LMS/MNT/S31901

2020 Annual Inspection Report for the DOE Monticello, Utah, Mill Tailings Site and Monticello Vicinity Properties

December 2020

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) was conducted on September 14, 15, and 16, 2020. 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 2020 annual inspection.

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 yards of used personal protective equipment and operating materials used at the repository are stored in properly designated containers. The repository cover did not show any evidence of settling, slumping, fracturing, seepage, ponding, or significant erosion. Site vegetation is healthy and composed primarily of desirable species. Sediment movement and vegetation were apparent in some of the drainage channels and toe trenches but do not impair their function. Small erosion rills were observed on the West Drainage Channel. The rills did not impact the integrity of the area and repairs were made as a maintenance item on October 5, 2020. All perimeter signs were in good condition. The water in Pond 4 was approximately 6.5 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). On June 2, 2020, a water line break on Property MP-00181 occurred causing the embankment to erode above Wetland 2. The DOE Office of Legacy Management was notified, and the City of Monticello took corrective action. Vegetation below the embankment erosion prevented sediment from reaching the wetland. 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 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 2019 and April 2020.

Conclusions and Recommendations. The 2020 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, and only minor maintenance action is needed.

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 14, 15, and 16, 2020. 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 2020 annual inspection. Photographs to support specific observations are identified in the text and in figures by photograph location (PL) numbers.

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 the Comprehensive Environmental Response, Compensation, and Liability Act (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 and to the former mill site, although the former mill site is not a supplemental standards area. IC-related restrictions are also applied to properties overlying contaminated groundwater.

Figure 3 identifies the locations of the Monticello properties affected by the remedial actions and 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 monuments, 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).

Constructed features and support structures 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 perimeter, and additional signs, including an entrance sign with contact information, are posted on or near site gates. Between the 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.

