

4.0 Maybell West, Colorado, Disposal Site

4.1 Compliance Summary

The Maybell West, Colorado, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title II Disposal Site (site) was inspected on September 2, 2021. Depressions observed during previous inspections on the top of the disposal cell and ancillary cell were revisited in 2021. The dimensions of Depressions No. 1, No. 2, and No. 3 appeared to be approximately the same size when compared to measurements made in 2020. The small depressions on the ancillary cell did not appear to change since the 2020 inspection. None of the depressions threaten the integrity or performance of the disposal cells; monitoring of the depressions will continue, including aerial surveys that can detect small changes in depression size. No changes were observed in associated drainage features.

Gullies were observed west of Diversion Channel No. 2, and slight rilling under the northern and southwestern perimeter fence was also observed. None of this erosion threatens the integrity of the main disposal cell, ancillary cell, or associated surface water diversion structures; monitoring of this erosion will continue. No new observations or maintenance needs were identified for 2021. Inspectors identified no cause for a follow-up inspection. Groundwater monitoring is not required at the site.

4.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the site are specified in the site-specific U.S. Department of Energy (DOE) Office of Legacy Management (LM) Long-Term Surveillance Plan (LTSP) (DOE 2010) and in accordance with procedures established to comply with the requirements of Title 10 *Code of Federal Regulations* Section 40.28 (10 CFR 40.28). Table 4-1 lists these requirements.

Table 4-1. License Requirements for the Maybell West, Colorado, Disposal Site

Requirement	LTSP	This Report	10 CFR 40.28
Annual Inspection and Report	Sections 3.3 and 3.4	Section 4.4	(b)(3)
Follow-Up Inspections	Section 3.5	Section 4.5	(b)(4)
Routine Maintenance and Emergency Measures	Section 3.6	Section 4.6	(b)(5)
Environmental Monitoring	Section 3.7	Section 4.7	(b)(3)

4.3 Institutional Controls

The 180-acre site, identified by the property boundary shown in Figure 4-1, is owned by the United States and was accepted under the U.S. Nuclear Regulatory Commission (NRC) general license in 2010. DOE is the licensee and, in accordance with the requirements for UMTRCA Title II sites, LM is responsible for the custody and long-term care of the site. Institutional controls (ICs) at the site include federal ownership of the property and the following physical ICs that are inspected annually: disposal cell, ancillary cell, entrance gate and sign, perimeter fence and signs, site marker, and boundary monuments.

4.4 Inspection Results

The site, approximately 4 miles northeast of Maybell, Colorado, was inspected on September 2, 2021. The inspection was conducted by J. Cario and B. Mays of the Legacy Management Support contractor. M. Cosby (Colorado Department of Public Health and Environment) attended the inspection. The purposes of the inspection were to confirm the integrity of visible features at the site, identify changes in conditions that might affect conformance with the LTSP, and evaluate whether any maintenance or additional inspection and monitoring are needed.

4.4.1 Site Surveillance Features

Figure 4-1 shows the locations of site features, including site surveillance features and inspection areas, in black and gray font. Site features that are present but not required to be inspected are shown in italic font. Observations from previous inspections that are currently monitored are shown in blue type. No new observations were identified in the 2021 annual inspection. Inspection results and recommended maintenance activities associated with site surveillance features are included in the following subsections. Photographs to support specific observations are identified in the text and in Figure 4-1 by photograph location (PL) numbers. The photographs and photograph log are presented in Section 4.9.

4.4.1.1 Site Access and Entrance Gate

Access to the site is from Moffat County Road 53, which runs north from U.S. Highway 40 approximately 8 miles east of Maybell, Colorado. County Road 53 ends at an unlocked gate near the northeast corner of the Maybell, Colorado, UMTRCA Title I Disposal Site (approximately 3 miles from U.S. Highway 40). LM is responsible for maintenance of the road from the end of County Road 53 to the site and has access under a U.S. Bureau of Land Management (BLM) right-of-way permit.

The dirt two-track access road continues west from the end of County Road 53 on BLM property and through a second unlocked gate. Just past the second gate, the access road turns south and continues for approximately 0.5 mile past an abandoned open pit uranium mine known as Rob Pit; it then bends north, following the route of the site's former haul road for approximately 0.25 mile to the site entrance gate.

The access road was passable, and no maintenance needs were identified. The entrance gate, a standard tubular metal stock gate, is near the southeast corner of the site. The gate was locked, and no maintenance needs were identified.

