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 was inspected on June 16, 2010. The disposal cell and all associated surface water diversion and drainage structures remained in good condition and were functioning as designed.

In 2009, a conical-shaped depression was discovered on the disposal cell cover, and investigation revealed it to be an historical test pit. Since then, several similar conical depressions have been found, and were mapped during the 2010 inspection. Although no displacement of materials is apparent in these areas, these depressions will be monitored in the future. Vehicle ruts, probably the result of herbicide application in 2008, are not deep enough to warrant concern but will also continue to be monitored.

With a few minor exceptions, all structures, including access roads, gates, entrance signs, fences, monitoring wells, site markers, perimeter signs, survey monuments, and erosion control markers, were in good condition. A section of loose erosion fabric found on a side slope of the lower outflow channel requires repair. Portions of the perimeter fence were bent or damaged but are still functional. Two six inch gaps in the fence require repair, as well as a gap in the former entrance gate. Three signs need replacing or updating. No other maintenance needs or causes for a follow-up or contingency inspection were identified.

16.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Shiprock Disposal Site are specified in the *Long-Term Surveillance Plan* [LTSP] *for the Shiprock Disposal Site, Shiprock, New Mexico* (DOE/AL/62350–60F, Rev. 1, DOE, September 1994) and in procedures established by DOE to comply with the requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). Table 16–1 lists these requirements.

Table 16–1. License Requirements for the Shiprock Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 6.0	Section 16.3.1
Follow-Up or Contingency Inspections	Section 7.0	Section 16.3.2
Routine Maintenance and Repairs	Section 8.0	Section 16.3.3
Groundwater Monitoring	Section 5.0	Section 16.3.4
Corrective Action	Section 9.0	Section 16.3.5

Institutional Controls—The 105-acre disposal site is held-in-trust by the United States Bureau of Indian Affairs. The Navajo Nation retains title to the land. The site was accepted under U.S. Nuclear Regulatory Commission (NRC) general license (10 CFR 40.27) 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. DOE Order 454.1 defines institutional controls as federal control of the property, site perimeter fencing, warning/no-trespassing signs along the property boundary, and a locked gate at the entrance to the site. Verification of these institutional controls is part of the annual inspection. Inspectors found no evidence that these institutional controls were ineffective or violated.

16.3 Compliance Review

16.3.1 Annual Inspection and Report

The results of the Shiprock Disposal Site inspection, conducted on June 16, 2010, are discussed below. Figure 16–1 shows features and photograph locations (PLs) mentioned in this report. Numbers in the left margin refer to items in the "Executive Summary" table.

16.3.1.1 Specific Site-Surveillance Features

Access Road, Gates, Fence, and Signs—Access to the site is via a gravel road off U.S. Highway 491 and through a sand and gravel processing facility, operated by the Navajo Engineering and Construction Authority (NECA), to the main entrance gate. DOE retains perpetual access to the site through a Custody and Access Agreement with the Navajo Nation (DE–FC04–83AL16258, October 7, 1983).

All three vehicle access gates—the main entrance gate at the east corner of the site (near the terrace escarpment); the gate providing terrace access at the northwest corner of the site, and the former entrance gate at the west corner of the site—were locked, intact and functional. However, the former entrance gate at the west corner had a 6-inch gap between its vertical poles that could allow passage of a small child (PL–1). This gap will be repaired. Two entrance sign pairs are placed near the main entrance gate and two are placed near the former entrance gate. One pictorial sign was missing at the former entrance at the west corner of the site. The remaining entrance signs were in good condition and had decals listing correct telephone numbers for DOE and the Navajo AML/UMTRA Office.

The security fence along the perimeter was intact but has damage in several areas, as observed in previous years. Several bent poles and a section of bent fence fabric between perimeter signs P11 and P12. Poles were also bent near perimeter sign P14, and a broken fence riser was observed near perimeter sign P15. No signs of trespassing were apparent. As observed in 2008, dirt was mounded against the fence near perimeter sign P13, but the fence was intact.

Tumbleweeds and trash have accumulated in many places along the perimeter fence, particularly along the site's western and southern boundaries, in the northwest corner, and in the outflow channel near perimeter sign P16. Although these accumulations are minor, neither presenting a fire hazard nor obstructing water flow through the channel, tumbleweed and trash around all site fences will be removed prior to the next annual inspection.

16A There are gaps beneath the fence, most formed by animals, along the site perimeter. Two six-inch gaps were identified near perimeter sign P3 (PL–2), between perimeter signs P4 and P5, and between perimeter signs P14 and P15. These gaps, like the gap in the west entrance gate, could provide access to children, who live and play immediately west of the site. Therefore, these gaps will be filled.