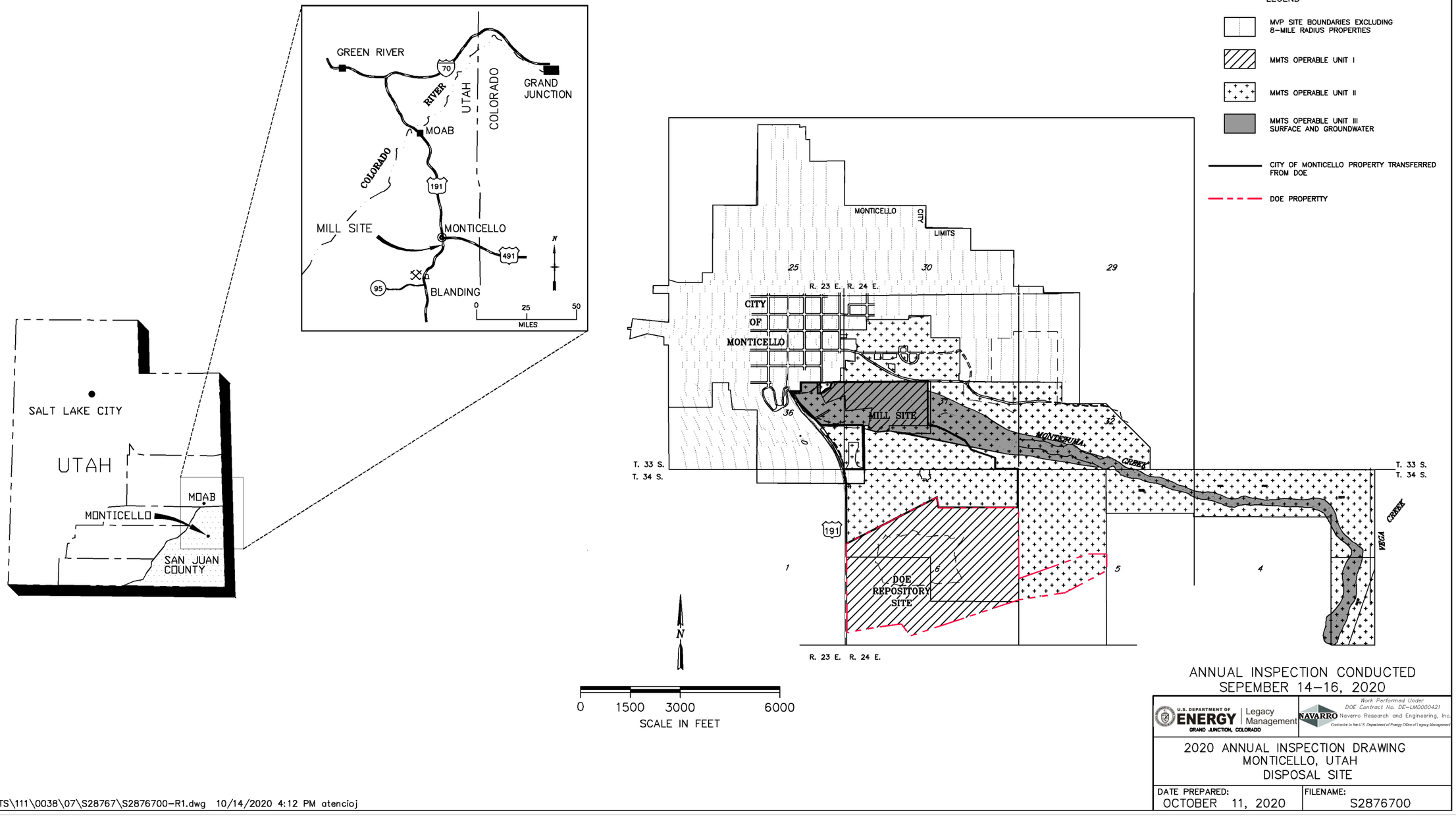


Figure 1. Location of Monticello MMTS and MVP Sites

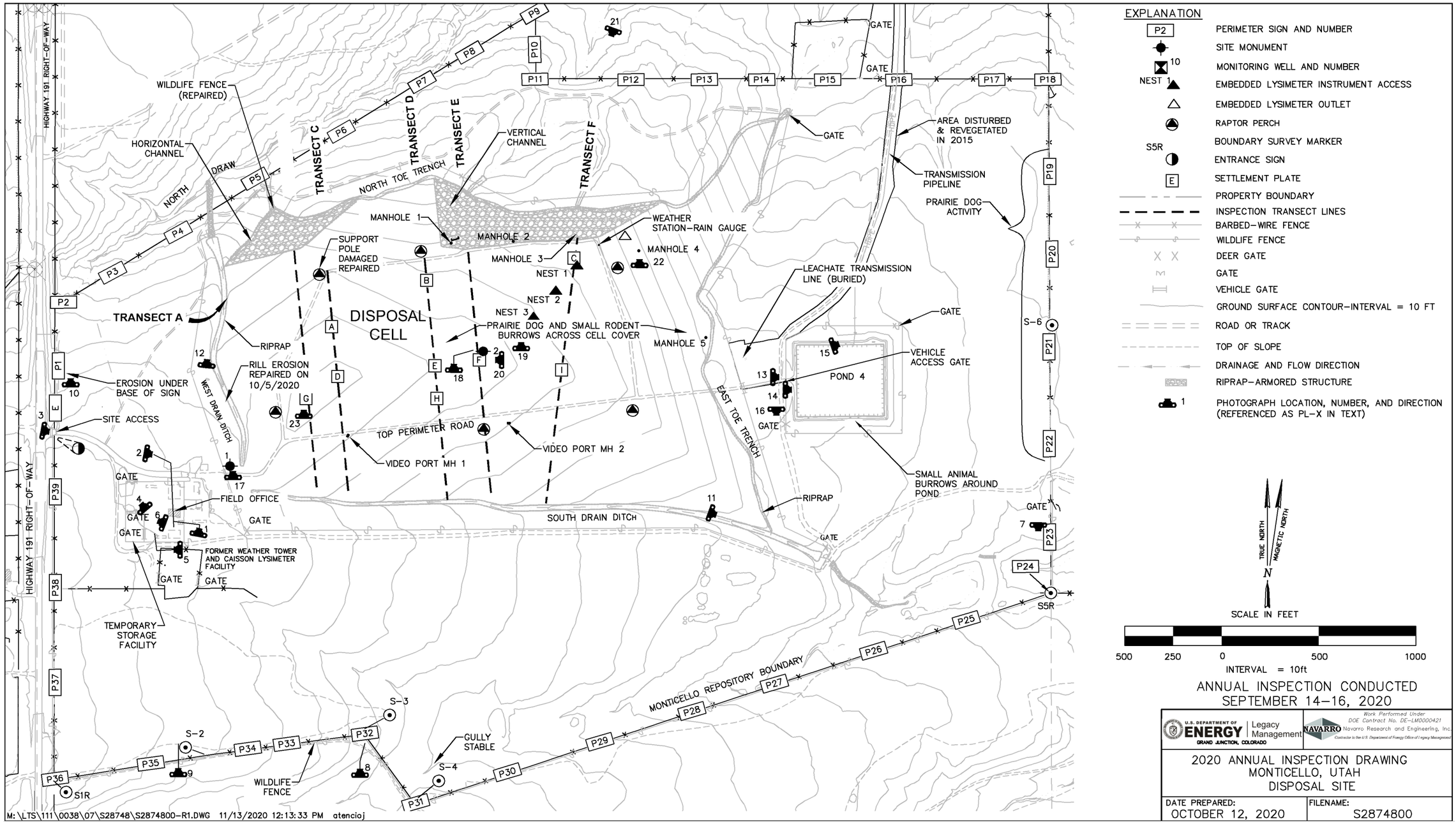


Figure 2. Monticello, Utah, Repository Site

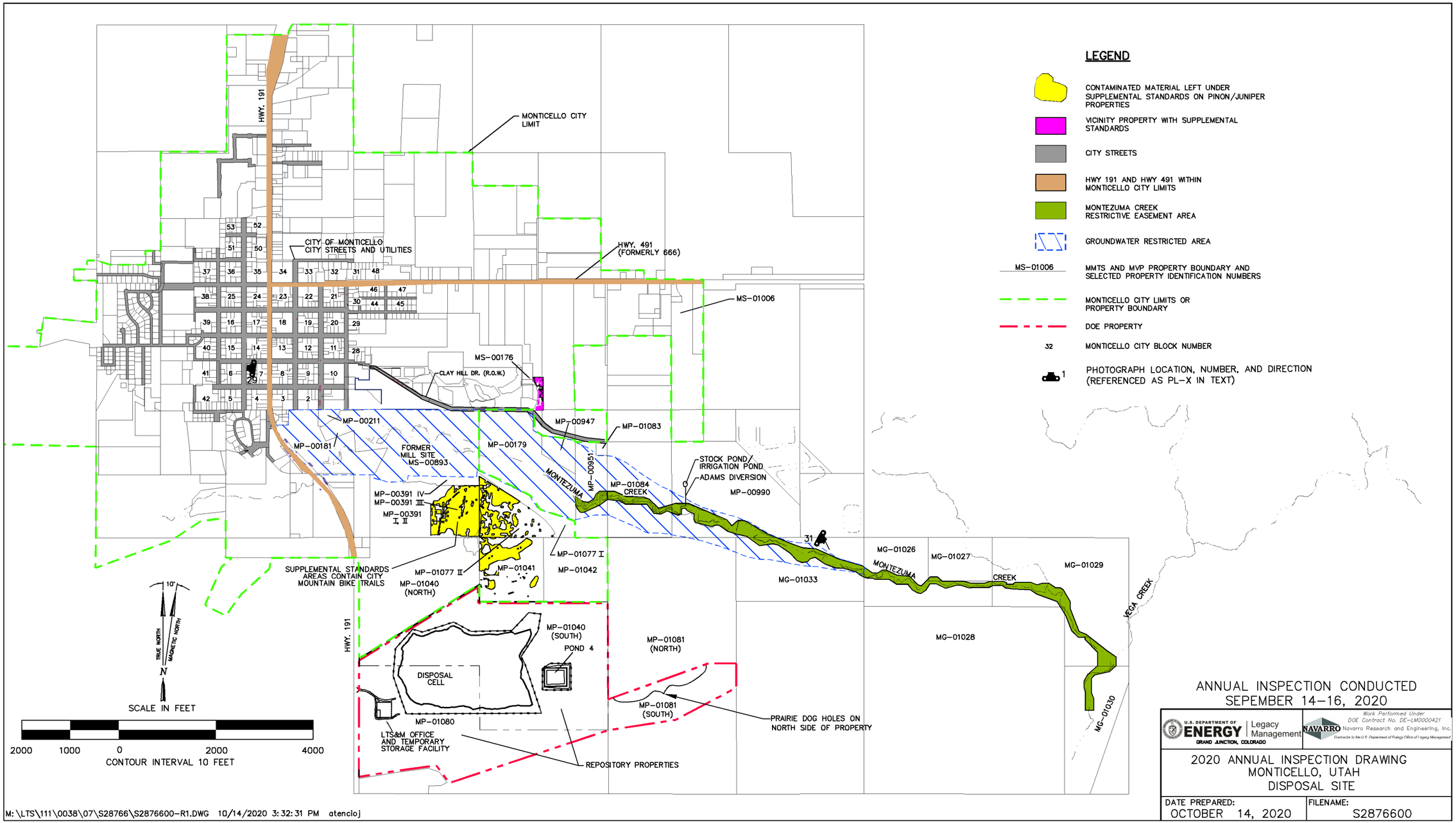


