in the LTS&M Plan. Leachate production rates are provided in quarterly reports to EPA and UDEQ. Interviews with onsite operations personnel indicate that the repository and Pond 4 LCRS and LDS are operating properly.

2.2 City-Owned Properties

Results of the 2021 annual inspection of City-owned properties are summarized below and in Section IV of Appendix A.

2.2.1 Recreational Use

The City-owned properties transferred from DOE are accessible to the public. Access roads were serviceable, although roads on property MP-01040 were eroded and may not be accessible by two-wheel-drive vehicles. Signs on these properties that post ICs (such as a prohibition against overnight camping) were in good condition. No evidence of overnight camping was observed on any of the properties. A mountain bike trail upgradient from the groundwater transfer building is intersected by an erosion channel that does not affect the remedy but continues to be monitored. Mountain bike trails were in generally good condition, and they appeared to be regularly used by the public.

2.2.2 Construction of Habitable Structures

No evidence of construction of habitable structures was observed on these properties during the 2021 inspection. Zoning ordinances that restrict the construction of habitable structures on property MP-00211 remain in effect.

2.2.3 Supplemental Standards Areas on Piñon/Juniper Properties

No evidence of soil removal was noted on any of the Piñon/Juniper properties supplemental standards areas, including in areas disturbed by the construction of new mountain bike trails. The bike trails and areas of eroded soils are routinely radiologically surveyed after heavy storms (as defined in the LTS&M Plan). Radiation levels above background have never been detected, and survey records are available at the Monticello sites field office.

2.2.4 Soil Movement, Drainage, and Runoff Controls

All riprap-armored structures, dams, check dams, berms, and runoff control drainages (Figure 4) were intact and functional. PL-26 shows a portion of the access road near Deer Draw Dam. The photograph illustrates the well-vegetated and intact soils that characterize the City-owned properties.

The erosion gully on the hillside on property MP-01077 above the transfer building was inspected in 2021. The gully has increased in size since 2020, due to high-intensity storm events (PL-27). The gully does not threaten the integrity of site features but will continue to be monitored.

On June 2, 2020, a water line break on Property MP-00181 occurred, causing embankment erosion above Wetland 2. LM was notified and the City of Monticello made corrective actions. The 2021 inspection saw no evidence of continued erosion from the break, but the area will continue to be monitored.

2.2.5 Wetlands

Wetlands 1, 2, and 3 are ecologically healthy and undamaged (PL-28, PL-29). There was no evidence of damage from human activity or natural causes. Erosion from the upgradient June 2020 waterline break will continue to be monitored due to its proximity to Wetland 2.

2.2.6 Groundwater Use

No evidence of water-well drilling on City-owned properties with groundwater restrictions was observed during routine inspections or during the 2021 annual inspection. No applications to appropriate water from or to drill wells into the alluvial aquifer were filed with the Utah Division of Water Rights for these areas (Section 2.6), and no drilling activities within the restricted area were noted or reported by onsite personnel.

2.3 City Streets and Utility Corridors, and UDOT Rights-of-Way

Section VIII of Appendix A presents results of the 2021 annual inspection of UDOT rights-of-way within city limits and city streets and utility corridors. No unmonitored or unplanned excavations were identified. Onsite personnel were aware of all planned excavations, and excavations were monitored in accordance with the LTS&M Plan. PL-30 shows an area of work in city streets being scanned by the LMS radiological control technician during the 2021 inspection. PL-31 shows the U.S. 191 embankment along the former mill site with no new erosion. No excavation work was performed within any UDOT rights-of-way within city limits in 2021.

2.4 Private Property MS-00176-VL

During the 2021 annual inspection, there was no evidence of erosion, soil removal, or construction of habitable structures (Appendix A, Section VIII-C) on property MS-00176. Zoning ordinances that restrict the construction of habitable structures on this property remain in effect. Over time, storm water runoff has deposited sediment from this property along the road, and this sediment is radiologically surveyed after significant rainfall events by onsite personnel. Levels of radiation in the sediment have never been above background. Monitoring of this erosion will continue, but at this time no maintenance is required.

2.5 Properties in the Montezuma Creek Restrictive Easement Area

Properties in the Montezuma Creek Restrictive Easement Area are inspected on a regular basis by onsite and water sampling personnel; during these visits, no evidence of significant erosion or soil removal from the restricted areas of these properties was noted. During the 2021 annual inspection, portions of Montezuma Canyon were inspected from observation points above the area, and no evidence of land-use changes or disturbance to the easement area was found. Observations in the easement area (PL-32) are recorded in Appendix A, Section V.

2.6 Groundwater Restricted Area

On September 7, 2021, M. Stilson of the Utah Division of Water Rights confirmed that there were no applications to appropriate water from the shallow alluvial aquifer in the GWRA. There were also no applications or approvals to drill into or through the shallow alluvial aquifer (Appendix A, Section VI). Onsite personnel also verified during routine surveillance that no new wells were installed within the GWRA.

2.7 Operable Unit III

2.7.1 Groundwater Remedy Optimization System

Facilities related to the GRO system are regularly inspected and maintained by onsite personnel, and results are provided to EPA and UDEQ in quarterly reports and annual groundwater reports. During the annual inspection, the pipeline access road, transfer building (PL-33), and extraction well field were visited (PL-34), and the visible components of the system were intact and functioning (PL-35).

2.7.2 Water Quality Monitoring Well Inspection

Water sampling teams noted no deficiencies during routine well inspections in October 2020 and April 2021.

