

## 16.0 Shiprock, New Mexico, Disposal Site

### 16.1 Compliance Summary

The Shiprock, New Mexico, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Disposal Site (site) was inspected on October 13, 2020. No changes were observed on the disposal cell or in the associated diversion channels. Inspectors identified several minor maintenance needs but found no cause for a follow-up inspection. Groundwater monitoring to evaluate disposal cell performance is not required.

### 16.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the site are specified in the site-specific Long-Term Surveillance Plan (LTSP) (DOE 1994) and 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 40.27 (10 CFR 40.27). Table 16-1 lists these requirements.

Table 16-1. License Requirements for the Shiprock, New Mexico, Disposal Site

Requirement	LTSP	This Report	10 CFR 40.27
Annual Inspection and Report	Section 6.0	Section 16.4	(b)(3)
Follow-Up or Contingency Inspections	Section 7.0	Section 16.5	(b)(4)
Maintenance and Repairs	Section 8.0	Section 16.6	(b)(5)
Environmental Monitoring	Sections 5.0 and 6.4	Section 16.7	(b)(2)
Corrective Action	Section 9.0	Section 16.8	–

### 16.3 Institutional Controls

The 105-acre site, identified by the property boundary shown in Figure 16-1, is held in trust by the U.S. Bureau of Indian Affairs. The Navajo Nation retains title to the land. UMTRCA authorized the U.S. Department of Energy (DOE) to enter into a Cooperative Agreement (DE-FC04-85AL26731) with the Navajo Nation and required it to be in place before bringing the site under the NRC general license. DOE and the Navajo Nation executed a Custodial Access Agreement that conveys to the federal government title to the residual radioactive materials stabilized at the repository site and ensures that DOE has perpetual access to the site.

The site was accepted under the NRC general license in 1996. DOE is the licensee and, in accordance with the requirements for UMTRCA Title I sites, is responsible for the custody and long-term care of the site. Institutional controls (ICs) at the site include federal custody of the disposal cell and its engineered features, administrative controls, and the following physical ICs that are inspected annually: the disposal cell and associated drainage features, entrance gates and signs, perimeter fence and signs, site markers, survey and boundary monuments, and erosion control markers.

## 16.4 Inspection Results

The site, 1 mile south of Shiprock, New Mexico, was inspected on October 13, 2020. An action plan for the inspection was developed to allow for modified stakeholder-assisted execution, thus avoiding the need for Grand Junction-based Legacy Management Support (LMS) staff to travel to the Navajo Nation while travel restrictions were put in place as a response to the novel coronavirus.

The inspection was conducted by L. Scott and G. Jay of the LMS contractor. J. Tallbull and S. Salt (Navajo Nation Abandoned Mine Lands [AML] Program) attended the inspection. The purposes of the inspection were to confirm the integrity of the visible features at the site, identify changes in conditions that might affect conformance with the LTSP, and evaluate the need, if any, for maintenance or additional inspection and monitoring.

### 16.4.1 Site Surveillance Features

Figure 16-1 shows the locations of site features in black and gray font, including site surveillance features and inspection areas. 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 text, and new observations identified during the 2020 annual inspection are shown in red. 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 16-1 by photograph location (PL) numbers. The photographs and photograph log are presented in Section 16.10.

#### 16.4.1.1 Access Roads, Entrance Gates, and Entrance Signs

Access to the site is from a gravel road off U.S. Highway 491. Three gates allow access to the site through the perimeter fence: the east gate (the current main entrance gate near the terrace escarpment), the north gate (an auxiliary access gate), and the west gate (the former main entrance gate). Access to the main entrance gate is through a gravel pit. The three gates were locked and functional. Pairs of entrance signs—one pictorial and one textual—are present near each gate. One pair is present at the east and north gates, and two pairs are present at the west gate. No maintenance needs were identified.

#### 16.4.1.2 Perimeter Fence and Signs

A chainlink perimeter fence encloses the disposal cell and drainage features. Gaps under the perimeter fence observed in 2019 near signs P3 and P15 were repaired before the 2020 inspection. The fence near perimeter sign P15 that was identified as damaged in 2019 was repaired before the 2020 inspection and was observed to be in good condition in 2020.

Dirt accumulation that was previously observed in the channel and along the fence on the southern side of the site was removed before the 2020 inspection. Inspectors will continue to monitor these areas. Regular maintenance to keep the perimeter fence lines free of trash, tumbleweeds, or other debris will continue. No other maintenance is needed at this time.