Figure 3. MMTS and MVP Supplemental Standards and Groundwater Restricted Areas

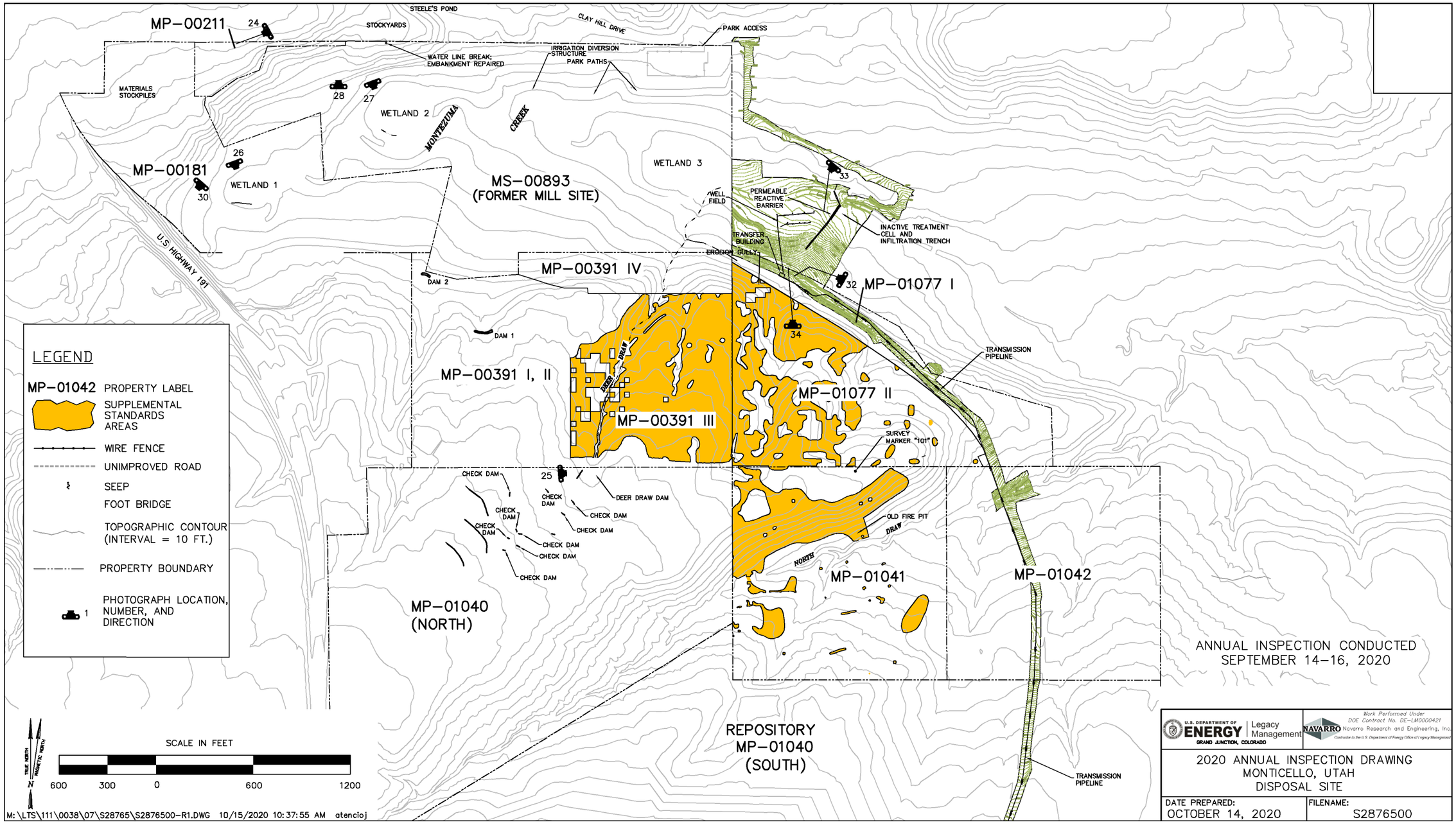


Figure 4. Monticello, Utah, Former Mill Site and Surrounding Area

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 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. 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 water 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 at an established 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 October.