2.8 Administrative and Records Inspection

The following documents and records, recorded by the onsite personnel, were inspected for completeness and accuracy of information (Appendix A, Section II):

- Radiological as-built drawings (residential and utility maps that document the location and results of radiological surveys provided by onsite personnel).
- Site record books, which include the repository site, the TSF, City-owned properties, private property restricted areas, and public roads and utilities.
- Surveillance checklists, which include meteorological monitoring data; TSF access and security logs; and monthly, quarterly, and Pond 4 surveillance checklists. Pond 4 and repository LCRS and LDS monitoring records are maintained electronically.

Deed restrictions (verified in the San Juan County Recorder's Office) were inspected to ensure that administrative controls remain in effect with the City of Monticello and San Juan County.

The following categories of documents and records were inspected to ensure that pertinent information for implementing LTS&M activities is readily available to onsite personnel and the general public:

- LTS&M Plan (including site-specific emergency response information), the *LMS Safety and Health Program* (LMS/POL/S20043), and the *Quality Assurance Manual* (LMS/POL/S04320). These documents are available electronically.
- Information Repository and OU III Administrative Record.
- LTS&M training records (applicable to onsite personnel and unescorted employees from the City of Monticello who access the TSF).

No major deficiencies were noted in the above administrative categories. LTS&M documents were available electronically from the field office. Deed restrictions were verified at the San Juan County Recorder's Office, including those associated with the sale of properties. The Information Repository and OU III Administrative Record were accessible electronically and available from the Monticello field office. The site record books were correct and complete and contained only minor errors that were corrected by onsite personnel before the end of the annual inspection.

3.0 Conclusions and Recommendations

The 2021 annual inspection confirmed that DOE LTS&M activities implemented throughout the year remain effective and appropriate, and ICs restricting land and groundwater use as part of the MMTS and MVP remedies remain effective. No corrective actions are necessary.

4.0 References

40 CFR 192.21. U.S. Environmental Protection Agency, "Criteria for Applying Supplemental Standards," *Code of Federal Regulations*.

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

LMS Safety and Health Program, LMS/POL/S20043, continuously updated, prepared by the LMS contractor for the U.S. Department of Energy Office of Legacy Management.

Quality Assurance Manual, LMS/POL/S04320, continuously updated, prepared by the LMS contractor for the U.S. Department of Energy Office of Legacy Management.

5.0 Photographs

Photographs were taken to document findings of the 2021 annual inspection. The location and orientation of the photographs are identified in Figure 2, Figure 3, and Figure 4.

PL-1. Monticello Field Office Building

PL-2. TSF Interior Looking South

PL-3. Field Office Conex Storage

PL-4. Field Office Electrical Gate

PL-5. TSF Gate with Postings

PL-6. TSF Storage Bin

PL-7. West Boundary of Wildlife-Friendly Fence

PL-8. Perimeter Sign P38

PL-9. Boundary Survey Marker S-1

PL-10. Looking North Toward Perimeter Sign 1 (No Change in Erosion Channel)