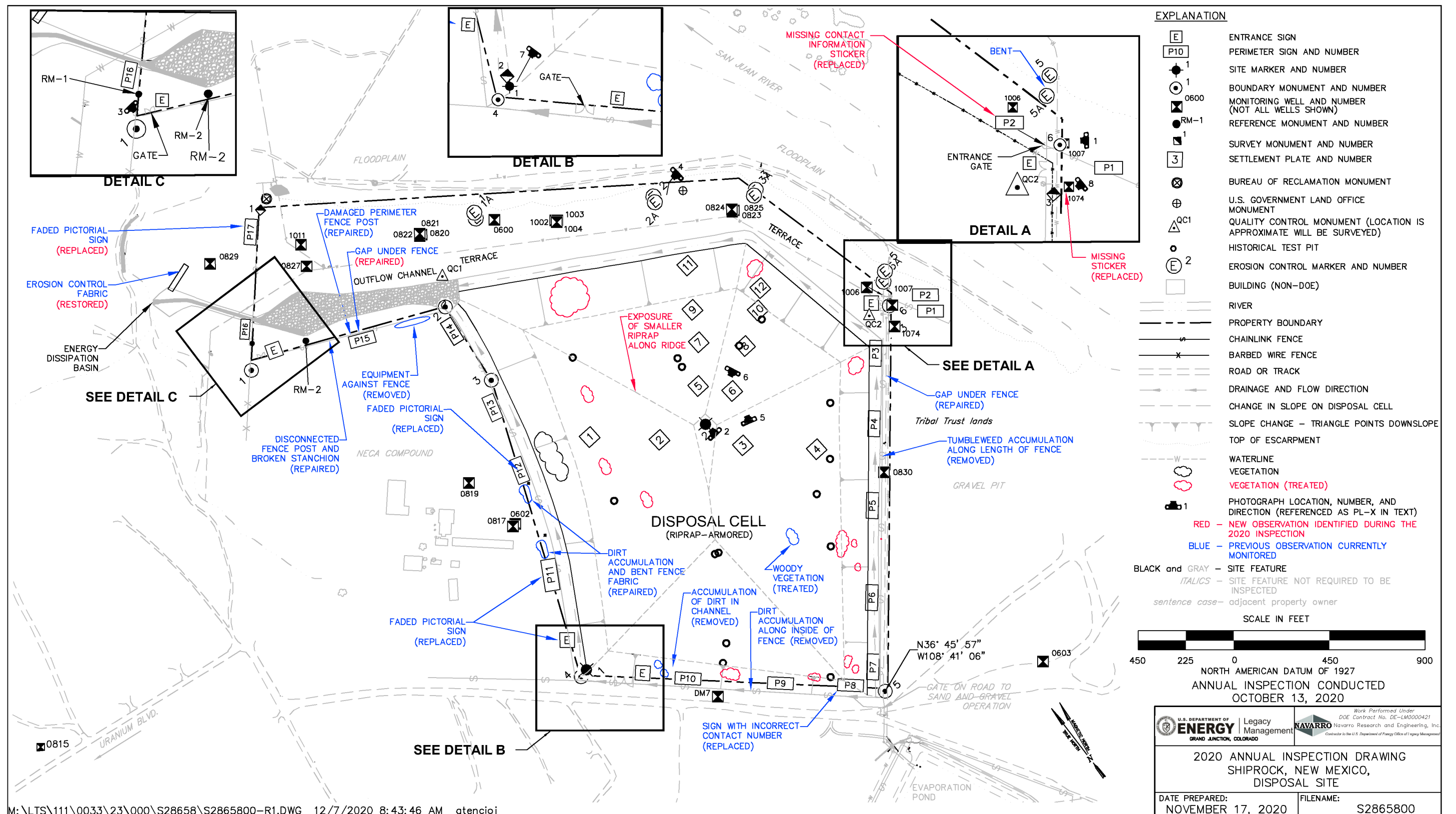


Figure 16-1. 2020 Annual Inspection Drawing for the Shiprock, New Mexico, Disposal Site

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There are 17 pairs of perimeter signs, designated P1 through P17 (each pair consisting of one pictorial and one textual sign), positioned along the perimeter fence.<sup>1</sup> The pictorial signs near the southwestern entrance sign and perimeter signs P11, P12, and P17, replaced in 2019, were observed to be in good condition during the 2020 inspection. Perimeter sign P2 was observed to have a faded contact information sticker, which was replaced following the inspection (PL-1). No other maintenance needs were identified.

#### ***16.4.1.3 Site Markers***

The site has two granite site markers. Site marker SMK-1 is just inside the west gate; minor cracks in its concrete base were resealed in 2018. Site marker SMK-2 (PL-2) is on the top slope of the disposal cell. No maintenance needs were identified.