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 Monticello. 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. Because the surface water and groundwater remedy is still being implemented, activities associated with OU III are not LTS&M activities. However, 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 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 applications have been granted in the OU III restrictive easement area.

CERCLA Five-Year Reviews (begun in 1997) are also conducted separately from the annual inspections 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 2020 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]

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

[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.

for evidence of 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 water 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 2020 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 14, 15, and 16, 2020. H. Petrie, F. Smith, G. McKinnon, C. Oliver, and C. Mueller 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 14, 2020

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 15, 2020

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 16, 2020

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

1.4.1 Additional Inspection-Related Activities

In 2020, 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 a phone call with M. Stilson of the Utah Division of Water Rights on September 9, 2020.

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 monuments, and structures associated with the embedded lysimeter). Results of the 2020 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). The exhaust fans in the restrooms were replaced and battery-backup systems were installed since the last annual inspection. 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 2020 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 reported that it did not contain any soil. The TSF yard was well-maintained (PL-6). The lay-down area for potential mixed waste was in good working order, as were clamshell containers that contain approximately 1.5 cubic yards of used personal protective equipment and other material. The TSF was also inspected quarterly by site personnel in 2020, and inspection results were presented in quarterly reports to EPA and UDEQ.

2.1.2 Repository Perimeter

Perimeter Fence

The southeastern perimeter wildlife-friendly fence was in good condition (PL-7). There was no evidence of vandalism or areas of excessive tumbleweed 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 2019 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 2019 (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. One small population of Canada thistle and common mullein was treated with herbicide after the annual inspection on September 17, 2020. 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 2020.

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 were observed on the West Drainage Channel. The rills did not impact the integrity of the area and repairs were made as a maintenance item on October 5, 2020. Shrubs observed in portions of the channels do not block potential flow, and 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.

Gate, Fence, Entrance, and Perimeter Signs

All gates were in good working condition. 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-13).

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 May 2020. 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-14. The fence around Pond 4 was in good condition (PL-16).

Lifesaving Equipment

Lifesaving rings and a rescue and work skiff were present and easily accessible near the pond. Vegetation around the work and safety skiff had been mowed for accessibility. Cabinets containing water rescue equipment were also highly visible, adequately labeled, and in good condition.

Pond 4 LCRS/LDS Control Cabinet

The weatherproof LCRS and LDS control cabinet was in good condition (PL-15). 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 6.5 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-17) and one at the apex of the disposal cell (PL-18)—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-19, PL-20, and PL-21). 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 2020, same as the score in 2019. Dominant species identified on the cover in 2020 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 2020. 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 2020 repository inspection on September 16 included an evaluation of geotechnical activity by geotechnical engineers. The repository was observed to be in good to excellent condition. No depressions, 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-22). All five 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-23). Elevation surveys on the settlement plates are performed every 5 years in preparation for the CERCLA

Five-Year Review. No significant settlement was reported in 2016 during the last survey, and the next scheduled survey is in 2021.

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 2020 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. Mountain bike trails were in 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 2020 inspection.

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-24 shows a portion of City-owned property MP-00211, and PL-25

shows a portion of the access road near Deer Draw Dam. Both photographs illustrate 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 2020. The gully has not deepened since 2017.

On June 2, 2020, a water line break on Property MP-00181 occurred, causing embankment erosion above Wetland 2 (PL-28). LM was notified and the City of Monticello made corrective actions.

2.2.5 Wetlands

Wetlands 1, 2, and 3 are ecologically healthy and undamaged (PL-26, PL-27). The June 2020 pipeline break did not affect Wetland 2 because vegetation prevented sediment transport.

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 2020 annual inspection. No applications to appropriate water or to drill 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 2020 annual inspection of UDOT rights-of-way 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-29 shows an area of work in city streets during 2020. PL-30 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 in 2020.