PL-11. South Drainage Channel, Looking East

PL-12. Brush Removal in West Drainage Channel, Looking North

PL-13. West Drainage Channel, 2020 Erosion Repairs

PL-14. Pond Entrance Gate

PL-15. Pond 4, Looking West

PL-16. Pond 4 Safety Cabinet

PL-17. Pond 4 LCRS/LDS Control Cabinet

PL-18. Site Monument 1, on Access Road

PL-19. Site Monument 2, at Apex of Disposal Cell

PL-20. Top of Disposal Cell Cover, Looking West

PL-21. Top of Disposal Cell Cover, Looking East

PL-22. Top of Disposal Cell Cover, Looking South

PL-23. Manhole 4

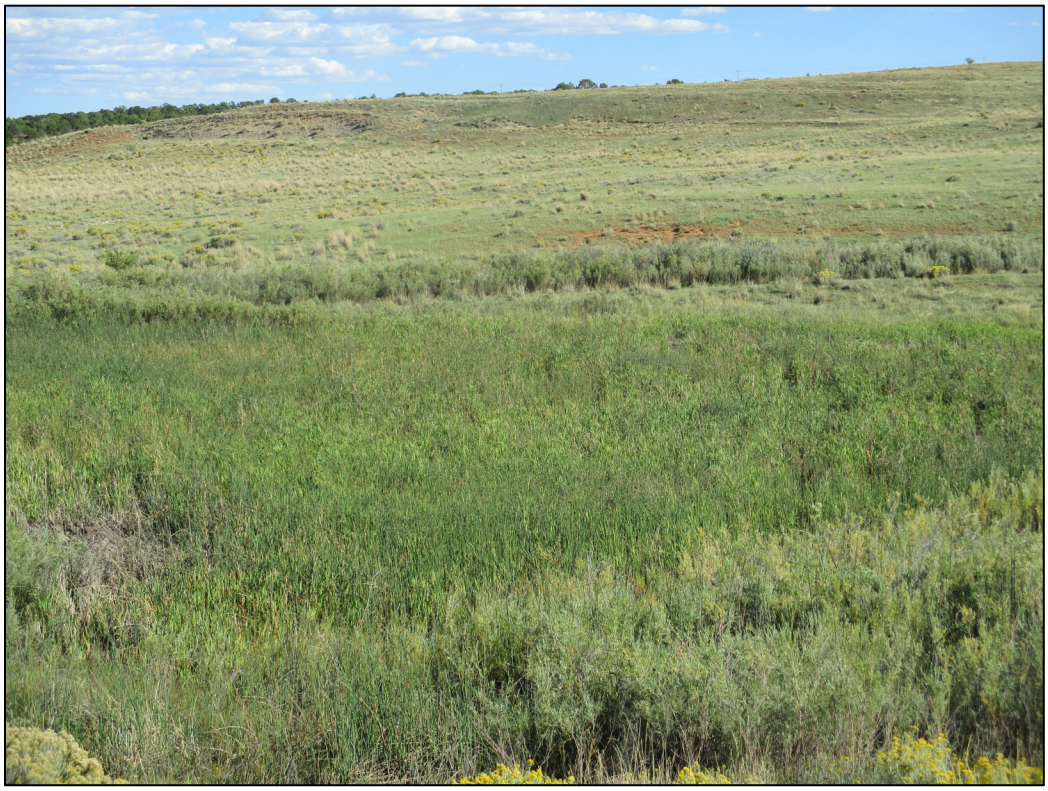
PL-24. Manhole 1, Interior

PL-25. Settlement Plate A

PL-26. Deer Draw Dam

PL-27. Erosion Gully Toward Transfer Building

PL-28. Wetland 1



PL-29. Wetland 2

PL-30. Radiological Control Technician Scanning City Curb Construction at 397 N. Main Street

PL-31. U.S. 191 Embankment

PL-32. Montezuma Canyon, View Downstream

PL-33. Transfer Building

PL-34. Extraction Well Field on Property MP-00179

PL-35. Extraction Wells on Property MP-00179

Appendix A

Annual Inspection Checklist

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MMTS: Monticello Mill Tailings (DOE) Site; Operable Units I, II, and III (UT 3890090035)
MVP: Monticello Radioactively Contaminated Properties (Monticello Vicinity Properties) (UTD 980667208)
Location: Monticello, Utah: EPA Region 8

Annual Inspection Preparation:

The following tasks were completed in preparation for the current MMTS and MVP annual inspection:

	Y	N	NA
Review annual inspection requirements in the LTS&M Plan	X	☐	☐
Review additional requirements for 5-Year Review inspections when applicable	X	☐	☐
Schedule site inspection and appoint chief and assistant inspectors	X	☐	☐
Review previous reports and records as outlined in the LTS&M Plan	X	☐	☐

Notes:

	Y	N
Provide team members with background information, maps, and inspection checklists	X	☐
Prepare Job Safety Analysis and other required Safety and Health documents	X	☐
Notify EPA and UDEQ at least 2 weeks before site visit and invite them to participate	X	☐
Notify representatives from other agencies as necessary and invite them to participate	X	☐
Verify names and telephone numbers of parties with access or notification agreements	X	☐
Contact State Engineer's Office for water well permit applications in and near GWMA	X	☐

Date(s) of Annual Inspection: 9/13/2021–9/15/2021

Inspection Team Members

Name	Affiliation	Phone Number	E-mail
Danika Marshall	RSI EnTech, LLC (ecologist)	(970) 248-6137	Danika.Marshall@lm.doe.gov
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Dave Dille	RSI EnTech, LLC (environmental scientist)	(970) 248-6326	Dave.Dille@lm.doe.gov
Chris Oliver	RSI EnTech, LLC (engineer)	(970) 248-6159	Chris.Oliver@lm.doe.gov
April Hardy	RSI EnTech, LLC (Real Property)	(970) 248-6206	April.Hardy@lm.doe.gov
Patty Gallo	RSI EnTech, LLC (Environmental Compliance)	(520) 820-1673	Patty.Gallo@lm.doe.gov
Hope Petrie	RSI EnTech, LLC (Environmental Compliance)	(970) 248-6257	Hope.Petrie@lm.doe.gov

Note: Attach additional sheets as needed for any of the following sections.

I. Interviews

Name of Individual Interviewed	Affiliation	Date Interviewed

Notes:

The onsite contractor operations lead accompanied inspectors on portions of the inspection. Notes are included in individual checklist sections below.

Individuals from the City of Monticello were not interviewed during the 2021 inspection. Interviews related to the CERCLA Five-Year Review were conducted separately from the annual inspection.

Name of Individual Interviewed	Affiliation	Date Interviewed
Marc Stilson	State engineer	9/7/2021

Notes:

Mr. Stilson, Southeastern Regional Engineer with the Utah State Engineer's office (i.e., Utah Division of Water Rights [UDWR]), confirmed in an email to P. Wetherstein that in 2021:

- *There were no requests or approvals to drill into or through the shallow alluvial aquifer in DOE's Groundwater Restricted Area (GWRA).*
- *There were no new applications or approvals, or change applications or approvals, to appropriate water for domestic purposes from or near the shallow alluvial aquifer in DOE's GWRA.*

Limitations on water appropriation and drilling activities in DOE's GWRA were established at DOE's request in the UDWR Ground-Water Management Policy for the Monticello Mill Tailings Site and Adjacent Areas, May 1999.

Name of Individual Interviewed	Affiliation	Date Interviewed
Gary McKinnon/Dave Dille	Contractor Operations Lead/Environmental Scientist	9/13/2021

Notes:

Gary McKinnon, contractor operations lead, and Dave Dille, environmental scientist, both with RSI EnTech, LLC, were interviewed in tandem. Both confirmed during the interview that in 2021:

- *There was no construction or disturbance within the planned restricted areas.*
- *New RSI EnTech, LLC signs were in place.*
- *Clam shells contents (PPE, piping, and pumps) were emptied on 5/18/2021.*
- *Security cameras were installed inside and outside of the main office building.*
- *The Radiological Survey of Excavated Town Soil Procedure Manual was updated.*
- *Weed control and shrub removal was done inside the west and south drain ditches.*
- *Continued progress was made on the OU III closure status.*

