

## 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 was inspected on September 5, 2023. Several depressions were observed and evaluated by a geotechnical engineer. None of the depressions threaten the integrity or performance of the disposal cells; and monitoring of the depressions will continue. No changes were observed in associated drainage features. Groundwater monitoring is not required at the site. Five minor maintenance needs were identified and completed in 2023. Inspectors identified no cause for a follow-up inspection.

### 4.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the site are specified in the site-specific *Long-Term Surveillance Plan for the Maybell West (UMTRCA Title II) Disposal Site, Moffat County, Colorado* (DOE 2010) (LTSP) in accordance with procedures established to comply with the requirements of the U.S. Nuclear Regulatory Commission (NRC) general license at 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 NRC general license in 2010. The U.S. Department of Energy (DOE) is the licensee and, in accordance with the requirements for UMTRCA Title II sites, the Office of Legacy Management (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 5, 2023. The inspection was conducted by Z. Aldous and C. Murphy of the Legacy Management Support (LMS) contractor. W. Frazier (LM) and M. Cosby (Colorado Department of Public Health and Environment) attended the inspection. Geotechnical engineer, C. Mueller (LMS) also attended the inspection to assess the disposal cell depressions. 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 maintenance or follow-up 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. Some 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, and new observations identified during the 2023 annual inspection are shown in red. Inspection results and recommended maintenance activities associated with site surveillance features are described in the following subsections. Photographs to support specific observations are noted 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 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. No maintenance needs were identified.