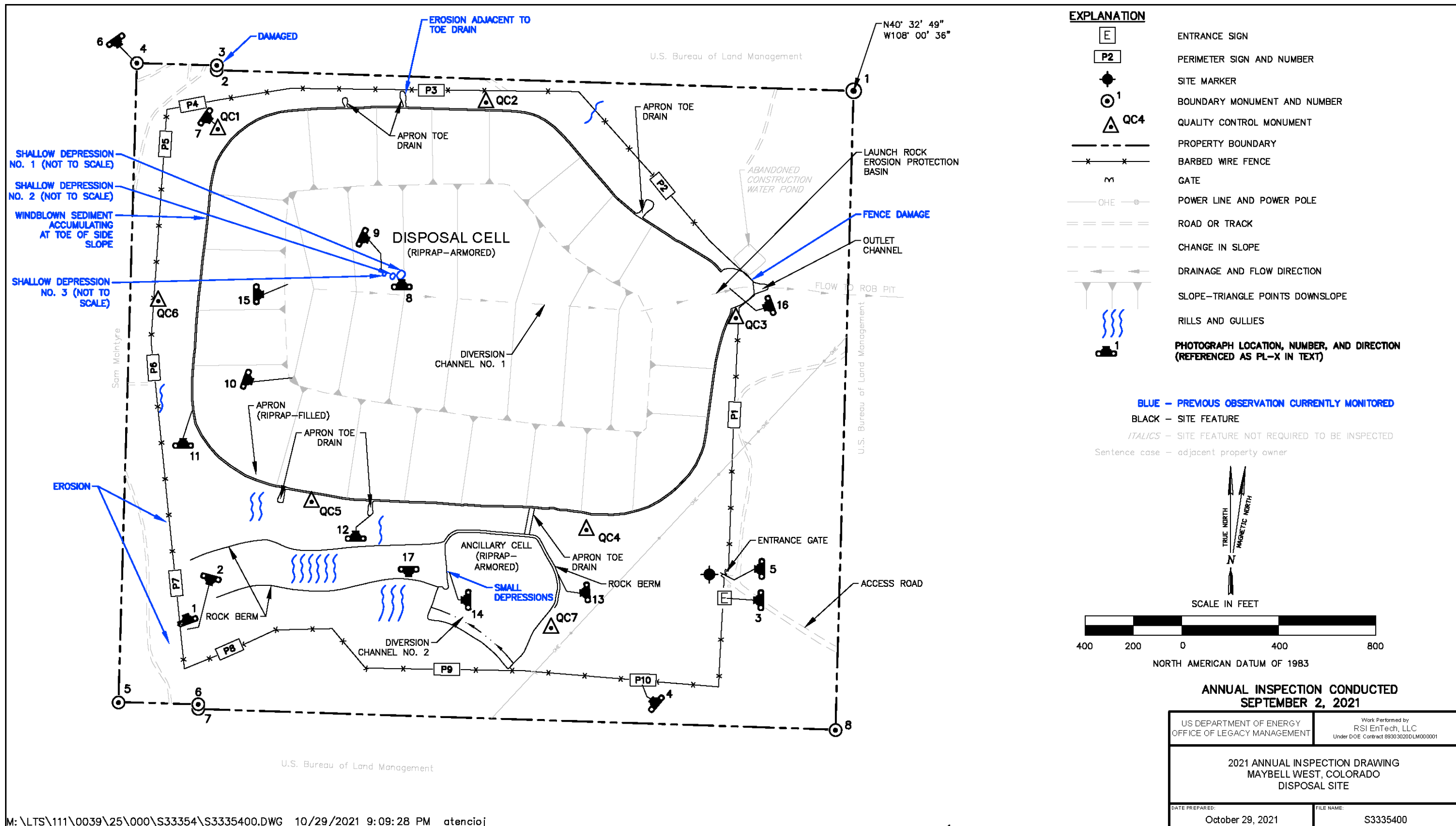


Figure 4-1. 2021 Annual Inspection Drawing for the Maybell West, Colorado, Disposal Site

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4.4.1.2 Perimeter Fence and Signs

A four-strand barbed-wire fence encloses the disposal cell, the ancillary cell, the drainage structures, and much of the site. The fence primarily serves to prevent livestock trespass, because the site is surrounded by open rangeland used for cattle grazing. Minor damage to the perimeter fence occurs periodically because the site is in wintering grounds frequented by big game animals (primarily pronghorn, deer, and elk). No damage to the perimeter fence was observed during the 2021 annual inspection. Minor erosion continues to be observed between perimeter signs P6 and P8 (PL-1). The erosion will continue to be monitored and repairs to the fence will be made as needed. Plastic fence flags were attached to the top two strands of the perimeter fence to serve as a visual marker to wildlife in order to reduce entanglement or striking the fence lines (PL-2). The fence flags were installed July 27, 2021. No maintenance needs were identified at the time of the inspection.