II. Administrative and Records Inspection

	Readily Available Y	Readily Available N	Current Y	Current N	
1. General LTS&M Documents					
Ready access from field office to online manuals	X	☐	X	☐	
Ready access from field office to online MMTS/MVP Administrative Record, OU III Administrative Record, and Information Repository collection	X	☐	X		
2. LTS&M Training Records for Access to Radiologically Controlled Areas					
Onsite employees			X	☐	
Unescorted City workers			☐	☐	X N/A
All City workers were escorted			☐	☐	X N/A
3. Record Books					
Record book entries and documentation	X Satisfactory	☐ Unsatisfactory			
Repository Site Record Book	X	☐	X	☐	
City-owned properties	X	☐	X	☐	
Private property restricted areas	X	☐	X	☐	
Public Roads and Utilities Record Book	X	☐	X	☐	
Documentation/recordkeeping requirements met	X Satisfactory	☐ Unsatisfactory			
Information readily traced to updated drawings	X Satisfactory	☐ Unsatisfactory			
Rad scan data for eroded/excavated material	X Satisfactory	☐ Unsatisfactory			
Entries include TSF transfers	☐ Satisfactory	☐ Unsatisfactory			X N/A
Entries include information on stockpiled material and follow-up scan results	X Satisfactory	☐ Unsatisfactory			☐ N/A
U.S. 191/491 entries include information on scan results and material returned to excavation	X Satisfactory	☐ Unsatisfactory			☐ N/A
Storm event surveys documented	X Satisfactory	☐ Unsatisfactory			☐ N/A

Notes for Record Books Inspection:

General LTS&M documents are available online.
An electronic version of the paper-based system is located at the Monticello, Utah, site. Evaluation of the electronic version of the Information Repository is posted to the website.
No transfer of radioactive material into TSF in fiscal year 2021.
Minor discrepancies between information recorded in the Public Roads and Utilities record book and corresponding information on the Radiological As-Builts. Bill Cary corrected all discrepancies on 9-15-2021.

4. Radiological As-Built Drawings			
Drawing updated annually	X Satisfactory	☐ Unsatisfactory	
Documentation and recordkeeping requirements met	X Satisfactory	☐ Unsatisfactory	
Radiological scan information recorded	X Satisfactory	☐ Unsatisfactory	

	Readily Available Y	Readily Available N	Current Y	Current N
5. Surveillance Checklists and Records				
TSF Access/Security Logs	X	☐	X	☐
Meteorological Monitoring Data, Monthly and Quarterly Repository Surveillance Checklists, and Monthly Pond 4 Surveillance Checklists	X	☐	X	☐

Notes for Checklist and Records Inspection:

None

6. Agreements (verify on Five-Year Review inspections only)			
DOE/City Cooperative Agreement (verify current with Environmental Compliance)	X	☐	☐ N/A
DOE/UDOT Memorandum of Understanding doesn't expire			
7. Zoning Restriction—Overlay Zone OL-1 (verify on Five-Year Review inspections only)			
Restriction is verified as current through City for property MP-00211-VL	X	☐	☐ N/A
Restriction is verified as current through City for property MS-00176-VL	X	☐	☐ N/A

8. Deed Restrictions *(verify at San Juan County Recorder's Office, 117 S. Main Street)*

Properties Transferred from DOE to City of Monticello

DOE ID	Parcel	Document	Book	Page	IC Annotations in Place Y	N
Electronic record	A34240063004 applies to all transferred city properties				X	☐
MP-00181-OT	A33230367201	E061691	B788	100-113	X	☐
	33S23E367204	E061691	B788	100-113	X	☐
MP-00391-VL	33S24E316001	E061691	B788	100-113	X	☐
MS-00893-OT	33S24E315400	E061691	B788	100-113	X	☐
MP-01040-VL (N)	34S24E061200	E061691	B788	100-113	X	☐
	34S24E061201		electronic record		X	☐
MP-01041-VL	34S24E060600	E061691	B788	100-113	X	☐
MP-01042-VL	34S24E060000	E061691	B788	100-113	X	☐
MP-01077-VL	33S24E318400	E061691	B788	100-113	X	☐

Notes:

Correction to quitclaim deed for properties transferred to City recorded as E062130, B789, P450-452 (applies to all of the above listed properties).

Properties Sold by DOE to Private Party

DOE ID	Parcel	Document	Book	Page	IC Annotations in Place Y	N
MP-01081-VL	34S24E053000	114283	933	105-111	X	☐

Montezuma Creek Soil and Sediment Properties

DOE ID	Parcel	Document	Book	Page	Y	N
MP-00990-CS	33S24E324800	E063343	B793	831-852	X	☐
	33S24E328400	E063343	B921	474-476	X	☐
	33S24E324802	E063343	electronic record		X	☐
	A33240324802	E063343	electronic record		X	☐
	A33240324804	E063343	electronic record		X	☐
MG-01033-VL	34S24E050000	E063343	B793	831-852	X	☐
	34S24E050601	E063343	electronic record		X	☐
MS-01026-VL	34S24E043000	E063343	B793	831-852	X	☐
MS-01027-VL	34S24E042400	E063343	B793	831-852	X	☐
MG-01030-VL	34S24E047200	E063255	B793	526-538	X	☐
MG-01029-VL	34S24E040000	E063255	B793	390-404	X	☐
	34S24E040001	E063255	electronic record		X	☐
MP-00951-VL	33S24E317200	E063926	B796	188-202	X	☐
	33S24E317207	E063926	electronic record		X	☐
	33S24E317204	E063926	electronic record		X	☐
	A33240317206	E063926	electronic record		X	☐
MP-01084-VL	33S24E326000	E063926	B796	188-202	X	☐