2.4 Private Property MS-00176-VL

During the 2020 annual inspection, there was no evidence of erosion, soil removal, or construction of habitable structures (Appendix A, Section VIII-C) on property MS-00176. 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. In 2020, 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-31) are recorded in Appendix A, Section V.

2.6 Groundwater Restricted Area

On September 9, 2020, 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-32), and extraction well field were visited (PL-33), and the visible components of the system were intact and functioning (PL-34).

2.7.2 Water Quality Monitoring Well Inspection

Water sampling teams noted no deficiencies during routine well inspections in October 2019 and April 2020.

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. Annotations were in place for properties sold or divided, and deed restrictions were attached. 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 2020 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 Navarro Research and Engineering, Inc., for the U.S. Department of Energy Office of Legacy Management.

Quality Assurance Manual, LMS/POL/S04320, continuously updated, prepared by Navarro Research and Engineering, Inc., for the U.S. Department of Energy Office of Legacy Management.

5.0 Photographs

Photographs were taken to document findings of the 2020 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. Monticello Field Office Storage Building

PL-3. Main Entrance Electrical Gate

PL-4. Field Office Electrical Gate

PL-5. TSF Gate with Postings

PL-6. TSF Yard

PL-7. South Boundary of Wildlife-Friendly Fence

PL-8. Perimeter Sign P32

PL-9. Boundary Survey Marker S-2

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

PL-11. South Drainage Channel, Looking East

PL-12. West Drainage Channel, Looking North

PL-13. Pond 4 Entry Gate

PL-14. Pond 4, Looking East

PL-15. Pond 4 LCRS/LDS Control Cabinet

PL-16. Pond 4 Fence, Looking South

PL-17. Site Monument 1, on Access Road

PL-18. Site Monument 2, at Apex of Disposal Cell

PL-19. Top of Disposal Cell Cover, Looking North

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

PL-21. Northeast Slope of Disposal Cell, Looking South

PL-22. Manhole #4

PL-23. Settlement Plate G

PL-24. City Property MP-00211

PL-25. Deer Draw Dam

PL-26. View of Wetland 1 on Former Mill Site

PL-27. View of Wetland 2 on Former Mill Site

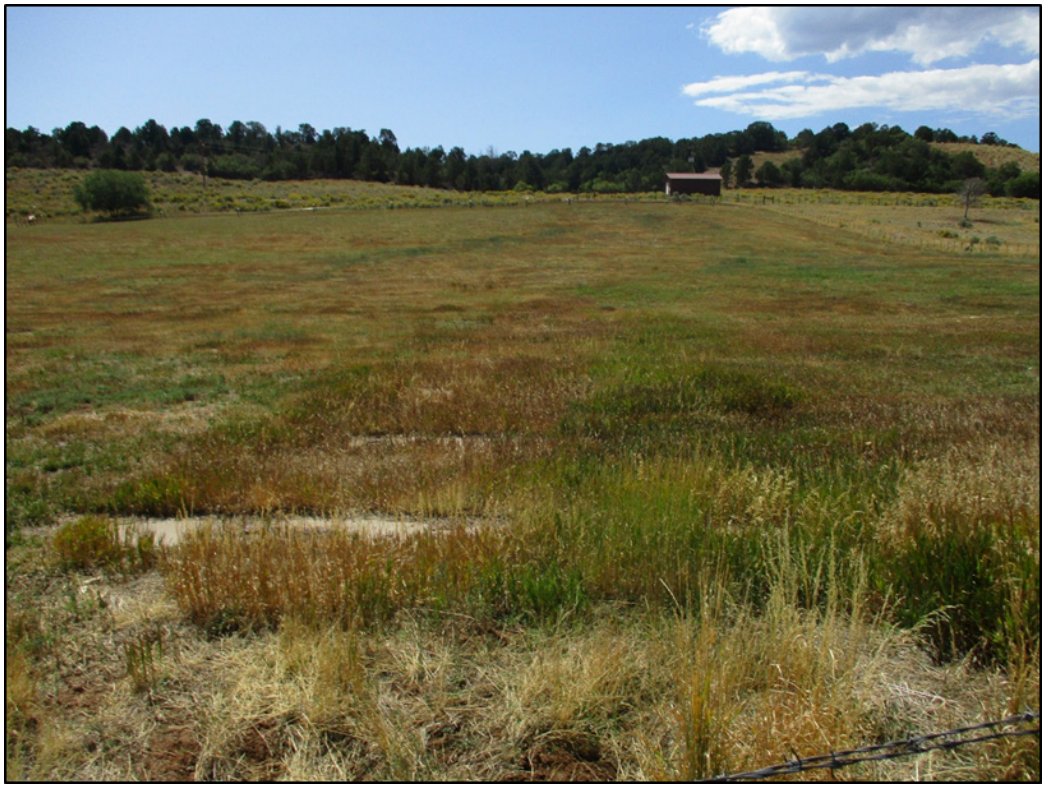
PL-28. Embankment on Property MP-100181 Showing Repaired Water Line Break Erosion