The entrance sign is mounted on a metal T-post directly south of the entrance gate (PL-3). Ten warning or perimeter signs are mounted on metal T-posts around the site (PL-4). No other maintenance needs were identified.

4.4.1.3 Site Marker

The site has one granite site marker near the entrance gate (PL-5). No maintenance needs were identified.

4.4.1.4 Boundary Monuments

Eight boundary monuments are on the site boundary outside the fenced area (PL-6). Four of the monuments are at the property corners, and the other four define an approximate 20-foot offset along the north and south boundaries where the private land that LM acquired in fee adjoins the BLM withdrawal area on the western portion of the site. Boundary monuments BM-3 and BM-6 (capped pieces of rebar) define the two 20-foot offsets. Boundary monument BM-3 was first observed to be bent during the 2017 annual inspection; since then attempts to straighten the monument were not successful; however the monument is still in place. No additional maintenance needs were identified.

4.4.1.5 Aerial Survey Quality Control Monuments

Seven aerial survey quality control (QC) monuments, installed in 2018, were inspected during the 2021 inspection (PL-7). No maintenance needs were identified.

4.4.2 Inspection Areas

In accordance with the LTSP, the site is divided into five inspection areas (referred to as “transects” in the LTSP) to ensure a thorough and efficient inspection. The inspection areas are (1) the top slope of the disposal cell, (2) the side slopes of the disposal cell, (3) the ancillary cell, (4) the diversion and drainage channels, and (5) the site perimeter and balance of the site.

4.4.2.1 Top Slope of the Disposal Cell

The disposal cell is on the reclaimed site of a former heap leach processing area. The top slope of the riprap-armored disposal cell occupies about 60 acres of the site. The top of the disposal cell showed no signs of significant erosion, settling, or other modifying processes that would affect the cell's integrity. However, three small shallow depressions have been observed (just north of Diversion Channel No. 1) since the site transitioned to DOE in 2010. These depressions appear to be the result of settlement of the underlying materials since completion of the disposal cell. Depression No. 1 was discovered during the initial annual inspection in 2010 (PL-8). A second smaller and shallower depression (Depression No. 2) was first noted just west of the first depression during the 2016 annual inspection. A third, depression (Depression No. 3 [PL-9]) was first observed during the 2018 annual inspection. All three depressions appeared during the 2021 inspection to be approximately the same size as observed during the 2020 annual inspection. Measurements taken annually vary by the methodology employed (i.e., using a handheld tape measure), and the individual taking the measurements.

All three depressions will continue to be measured during annual inspections to determine if additional, more significant settlement is occurring. The comparison of 2018 baseline aerial survey data with data from future aerial surveys will help LM measure and monitor the depressions. The next aerial survey is anticipated to take place in summer 2022.

No standing water was observed in any of the depressions during the inspection. These depressions currently do not threaten the integrity or performance of the disposal cell. No maintenance needs were identified.

While various species of plants were present on the top slope of the disposal cell, no deep-rooted vegetation was observed. If encroachment of deep-rooted vegetation is observed, an evaluation will be conducted as required by the LTSP to determine if any action is necessary. Noxious weeds were identified and controlled (treated with herbicide) on the disposal cell and ancillary cell top slopes in accordance with the LTSP on July 27, 2021.

4.4.2.2 Side Slopes of the Disposal Cell

The disposal cell was designed to control surface water runoff resulting from a probable maximum flood event. The side slopes of the disposal cell were constructed with a 20% slope and are covered with a 1-foot-thick layer of riprap (PL-10). Minor sediment accumulation observed in the toe drain apron below the northwest side slope appears to be windblown (PL-11), and there was no evidence of side slope instability, erosion, or settlement. This area of sediment accumulation will continue to be monitored to ensure the toe drain and side slope are functioning properly.