Notes:

None

Utah Department of Transportation Properties

DOE ID	Parcel	Document	Book	Page	Y	N
MS-00895-OT	A33230367811	E068703	B814	533	X	☐
	A33230367825		electronic record		X	☐
MS-00892-OT	A33230367202	E068704	B814	534	X	☐
MS-01021-OT	A33230367812	E068705	B814	535-536	X	☐
MS-01020-OT	A33230369001	E068706	B814	537-538	X	☐
MS-01020-OT	A33230310090	E068885	B815	269	X	☐

Notes for Deed Restriction Inspection:

None

III. Repository Inspection

A. Access Area

1. Site Access Sign/Emergency Information	X	Satisfactory	☐	Repairs/Maintenance Needed
2. Field Office	X	Satisfactory	☐	Repairs/Maintenance Needed
3. Temporary Storage Facility	X	Satisfactory	☐	Repairs/Maintenance Needed
Bin cover	X	Functional	☐	Not Functional
Approximate volume of bin contents (cubic yards) _0___				
Safety and Health/RAD postings	X	Appropriate	☐	Inadequate
Drums and secondary containment	X	Good condition	☐	Unavailable/not good condition
Vandalism/trespassing	X	Not evident	☐	Evident (locate on map)

Describe Access Area Repairs/Maintenance Needed:

None

B. Repository Perimeter

(Note locations of erosion, noxious weeds, vandalism, or excessive vegetation on map)

1. Outer Fencing and Gates	X	Satisfactory	☐	Repairs/Maintenance Needed
2. Signs *(Note condition of 40 numbered reference signs and posts)*				
Signs damaged but legible, requiring monitoring: *None*				
Signs requiring replacement: *None*				
3. South Boundary Markers	X	All six markers located	☐	Marker(s) _____not located
4. Erosion/Gullying	X	Not evident	☐	Evident
5. Vegetation	X	Not excessive	☐	Excessive growth
	☐	Noxious weeds absent	X	Noxious weeds present
6. Land Use Changes on Adjoining Property	X	No change	☐	Change
7. Vandalism/Trespassing	X	Not evident	☐	Evident

Notes for Condition of Repository Perimeter (e.g., repairs needed, erosion areas, vandalism):

Infestations of noxious weeds were mapped (and subsequently treated with herbicide on September 28, 2021).

Repository Runoff/Run-On Controls

(North and East Toe Trenches; South and West Drainage Channels)

1. Settlement	X	Not evident	☐	Evident
2. Material Degradation	☐	Not evident	X	Evident
3. Erosion/gullies	X	Not evident	☐	Evident
4. Siltation	☐	Not evident	X	Evident
5. Obstructions	X	Not evident	☐	Evident
6. Excessive Vegetation	X	Not evident	☐	Evident

Notes for Condition of Repository Runoff and Run-On Controls (Note: Locate all areas of concern on map):

Material degradation and siltation do not impact the integrity of the area. No sign of erosion on the North and East Toe Trench. The runoff/run-on controls were inspected by RSI EnTech Engineers (see Appendix B).

Pond 4 *(Note: Locate all areas of concern on map)*

1.	**Perimeter Fence and Access Gate**	X	Satisfactory	☐	Unsatisfactory
2.	**Erosion/Biointrusion of Pond Berm**	☐	Not evident	X	Evident
3.	**Safety Equipment** Pond barrier rope intact	X	Yes	☐	No
	Personal floatation devices and postings present and visible	X	Yes	☐	No
4.	**Pond 4 LCRS and LDS Electrical Housing/Surface Installations**				
	Physical condition is:	X	Satisfactory	☐	Unsatisfactory
5.	**Liner—Holes/Cracks/Tears**	X	Not Evident	☐	Evident
6.	**Siltation and Vegetation in Pond 4**	X	Not evident	☐	Evident
7.	**Pond 4 Water Level** Estimated water depth is 6.4 feet				
8.	**Vandalism**	X	Not evident	☐	Evident

Notes for Condition of Pond 4 Features:

Evidence of submerged vegetation growing in the pond, but pond function is not impaired. Evidence of rodent biointrusion on the north and west sides, but liner function is not impaired. Continued monitoring is recommended.

C. Repository Cover Inspection

1.	**Top Perimeter Road and Road to Pond 4**	X	Satisfactory	☐	Unsatisfactory
2.	**Interior Wildlife Fence and Wildlife Gates**				
	Physical condition is:	X	Satisfactory	☐	Unsatisfactory
3.	**Cover Vegetation**				
	See attached *Repository Cover Vegetation Index* form; note areas of concern on map				
4.	**Riprap Armoring**				
	X Slumping/sliding not evident	☐	Slumping/sliding evident (locate on map)		
	X Rock deterioration not evident	☐	Rock deterioration evident (locate on map)		
5.	**Settlement/Desiccation/Erosion/Gullies**				
	X Settlement depressions not evident	☐	Settlement depressions evident (locate on map)		
	X Desiccation cracking not evident	☐	Desiccation cracking evident (locate on map)		
	X Erosion/gullies not evident	☐	Erosion/gullies evident (locate on map)		
6.	**Holes/Burrows/Biointrusion**				
	☐ Holes/burrows/biointrusion not evident	X	Holes/burrows/biointrusion evident (locate on map)		
7.	**Seepage/Ponding**				
	X Seepage not evident	☐	Seepage evident (locate on map)		
	X Ponding not evident	☐	Ponding evident (locate on map)		
	X Soft subgrade not evident	☐	Soft subgrade evident (locate on map)		
	X Phreatophytes not present	☐	Phreatophytes present (note species/locate on map)		
8.	**Site Monument at Apex of Cover**	X	Satisfactory	☐	Repairs/maintenance needed
	Site Monument at Boundary Gate	X	Satisfactory	☐	Repairs/maintenance needed

Notes for Repository Cover Inspection:

Evidence of small rodent biointrusion, but cover function is not impaired. Continued monitoring is recommended.