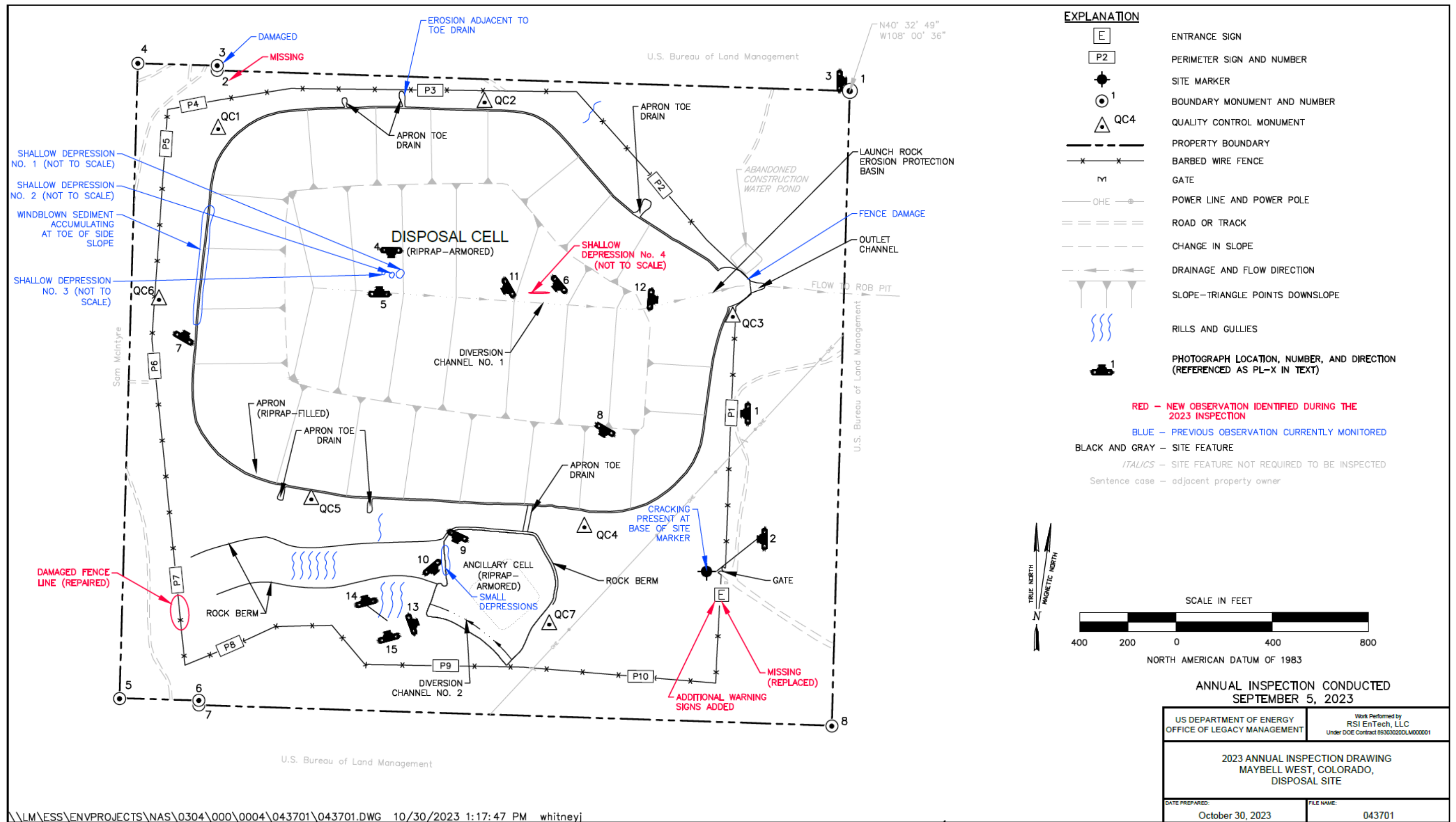


Figure 4-1. 2023 Annual Inspection Drawing for the Maybell West, Colorado, Disposal Site

#### ***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 from trespassing 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). A small section of fence line on the western side was damaged and repaired during the 2023 maintenance trip. Plastic fence flags are attached to the top two strands of the perimeter fence to serve as a visual marker to wildlife to reduce entanglement or striking the fence lines. The majority of the fence line is heavily covered in brush. Clearing brush provides access to the fence for maintenance and repair and increases its visibility, which hopefully will reduce the likelihood of an animal becoming entangled. During the 2023 maintenance trip, the entire interior fence line was cleared, except for two small areas that could not be accessed with the equipment. Work on the exterior of the fence was started and the southern fence line was cleared. This work will continue until the fence lines are cleared on both sides.

The entrance sign is mounted on a metal T-post directly south of the entrance gate. It was missing during the 2022 inspection. A generic perimeter sign was hung in its place in 2022 and was replaced with the site-specific new entrance sign in 2023. Ten warning or perimeter signs are mounted on metal T-posts around the site (PL-1). Additional warning signs were added to the entrance gate during the 2023 maintenance trip. No other maintenance needs were identified.

#### ***4.4.1.3 Site Marker***

The site has one granite site marker near the entrance gate (PL-2). There is minimal cracking in the cement at the base of the site marker. It does not affect the integrity of the marker. No maintenance needs were identified.

#### ***4.4.1.4 Boundary Monuments***

Eight boundary monuments are on the site boundary outside the fenced area (PL-3). 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 remains bent, but the boundary monument is still in place; attempts to straighten the boundary monument were not successful, and it is missing its cap. Boundary monument BM-2 is missing. It will be surveyed and reinstalled in 2024. No additional maintenance needs were identified.

#### ***4.4.1.5 Aerial Survey Quality Control Monuments***

The seven aerial survey quality control monuments were inspected during the 2023 inspection. 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 disposal cell integrity. However, four 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. A second smaller and shallower depression (Depression No. 2) was first noted just west of the first depression during the 2016 annual inspection (PL-4). A third depression (Depression No. 3) was first observed during the 2018 annual inspection (PL-5). A fourth depression (Depression No. 4), east of the previous three depressions, was noted during the 2023 inspection (PL-6). Depression No. 4 does not appear new, but it was not specifically noted during previous inspections. During the 2023 inspection, Depressions Nos. 1–3 appeared to be approximately the same size, as observed during the 2022 annual inspection.