#### ***16.4.1.4 Survey and Boundary Monuments***

Three survey monuments and six boundary monuments delineate the property boundary. Two additional boundary monuments are offsite; monitoring of these monuments was discontinued in 1999 and 2003. Steel T-posts were installed next to all boundary monuments to help inspectors locate the monuments. The site map was updated with the more recent coordinates for boundary monument BM-6, as resurveyed in 2018. Boundary monument BM-1 (PL-3) was identified within the Navajo Engineering and Construction Authority yard and the location was added to the site map following the inspection. The GPS coordinates were resurveyed in 2019 following the inspection. The concrete at survey monument SM-1 is cracked, but the crack does not threaten the integrity of the marker. All boundary monuments were observed to be clear of vegetation and were visible during the 2020 inspection. No maintenance needs were identified.

#### ***16.4.1.5 Aerial Survey Quality Control Monuments***

Two aerial survey quality control monuments, installed earlier in 2020, were inspected during the 2020 annual inspection. No maintenance needs were identified.

#### ***16.4.1.6 Erosion Control Markers***

The site has four pairs of erosion control markers along the edge of the terrace escarpment (1/1A, 2/2A, 3/3A, and 5/5A) (PL-4). Erosion control markers 4 and 4A are not inspected; they were installed on the terrace east of the site in the gravel pit. Erosion control marker 5A, near the east entrance gate, was previously bent by a vehicle, but it is functional and does not require repair. No maintenance needs were identified.

### **16.4.2 Inspection Areas**

In accordance with the LTSP, the site is divided into three areas to ensure a thorough and efficient inspection. The inspection areas are (1) the disposal cell, diversion channels at the base of the disposal cell, and the outflow channel; (2) the terrace area north and northeast of the

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<sup>1</sup> Plate 1 of the LTSP shows six sets of perimeter signs on fence fabric along the terrace escarpment. These were never installed because a fence was never installed in this area. As the escarpment itself prohibits access to the site, a fence was not needed.

disposal cell; and (3) the outlying area, which includes the fenced evaporation pond south of the disposal cell and the gravel pit southeast of the disposal cell. Inspectors examined specific site surveillance features within each area and looked for evidence of erosion, settling, slumping, or other modifying processes that might affect the site's conformance with LTSP requirements.

#### ***16.4.2.1 Disposal Cell, Diversion Channels, and Outflow Channel***

The disposal cell, completed in 1986, occupies 77 acres and is armored in riprap to control erosion and deter animal and human intrusion (PL-5). There was no evidence of erosion, settling, slumping, rock degradation, or other modifying processes that might affect the integrity of the disposal cell. Piezocones associated with a research project installed on the disposal cell cover in the past are no longer in use. Some of the filled piezocone pits have subsided slightly or were never completely backfilled, which resulted in shallow conical depressions in the cover. As reported in previous site inspection reports, the surface of the disposal cell contains numerous ruts associated with past vehicle traffic. An area where smaller riprap has been exposed was identified along the northern ridge of the disposal cell. This area will be monitored for further changes that might indicate erosion or degradation of the cover. The condition of other depressions and vehicle ruts is monitored annually and has not changed significantly since the 2014 inspection.

Windblown sediment has accumulated in the rock cover in several places. In accordance with the LTSP, woody, deep-rooted shrubs are controlled. Numerous woody shrubs found on the top and side slopes of the disposal cell (PL-6) were treated in 2020 before the inspection.

Diversion channels around the base of the disposal cell contained scattered vegetation, including several woody shrubs. The channel along the southwestern side of the disposal cell has accumulated sediment, and a significant amount of vegetation has grown (PL-7). It is possible that the sediment was generated from the maintenance of the road adjacent to the perimeter fence and has settled in the bottom of the channel. These shrubs do not adversely affect the performance of the diversion channel at this time and are not a concern, but they will continue to be monitored. Nonwoody plants were growing within the outflow channel, and woody vegetation was growing on the banks of the channel. No other maintenance needs were identified.

#### ***16.4.2.2 Terrace Area***

The terrace area is north and northeast of the disposal cell along the top of a steep escarpment. Other than annual weeds, little vegetation grows on the terrace. The edge of the escarpment varies between 175 and 345 feet from the base of the disposal cell and is prone to slumping. No new significant erosion was evident during the inspection in 2020. The LTSP states that the base of the terrace escarpment should be inspected for signs of seepage, and seeps were identified during early site inspections. However, this is no longer part of annual inspection, procedures as the seeps are now monitored as part of the groundwater compliance program for the site. Monitoring well 1074 was observed to be missing a No. 4 ID sticker, and the No. 1 ID sticker was damaged (PL-8). These stickers were replaced following the 2020 inspection. No maintenance needs were identified.

### **16.4.2.3 Outlying Area**

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 impacts were observed. A former gravel pit that is no longer actively extracting aggregate is immediately southeast of the disposal cell. Inspectors identified no significant changes in land use associated with the gravel pit or with other outlying areas near the disposal cell during the 2020 inspection.