Cover Penetrations
(Caution: Confined space entry requirements in effect for all manholes)

1.	**Manholes 1 and 3 (LCRS and LDS access vaults)**				
	Covers secure and operable	X	Yes	☐	No
	Exterior pump access ports are undamaged	X	Yes	☐	No
	Evidence of leakage into vaults	☐	Yes	X	No
	Evidence of drainage through cover penetrations	☐	Yes	X	No
2.	**Manholes 2, 4, and 5**				
	Covers secure and operable	X	Yes	☐	No
	Evidence of drainage through cover penetrations	☐	Yes	X	No

Notes for Condition of Manholes (include condition of telemetry equipment and appropriateness of safety and health postings):

None

3. LCR Video Ports (check covers only; ports are inoperable)

Covers secure and operable	X Yes	☐ No
Evidence of drainage through cover penetrations	☐ Yes	X No

4. Settlement Monuments (A to I) (Note: Plates surveyed during Five-Year Review inspections only)

Surface completions undamaged	X Yes	☐ No
Inner plates undamaged	X Yes	☐ No

5. Embedded Lysimeter

Evidence of seepage at outlet	☐ Yes	X No
Instrumentation installations undamaged	X Yes	☐ No
Evidence of drainage along cover penetrations	☐ Yes	X No
Telemetry surface installations in good condition	X Yes	☐ No

6. Operation of Repository and Pond 4 LCRS and LDS (interview onsite LM operator)

Pumping rates are reported in quarterly Federal Facility Agreement reports to EPA and UDEQ. Reports are available in System Operation and Analysis at Remote Sites (SOARS).

Note Any Anomalies or Other Observations Reported by the LM Operator:

None

Notes for Cover Penetrations Inspection and Operation of LCRS/LDS:

None

IV. City-Owned Properties Inspection

A. City-Owned Properties Transferred from DOE

(MP-00181, MP-00391, MP-00893, MP-01040 (North Portion), MP-01041, MP-01042, and MP-01077)

Property	181		391		893		1040		1041		1042		1077	
	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
Accessible to public	X	☐	X	☐	X	☐	X	☐	X	☐	X	☐	X	☐
Evidence of camping	☐	X	☐	X	☐	X	☐	X	☐	X	☐	X	☐	X
Habitable structure(s)	☐	X	☐	X	☐	X	☐	X	☐	X	☐	X	☐	X
Gullies/erosion	☐	X	☐	X	☐	X	☐	X	☐	X	☐	X	X	☐
Runoff/drainage controls intact and in good repair (ditches, riprap structures, dams, check dams, berms)	X	☐	X	☐	X	☐	X	☐	X	☐	X	☐	X	☐
Land use changes	☐	X	☐	X	☐	X	☐	X	☐	X	☐	X	☐	X
Evidence of vandalism	☐	X	☐	X	☐	X	☐	X	☐	X	☐	X	☐	X
Soil removal evident	n/a		☐	X	n/a		n/a		☐	X	n/a		☐	X
Water well installation	☐	X	n/a		☐	X	n/a		n/a		n/a		n/a	
Wetland/creek damage	☐	X	n/a		☐	X	n/a		n/a		n/a		n/a	

Describe Any Violations of Institutional Controls and/or Repair/Maintenance Issues (locate on map):

Previous years gully erosion on property 1077 increased due to heavy storm events. Continue to monitor due to location, uphill from the transfer station building.

B. City-Owned Property MP-00211

	Yes	No	N/A
Evidence of Excavation or Construction	☐	X	
If yes, confirm the following with onsite LM representative:			
In accordance with Monticello zoning district Overlay Zone (OL-1)	☐	☐	X
Violation has been reported	☐	☐	X

Radiological contamination was encountered	☐		☐		X	
Radiological contamination was appropriately managed	☐		☐		X	
Corrective Action Required	☐		X			

Notes for City-Owned Property MP-00211 Inspection: *None*

V. Montezuma Creek Soil and Sediment Properties

Evidence of Habitable Structures Within the Restricted Area	☐	Yes	X	No		
Evidence of Soil Removal From the Restricted Area	☐	Yes	X	No		
Land Use/Ownership Has Changed*	☐	Yes	X	No		
Landowners Are Aware of Use Restrictions*	X	Yes	☐	No		
Violations Have Been Reported *	☐	Yes	☐	No	X	N/A
Corrective Action Required	☐	Yes	X	No		

**** confirm with onsite LM representative***

Notes for Soil and Sediment Properties Inspection:

No anomalies have been reported by sampling teams or onsite representatives.

VI. Groundwater Management Area

Evidence of Water Well Installation Within the Restricted Area*	☐	Yes	X	No		
No Permits for Water Well Installation Within the Restricted Area	X	Yes	☐	No		
Violations Have Been Reported*	☐	Yes	☐	No	X	N/A
Land Ownership Has Changed*	☐	Yes	X	No		
Landowners Are Aware of Water Use Restriction*	X	Yes	☐	No		
Corrective Action Required	☐	Yes	X	No		

**** confirm with onsite LM representative***

Notes for Groundwater Management Area Inspection:

Onsite representatives regularly inspect area to verify that new wells have not been drilled.