An LMS engineer participated in the inspection to evaluate the depressions on the top of the cell. Depressions No. 1, 3, and 4 are shallow and widespread; these are likely settlement made more evident by accumulating surface water that is infiltrating and forcing additional consolidation as it flushes through the cover and waste profile. This is not a concern from a risk standpoint, and it is anticipated that additional features become more prominent and easier to identify with each inspection. Several minimally visible depression features were noticed while inspectors walked the western half of the cover. These features might become more noticeable over the years. Depression No. 2 is a very localized but deep depression that is concerning due to its depth to relative size. It is recommended to continue monitoring it and to perform localized light detection and ranging (lidar) testing or even standard land surveying of the area.

All four depressions will continue to be measured during annual inspections to determine if additional, more significant settlement is occurring. Aerial surveys are currently scheduled to be conducted every 5 years to assist in monitoring the depressions. 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. Bull thistle (noxious weed) was present on the disposal cell and was treated, in accordance with the LTSP, following the inspection.

#### ***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. Minor sediment accumulation observed at the base of the apron below the northwest side slope appears to be windblown (PL-7), and there was no evidence of side slope instability, erosion, or settlement. This area of sediment accumulation will continue to be monitored to ensure that 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 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-8) 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 were observed previously on the west end of the ancillary cell on the crest of the top slope (PL-9). These are very likely channelized flow from the cover eroding out areas of the top to side slope transition. Additional small depressions on the toe of the side slope (PL-10) were observed during the 2022 inspection. None of the depressions are impacting the performance of the cell, but they will continue to be monitored. Various species of deep-rooted vegetation are present on the top and side slopes of the ancillary cell. The side slopes and top of the ancillary cell were treated for brush following the inspection.

#### ***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-11), 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-12), 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 (PL-13). 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 the disposal cell against erosion and headcutting. Several gullies (PL-14) and rills (PL-15) have developed on this south slope but do not threaten the integrity of the disposal cell. The gullies will continue to be monitored and repaired as needed. 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 with herbicide in accordance with the LTSP.

During each site inspection, the area surrounding the site for a distance of 0.25 mile is 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 in September 2023:

- The noxious weeds identified on the top slope of the disposal cell were treated with herbicide
- The side slopes and top of the ancillary cell were treated for brush
- The missing entrance sign was replaced
- Additional warning signs were added to the entrance gate
- Brush was cleared from the interior of the perimeter fence and a small section of the exterior fence

Boundary monument BM-3 is damaged and will need to be repaired or replaced but continues to delineate the property. Boundary monument BM-2 is missing and will need to be replaced. A survey team will perform this maintenance in 2024. 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, Office of Legacy Management, February.

## 4.9 Photographs

Photograph Location Number	Azimuth	Photograph Description
PL-1	270	Perimeter Sign P1 with Bullet Holes
PL-2	270	Site Marker
PL-3	90	Boundary Monument BM-1
PL-4	180	Shallow Depression No. 2
PL-5	—	Shallow Depression No. 3
PL-6	230	Shallow Depression No. 4
PL-7	30	Windblown Sediment Accumulation at Toe of Side Slope
PL-8	210	Ancillary Cell Overview
PL-9	205	Depressions on Crest of Ancillary Cell
PL-10	140	Depressions on Toe of Ancillary Cell
PL-11	240	Diversion Channel No. 1
PL-12	95	Launch Rock Erosion Protection Basin
PL-13	70	Diversion Channel No.2
PL-14	345	Largest Gully Below Rock Berm
PL-15	345	Erosion Rills Below Rock Berm

**Note:**

— = Photograph taken vertically from above.





*PL-1. Perimeter Sign P1 with Bullet Holes*



*PL-2. Site Marker*





*PL-3. Boundary Monument BM-1*



*PL-4. Shallow Depression No. 2*





*PL-5. Shallow Depression No. 3*



*PL-6. Shallow Depression No. 4*





*PL-7. Windblown Sediment Accumulation at Toe of Side Slope*



*PL-8. Ancillary Cell Overview*





*PL-9. Depressions on Crest of Ancillary Cell*



*PL-10. Depressions on Toe of Ancillary Cell*





*PL-11. Diversion Channel No. 1*



*PL-12. Launch Rock Erosion Protection Basin*





*PL-13. Diversion Channel No. 2*



*PL-14. Largest Gully Below Rock Berm*





*PL-15. Erosion Below Rock Berm*