PL-29. Water Line Tie-In at 517 South and 100 West Street

PL-30. U.S. Highway 191 Embankment

PL-31. Montezuma Canyon, View Downstream

PL-32. Transfer Building



PL-33. Extraction Well Field on Property MP-00179

PL-34. Transfer Building Interior

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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: 9/14/2020–9/16/2020

Inspection Team Members

Name	Affiliation	Phone Number	E-mail
Danika Marshall	Navarro Research and Engineering, Inc. (Ecologist)	(970) 248-6137	Danika.Marshall@lm.doe.gov
Paul Wetherstein	Navarro Research and Engineering, Inc. (Environmental Compliance)	(970) 248-6645	Paul.Wetherstein@lm.doe.gov
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Connor Mueller	Navarro Research and Engineering, Inc. (Engineer)	(970) 248-6258	Connor.Mueller@lm.doe.gov
Hope Petrie	Navarro Research and Engineering, Inc. (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.

Name of Individual Interviewed	Affiliation	Date Interviewed
Marc Stilson	State Engineer	9/9/2020

Notes:

Mr. Stilson, Southeastern Regional Engineer with the Utah State Engineer's office (i.e., Utah Division of Water Rights), confirmed during the interview to P. Wetherstein that in 2020:

- *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/Fred Smith	Contractor Operations Lead/Site Lead	9/14/2020

Notes:

Gary McKinnon, contractor operations lead, and Mr. Smith, site lead, both with Navarro Research and Engineering, Inc., were interviewed in tandem. Both confirmed during the interview that in 2020:

- *No construction or disturbance within the planned restricted areas.*
- *A Davit wall mount retrieval system (safety feature for confined space entry) was installed on Vaults #1 and #3.*
- *Road maintenance on site access roads.*
- *Replaced exhaust fans in restrooms and added battery backup systems.*
- *Updated the Wildland Fire Document.*
- *QAPP (Quality Assurance Project Plan).*
- *Mowing and cutting maintenance around Pond 4.*
- *Continued progress made on the OU III closure status.*

II. Administrative and Records Inspection

	Readily Available		Current	
	Y	N	Y	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 2020.
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 9-15-2020.

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		Current	
	Y	**N**	**Y**	**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:

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 MP-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					IC Annotations in Place	
DOE ID	**Parcel**	**Document**	**Book**	**Page**	**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					IC Annotations in Place	
DOE ID	**Parcel**	**Document**	**Book**	**Page**	**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:

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:				
	Signs requiring replacement:				
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**	☐	Not evident	X	Evident

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

None

Repository Runoff/Run-On Controls
(North and East Toe Trenches; South and West Drainage Channels)

1.	**Settlement**	X	Not evident	☐	Evident
2.	**Material Degradation**	X	Not evident	☐	Evident
3.	**Erosion/gullies**	☐	Not evident	X	Evident
4.	**Siltation**	X	Not evident	☐	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):

Small rill erosion was observed at the West Drainage Channel. The rills did not impact the integrity of the area and repairs were made as a maintenance item on October 5, 2020. No sign of erosion on the North and East Toe Trench. The runoff/run-on controls were inspected by Navarro 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 6.5 feet
8. **Vandalism** X Not evident ☐ Evident

Notes for Condition of Pond 4 Features:

Evidence of rodent biointrusion on the north and west sides, but liner function is not impaired. Continued monitoring is recommended. Vegetation along the access road and the skiff was mowed in May 2020.

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):

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		☐	☐	n/a		n/a		☐	☐	n/a		☐	☐
Water well installation	☐	X	n/a		☐	X	n/a		n/a		n/a		☐	X
Wetland/creek damage	☐	X	n/a		☐	X	n/a		n/a		n/a		n/a	
Supplemental standards fence intact	n/a		☐	X	n/a		☐	X	n/a		n/a		☐	X

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

Water line brake occurred at property MP-00181 on June 2. LM was notified and the City made corrective actions. Vegetation below embankment, surrounding wetland #2, prevented sediment from filling the wetland.