In 2002, the Office of Legacy Management (LM) constructed an 11-acre lined evaporation pond near the disposal cell as part of the groundwater compliance strategy. The pond, surrounded by a chainlink security fence, is maintained under the groundwater compliance strategy. Both the security fence and pond were intact and functional at the time of the inspection. The degraded portion of the erosion control fabric on the south-facing bank of the energy dissipation basin identified during the 2018 inspection has been repaired and is functioning as intended.

Fences and warning signs posted in Bob Lee Wash are maintained under the groundwater compliance strategy and were not examined during the 2020 annual inspection. No other maintenance needs were identified.

## **16.5 Follow-Up or Contingency Inspections**

LM will conduct follow-up or contingency 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 or contingency inspection was identified.

## **16.6 Maintenance and Repairs**

Minor maintenance needs completed before the 2020 inspection, include the following:

- Repairing the gaps under the fence at perimeter signs P3 and P15
- Repair of fence near perimeter sign P15
- Removal of dirt accumulation in the channel and along the southern fence line
- Treatment of woody vegetation on top and slide slopes of the cell

Inspectors documented minor maintenance needs that were addressed following the inspection, including the following:

- Replacing the missing stickers on monitoring well 1074
- Replacing a faded sticker containing contact information on perimeter sign P2

Ongoing maintenance conducted at the site included removal of trash and debris (including tumbleweeds) along the perimeter fence.

## 16.7 Environmental Monitoring

### 16.7.1 Groundwater Monitoring

In accordance with the LTSP, groundwater monitoring to evaluate disposal cell performance is not required. However, groundwater monitoring is conducted in accordance with a groundwater compliance strategy. The monitoring wells associated with the groundwater compliance strategy (i.e., along the terrace and at offsite locations) are not included in the annual inspection process. All wells encountered during the inspection were locked, and no maintenance needs were observed.

### 16.7.2 Vegetation Monitoring

In a 1999 letter to the Navajo AML Reclamation/Uranium Mill Tailings Remedial Action Department (Bergman-Tabbert 1999), LM committed to spraying annual weeds on the disposal cell top slope. During the inspection, annual weeds were observed growing on less than 1% of the top slope. After discussion among LM, Navajo AML, and LMS ecologists, LM recommended that it cease treatment of nonnoxious weeds on the cell and allow natural plant succession to progress. LM wrote a new letter to Navajo AML outlining its proposed vegetation management plan (Kautsky 2019). Under the plan, LM would continue to treat weeds listed as noxious by the State of New Mexico and Navajo Nation (primarily *Halogeton glomeratus*) in accordance with applicable laws and would treat deep-rooted woody species in accordance with the LTSP. Vegetation will continue to be monitored to inform future management decisions.

## 16.8 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192. No need for corrective action was identified.

## 16.9 References

10 CFR 40.27. U.S. Nuclear Regulatory Commission, “General License for Custody and Long-Term Care of Residual Radioactive Material 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*.

Bergman-Tabbert, 1999. D. Bergman-Tabbert, site manager, U.S. Department of Energy Office of Legacy Management, letter (Shiprock Uranium Mill Tailings Remedial Action Site) to Madeline Roanhorse, director Navajo Nation UMTRA Program Division of Natural Resources, May 13.

DOE (U.S. Department of Energy), 1994. *Long-Term Surveillance Plan for the Shiprock Disposal Site, Shiprock, New Mexico*, DOE/AL/62350-60F, Rev. 1, September.

Kautsky, M., 2019. Mark Kautsky, Title I manager, U.S. Department of Energy Office of Legacy Management, letter (Updated Agreement for Vegetation Control on the Shiprock Disposal Cell) to Madeline Roanhorse, director Navajo Nation UMTRA Program Division of Natural Resources, October 10.



## 16.10 Photographs

Photograph Location Number	Azimuth	Photograph Description
PL-1	270	Pictorial Sign and Perimeter Sign P2 with Faded Information
PL-2	—	Site Marker SMK-2
PL-3	180	Boundary Monument BM-1
PL-4	270	Erosion Control Marker E-2
PL-5	20	Disposal Cell Top Slope
PL-6	250	Disposal Cell Top Slope with Growing Vegetation
PL-7	260	Sediment Accumulation near Southwest Fence Line
PL-8	230	Missing ID Stickers on Monitoring Well 1074

**Note:**

— = Photograph taken vertically from above.



*PL-1. Pictorial Sign and Perimeter Sign P2 with Faded Information*



*PL-2. Site Marker SMK-2*





*PL-3. Boundary Monument BM-1*



*PL-4. Erosion Control Marker E-2*





*PL-5. Disposal Cell Top Slope*



*PL-6. Disposal Cell Top Slope with Growing Vegetation*





*PL-7. Sediment Accumulation Near Southwest Fence Line*



*PL-8. Missing ID Stickers on Monitoring Well 1074*

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