Surface water runoff from the side slopes is conveyed by an apron at the toe of the slope to six riprap-armored toe drains (PL-12) at low points in the apron. The apron and toe drains are constructed channels filled with riprap. Minor erosion has occurred adjacent to a toe drain along the north side of the disposal cell, but that has not impacted the performance of the toe drain. No maintenance needs were identified.

4.4.2.3 Ancillary Cell

The ancillary cell (PL-13) was constructed to contain waste materials associated with the reclaimed evaporation pond area. It slopes gently toward the southwest. A rock berm wraps around its eastern and northern sides to protect it from surface water runoff. Small depressions observed on the west end of the ancillary cell top slope are not impacting the performance of the cell, but it will continue to be monitored (PL-14). Various species of plants were present on the top slope of the ancillary cell. Noxious weeds were also treated during the July 27, 2021, noxious weed treatment event.

4.4.2.4 Diversion and Drainage Channels

Final surface conditions at the site include a combination of rock armoring and contouring to achieve the surface water drainage control and erosion protection necessary to satisfy the design longevity requirements. The top slope of the disposal cell was designed to drain surface water runoff to the center and into riprap-armored Diversion Channel No. 1 (PL-15), which is graded toward and then down the east side slope of the disposal cell. Surface water runoff ultimately discharges into Rob Pit east of the site. An erosion protection structure, referred to as the Launch Rock Erosion Protection Basin (PL-16), was constructed at the outfall of Diversion Channel No. 1 to protect the disposal cell from headcutting that may occur from the deep channel that runs into Rob Pit. Diversion Channel No. 2 runs along the south side of the ancillary cell to convey surface water runoff away from the ancillary cell. The diversion channels and outlet channel of the Launch Rock Erosion Protection Basin continue to function as designed.

The rock berm that runs along the northern edge of the ancillary cell continues west across the slope south of the disposal cell to protect against erosion. Several gullies and rills have developed on this south slope but do not threaten the integrity of the disposal cell (PL-17). The gullies will continue to be monitored and repaired as needed. The rock berm effectively controls headcutting from these gullies and protects the disposal cell. No maintenance needs were identified.

4.4.2.5 Site Perimeter and Balance of the Site

Reclaimed surfaces at the site were planted with a mixture of native and adaptive grasses to provide soil stability, and the vegetation continues to improve. Noxious weeds are controlled (treated with herbicide) in accordance with the LTSP.

During each site inspection, the area surrounding the site is checked to ensure that changes in land or water use do not affect site protectiveness. The area beyond the site boundary for a distance of 0.25 mile was visually observed for erosion, changes in land use, or other phenomena that might affect the long-term integrity of the site. No such changes were identified.

4.5 Follow-Up Inspections

LM will conduct follow-up inspections if (1) a condition is identified during the annual inspection or other site visit that requires a return to the site to evaluate the condition or (2) LM is notified by a citizen or outside agency that conditions at the site are substantially changed. No need for a follow-up inspection was identified.

4.6 Routine Maintenance and Emergency Measures

The following maintenance actions were completed July 27, 2021:

- Noxious weeds treated with herbicide.
- Wildlife-friendly fence flagging was installed along the entire perimeter fence.

Boundary monument BM-3 is damaged and will need to be repaired or replaced but continues to delineate the property. No other maintenance needs were identified.

Emergency measures are corrective actions that LM will take in response to unusual damage or disruption that threatens or compromises site health and safety, security, integrity, or compliance with 40 CFR 192. No emergency measures were identified.

4.7 Environmental Monitoring

In accordance with the LTSP, groundwater monitoring is not required at the site because the results of 30 years of historical groundwater monitoring performed at the site by the former licensee (20 years before reclamation and 10 years after reclamation) indicated that groundwater was not contaminated by site-related activities.

4.8 References

10 CFR 40.28. U.S. Nuclear Regulatory Commission, "General License for Custody and Long-Term Care of Uranium or Thorium Byproduct Materials Disposal Sites," *Code of Federal Regulations*.

40 CFR 192. U.S. Environmental Protection Agency, "Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings," *Code of Federal Regulations*.

DOE (U.S. Department of Energy), 2010. *Long-Term Surveillance Plan for the Maybell West (UMTRCA Title II) Disposal Site, Moffat County, Colorado*, LMS/MAW/S01879, February.