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*

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	X	No
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 2020.

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 2020.

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: 9/16/2020 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:

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.)

Low moisture year.

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	1	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

Appendix B

Geotechnical Inspection Report

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Monticello Repository – Geotechnical Inspection Report

Introduction

An inspection was performed at the Monticello repository on September 16, 2020, to assess the geotechnical condition of the repository as part of a comprehensive inspection of the Monticello, Utah, Mill Tailings Site and Monticello Vicinity Properties that is performed annually by Navarro Research and Engineering, Inc. This 2020 geotechnical inspection report follows the 2019 inspection report.

The repository top cover, side slopes, and diversion ditches and swales were observed during the inspection. Photos were taken to represent the site conditions described in this geotechnical inspection report. This portion of the overall annual inspection was performed by Connor Mueller, project geotechnical engineer, and Chris Oliver, civil design engineer, and they were accompanied by Fred Smith, Legacy Management Support site lead for the Monticello site.

Overall Site Condition

The overall site was in good to excellent condition during the inspection. Vegetative growth on the vegetated top and side slopes continues to be in a generally healthy growth condition. Vegetation was sparser on some areas of the side slopes, which is slowly leading to erosion of exposed soils and filling of the transition between the vegetated and riprap covered side slope areas. Ongoing monitoring is recommended at this time to assess whether the erosion will cause more serious issues in the future; however, at this time annual monitoring is adequate to address this monitoring suggestion. Despite some spots of side slope erosion, no serious geotechnical problems were identified on the repository or the site. Figure B-1 shows the overall cover conditions on top of the repository.

Figure B-1. Top Slope Vegetation Cover, September 16, 2020

Drainage Diversion Ditches and Swales

An expanding rill was observed to be bypassing riprap armor feeding into the West Drainage Channel. The bypassing is occurring along the edge of the riprap apron leading into the drainage channel. Turbulent conditions are likely forming at this transition point and have likely been developing the rill for some time. The recommended solution to remedy this feature is to excavate out an area larger than the erosion rill and provide additional riprap fill to adjust for the modified flow conditions being encountered. Future work may also be required if the flow continues to bypass the remediated area; therefore, care should be taken to promote drainage into the riprap channel. Figure B-2 shows the erosion rill. No rock degradation was observed within the West Drainage Channel. The outfall of the South Drainage Channel was observed and no issues were noted during this inspection.

Figure B-2. West Drainage Channel Erosion

Erosion Control Riprap Side Slopes

The northwest riprap-covered side slope was found to be in good condition. The slope is protected against erosion by diorite riprap (as shown in Figure B-3), which appeared in great condition. Shallow channels with occasional shallow rills were found along the soil/rock interface of the side slope. The channels and rills above the riprap slope were formed from surface flow from a combination of melting snow cover and/or precipitation (as shown in Figure B-4). These features do not currently pose any difficulties, but continued monitoring is required to ensure erosion features do not create any problems such as undermining of the soil/rock interface or the rock slope below.

Figure B-3. Northwest Riprap Side Slope

Figure B-4. Sediment at Top of Northwest Slope

Sediment is being transported to the edge of thickened riprap toe at the bottom of the northeastern and eastern side slopes (as shown Figure B-5). The performance intent of the riprap toe does not appear to be impacted and therefore these erosion features are not considered an issue. In each of these cases, vegetation is establishing within the sediment and does not currently pose any increased problems for long-term erosion protection. These minor erosion features should continue to be monitored during the annual site inspections. Some surface wearing and fracturing of sandstone rock (as shown in Figure B-6) within the riprap toe has been regularly observed during recent inspections. This breakdown is not ubiquitous or widespread, and it is not considered a problem.

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

Figure B-6. Breakdown of Sandstone Rock, East Thickened Riprap Toe

Pond 4 and Groundwater Collection and Transfer Building

No problems were reported at Pond 4 (Figure B-7) and the groundwater transfer building, so neither of these facilities were visited during the geotechnical inspection. Pond 4 continues to be in a stable condition and no major issues were brought to the attention of either Mr. Mueller or Mr. Oliver.

Figure B-7. Pond 4 from East