VII. OU III Monitoring Wells and Water Treatment Systems

A. Monitoring Well Surface Completions

(Note: Active wells are inspected and maintained biannually during sampling events. Observations on inactive wells are reported to the sampling team.)

	Yes	No		
Outer Casing or Flush Mount Vault of Inactive Wells Intact	X	☐		
Wells Are Locked, and Flush Mount Well Lids Are Secured	X	☐		
Groundwater Treatment Facility and Building	X Satisfactory	☐ Repairs/Maintenance Needed		
Pipeline	X Satisfactory	☐ Repairs/Maintenance Needed		

Notes for Inactive Monitoring Well Inspection (Note location of any maintenance issues on map):

Wells are checked and maintained twice a year by groundwater sampling team.

VIII. MVP Field Inspection

A. City Streets and Utilities

	Yes	No		
Roads/Utilities Under Construction				
Unmonitored excavations observed during inspection	☐	X		
Planned excavations are identified by onsite LM representative	X	☐		
Radiological material is properly controlled and managed	☐	☐	X	N/A

Notes for City Streets and Utilities Inspection:

Onsite personnel normally drive city streets daily to look for excavation work. The utility locator service is accessed through Blue Stakes notices (811 from the State of Utah). No radioactive material was encountered during 2021.

B. UDOT U.S. Highways 191 and 491 Rights-of-Way

	Yes	No	
Roads Under Construction			
Unmonitored excavations observed during inspection	☐	☐	X N/A
Planned excavations are identified by onsite LM representative	☐	☐	X N/A
Radiological material is properly controlled and managed	☐	☐	X N/A

Notes for UDOT Highways Inspection:

UDOT information available on website; no construction. Onsite LM representative routinely consults website for future projects. No highway projects in 2021.

Erosion (highway shoulders and U.S. 191 embankment at Montezuma Creek)

☐ New erosion evident ☐ Previous erosion evident; unchanged X No erosion evident

Eroded Material Scanned for Radiological Contamination and Properly Managed

☐ Yes ☐ No X N/A

Describe Erosion Noted on UDOT Highways:

None

C. Property MS-00176
(Note: Observations and activities for MS-00176-VL are recorded by the onsite LM representative in the Private Properties Restricted Areas Record Book)

Monticello zoning district Overlay Zone (OL-1) requires radiological scanning of the footprint of new habitable structures. Radiologically contaminated material is removed under the direction of the onsite LM representative.

	Yes	No
Unmonitored Excavations Observed During Inspection	☐	X
Planned Excavations Are Identified by Onsite LM Representative	X	☐
Site Conditions Indicate ICs Properly Implemented	X	☐

Notes for Property MS-00176 Inspection:

No changes noted since last annual inspection.

Record the photographs taken during the annual inspection, including the location on map(s), azimuth, and a brief description of the feature(s) photographed.

Repository Cover Vegetation Index
Monticello, Utah

Date inspected: 9/14/2021 Inspected by: Danika Marshall

Dominant species present on the repository cover at time of inspection
(**Note:** Dominant species make up an estimated 10% or more of the vegetative cover):

Species Name	Growth Form			Life Cycle		Vegetation Type		
	Shrub	Grass	Other	Annual	Perennial	Native	Weedy	Other
Agropyron cristatum		X			X			X
Thinopyrum intermedium		X			X			X
Bromus inermis		X			X			X
Artemisia tridentata	X			X		X		
Pascopyrum smithii		X			X			X
Ericameria nauseosa	X			X		X		
Bromus tectorum		X				X		

Less common species present on repository cover:

Grindelia squarrosa, Machaeranthera canescens, Lactuca serriola, Viguiera multiflora, Sisymbrium altissimum, Helianthus annuus, and *Convolvulus arvensis.*

Noxious weed species present (record locations on map or GPS):

Convolvulus arvensis (State of Utah Class C noxious weed; no control warranted).

Additional notes:

Evidence of accumulating dead vegetation debris mostly grasses. Cover function is not impaired. Continued monitoring is recommended.

Vegetation Condition Score (see reverse): 4.3

Notes: (Has the composition of vegetation changed, including plant diversity? If so, how? Describe any evidence of vegetation disturbance or relevant climate factors. If the vegetation score is less than 3.0, provide explanation and/or recommendations.)

High intensity moisture events during the months of August and September 2021.

Condition of Vegetative Cover

(indicate number in each row that best represents current conditions):

Indicator	1	2	3	4	5
Composition of plant cover (estimated visually)	Annual weeds dominant; nonweedy perennial species <20% of total cover	Annual weeds abundant and expanding; nonweedy perennial species 20%–40% of total cover	Annual weeds present and expanding; nonweedy perennial species 40%–60% of total cover	Some weeds present; nonweedy perennial species 60%–80% of total cover	No obvious weeds; nonweedy perennial species exceeding 80% of total cover
Total plant cover (visual estimate)	Canopy cover less than 30%	Canopy cover 30%–50%	Canopy cover 50%–70%	Canopy cover 70%–90%	Canopy cover over 90%
Bare soil	Mostly bare soil	Large areas of bare soil	Moderate areas of bare soil	Few areas of bare soil	No obvious areas of bare soil
Diversity of dominant species	One species dominant across site	2–3 species dominant across site, one or both of which are weedy; species occur in patches	2–3 species dominant across site, both of which are nonweedy; species evenly distributed with some monoculture patches	More than 3 species dominant across site, at least 2 of which are nonweedy perennials; few patches of monocultures	More than 4 nonweedy perennial species dominant across site; few to no patches of monocultures
Diversity of trace species	0–1 nonweedy trace species observed on cover	2 nonweedy trace species observed	3–4 nonweedy trace species observed	5–6 nonweedy trace species observed	7 or more nonweedy trace species observed
Plant residue	No plant residue on soil surface	1%–10% of soil surface covered with plant residue	10%–20% of soil surface covered with plant residue	20%–30% of soil surface covered with plant residue	30%–70% plant residue on soil surface
Standing dead vegetation (visual estimate)	Standing dead >25%	Standing dead 15%–25%	Standing dead 5%–15%	Standing dead <5%	No obvious standing dead
Erosion	Sheet erosion visible; rills/gullies present, or blowouts or dunes forming	Sheet erosion visible; some small rills present, or soil swept from onsite, causing burial or abrasion of vegetation	Sheet erosion not obvious; no visible rills or rills stabilized, or soil swept from offsite, causing burial or abrasion	No obvious sheet erosion; rills not present or fully stabilized, or some soil deposition from off site without burial or abrasion	No visible signs of current or past sheet or wind erosion
Disturbance	Evidence of mass disturbance to several species of vegetation (fire, animal damage, etc.)	Evidence of some disturbance to several species of vegetation or major disturbance to one species	Evidence of minor disturbance to one or two species of vegetation; localized to individual patches	Evidence of minor damage to individual plants only; disturbance not sitewide	No evidence of disturbance to any plant species or individual plants
Total each column	0	0	0	6	3