4.9 Photographs

Photograph Location Number	Azimuth	Photograph Description
PL-1	340	Erosion Under the Perimeter Fence Southwest of the Disposal Cell
PL-2	195	Wildlife Fence Flagging Along Perimeter Fence
PL-3	270	Site Entrance Sign
PL-4	310	Perimeter Sign P-10
PL-5	270	Granite Site Marker
PL-6	145	Boundary Monument BM-4
PL-7	125	Quality Control Monument QC-1
PL-8	0	Shallow Depression No. 1
PL-9	115	Shallow Depression No. 3
PL-10	110	View Southeast of Southern Disposal Cell Side Slope
PL-11	0	Windblown Material Along Western Toe Slope of Disposal Cell
PL-12	0	Apron Toe Drain on the South Side of Disposal Cell
PL-13	265	View West of Ancillary Cell Top Slope
PL-14	270	Small Depressions on Ancillary Cell Top Slope
PL-15	90	View East of Diversion Channel No. 1
PL-16	250	View Southwest of the Launch Rock Erosion Protection Basin
PL-17	180	Erosion South of Rock Berm Near Diversion Channel No. 2



PL-1. Erosion Under the Perimeter Fence Southwest of the Disposal Cell



PL-2. Wildlife Fence Flagging Along Perimeter Fence



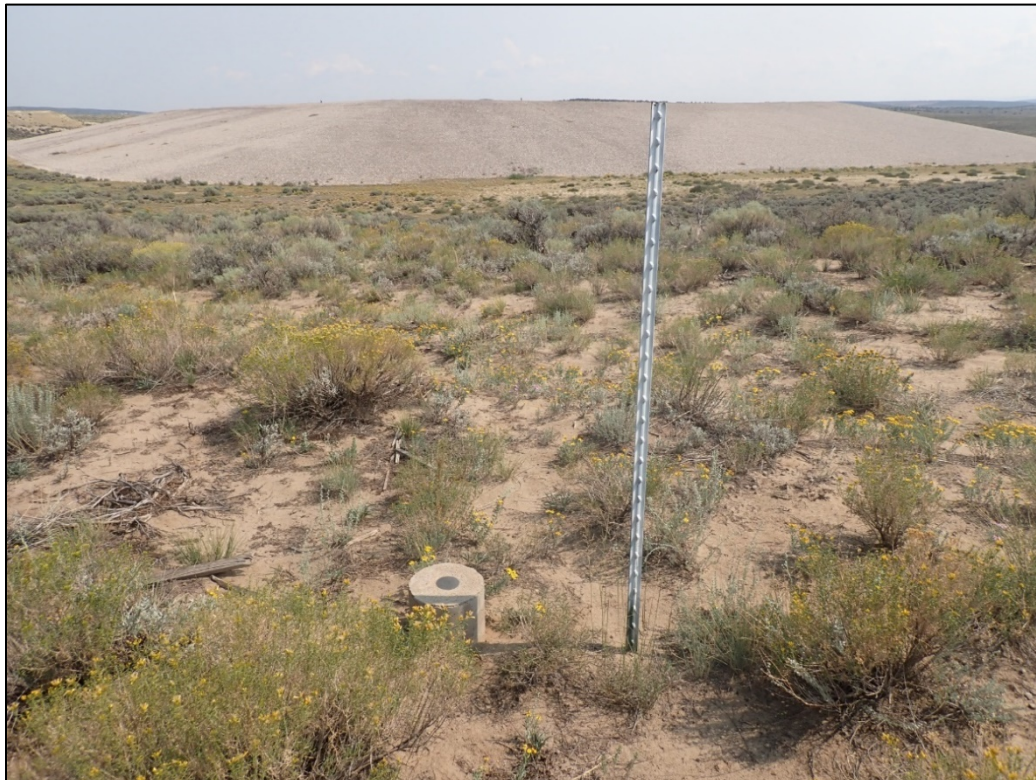
PL-3. Site Entrance Sign



PL-4. Perimeter Sign P-10



PL-5. Site Marker



PL-6. Boundary Monument BM-4



PL-7. Quality Control Monument QC-1



PL-8. Shallow Depression No. 1



PL-9. Shallow Depression No. 3



PL-10. View Southeast of Southern Disposal Cell Side Slope



PL-11. Windblown Material Along Western Toe Slope of Disposal Cell



PL-12. Apron Toe Drain on the South Side of Disposal Cell



PL-13. View West of Ancillary Cell Top Slope



PL-14. Small Depressions on Ancillary Cell Top Slope



PL-15. View East of Diversion Channel No. 1



PL-16. View Southwest of the Launch Rock Erosion Protection Basin



PL-17. Erosion South of Rock Berm Near Diversion Channel No. 2