Add up all columns for total condition score:

	0	(Column 1) × 1 =	0
	0	(Column 2) × 2 =	0
	0	(Column 3) × 3 =	0
	6	(Column 4) × 4 =	24
+	3	(Column 5) × 5 =	15
		Total: =	**39**

Divide total by 9 to calculate vegetative cover condition score = 4.3

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Appendix B

Geotechnical Inspection Report

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Monticello Disposal Cell 2021 Engineering Inspection

Introduction

Purpose and Scope

An inspection was performed at the disposal cell at the Monticello, Utah, Disposal and Processing Sites on September 15, 2021, to assess its condition as part of a comprehensive annual inspection.

The disposal cell's top cover, side slopes, diversion ditches, and swales were observed during the inspection. Photos were taken to represent current site conditions as described within this report.

Site Inspection

Disposal Cell Condition

The disposal cell was found to be in satisfactory condition during the inspection. Vegetation on the disposal cell cover and side slopes continues to be healthy. No disposal cell performance concerns were identified during the inspection. Figure B-1 shows the overall cover conditions on top of the disposal cell.

Figure B-1. Top Slope Cover, September 15, 2021

Drainage Diversion Ditches and Swales

During the 2020 inspection, inspectors noted an expanding rill that had formed by runoff bypassing riprap armor feeding into the west drainage channel. The rill was subsequently filled with additional riprap to arrest the headcutting. During the 2021 inspection, the riprap appeared to be working well and no new erosion showed despite significant rainfall in late summer of 2021. Vegetation was thriving in and around the repaired area, further stabilizing the soils. Figure B-2 shows the repaired erosion in the west drainage channel. The outfall of the southern diversion ditch was observed, and no issues were noted during this inspection.

Figure B-2. West Drainage Channel Erosion Repair

Erosion Control Riprap Side Slopes

The northwest riprap-covered side slope was found to be in satisfactory condition. The slope is protected against erosion by diorite riprap (Figure B-3), which also appeared to be in satisfactory condition. No evidence of movement or settling was observed. Some areas of the side slopes outside the tailing's footprint contain relatively sparse vegetation growth, allowing minor erosion of exposed soils which are being deposited at the transition between the vegetated and riprap-covered areas. Shallow rills were found along the uphill soil/rock interface of the side slope (Figure B-4). These rills are not currently a cause for concern; however, continued monitoring is recommended to ensure erosion features do not dramatically expand unexpectedly. At this time, the annual site inspection is adequate to address this monitoring recommendation.

Figure B-3. Northwest Riprap Side Slope

Figure B-4. Sediment at Top of Northwest Slope

Riprap Toe Trench

Sediment appears to be eroding onto the thickened riprap toe trench along the bottom of the disposal cell's north, northeastern, and eastern side slopes (Figure B-5 and Figure B-6). The amount of sediment is most significant on the north side slope, where the toe trench is almost completely covered. The toe trenches are not designed to collect or transport water. The purpose of the toe trenches is to halt any headcutting that is advancing toward the toe of the slope from below. Therefore, the sediment accumulation is purely cosmetic and does not affect the performance intent of the riprap toe. These erosion features should not be considered an issue. These minor erosion features should continue to be monitored during annual site inspections.

Figure B-5. Sediment Transport onto East Thickened Riprap Toe

Figure B-6. Sediment Transport onto North Thickened Riprap Toe

Some surface wearing and fracturing of sandstone rock (Figure B-7) has been continuously observed within the riprap toe, according to recent inspection reports. This breakdown is likely only occurring at the surface and should not be considered a problem.

Figure B-7. Breakdown of Sandstone Rock, East Thickened Riprap Toe

Pond 4 and Groundwater Collection and Transfer Building

No problems were reported at either Pond 4 (Figure B-8) or the groundwater collection and transfer building, so these were not visited during the engineering inspection. Pond 4 continues to be in a stable condition, and no major issues were identified.

Figure B-8. Pond 4 From East

Conclusion

The disposal cell at the Monticello disposal and processing sites appears to be in satisfactory condition. All drainage features appear to be functioning as designed, and no significant erosion was observed. Minor erosion was observed on 10:1 (5.71 degree) side slopes due to unconcentrated surface flow; this is acceptable. Based on geotechnical and engineering reports supplementing the Monticello site annual inspections since 2017, no site conditions require special attention.