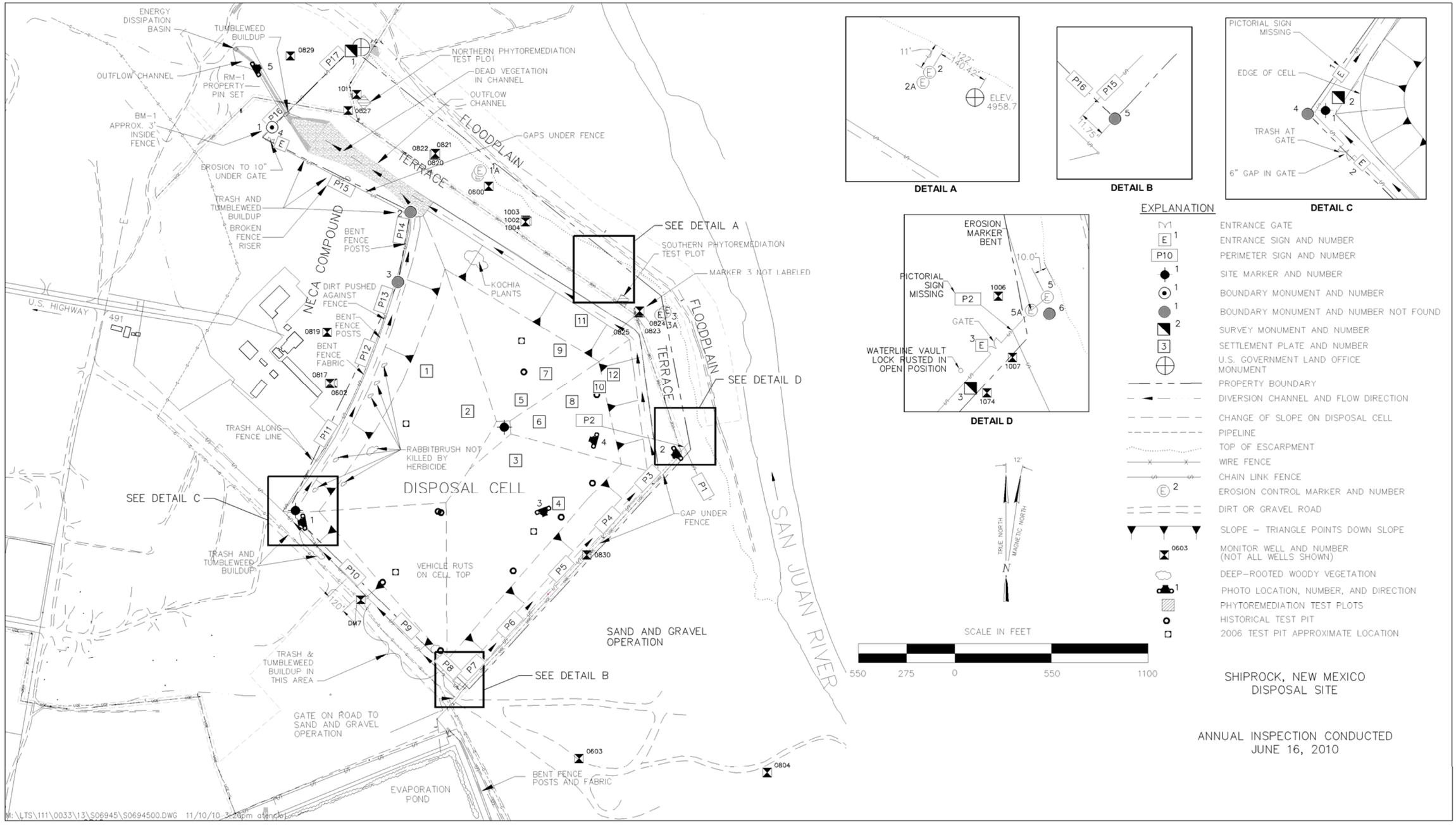

Figure 16–1. 2010 Annual Compliance Drawing for the Shiprock Disposal Site

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All perimeter signs were in good condition, with no vandalism evident, except for one missing pictorial sign (P2) near the entrance gate. This sign will be replaced before the next annual inspection.

Site Markers and Monuments—Two site markers are placed at the site: site marker SMK–1 is just inside the former main entrance gate, and site marker SMK–2 is on top of the disposal cell. Minor cracking in the concrete around the base of SMK–1 was sealed in May 2003. Both site markers were in good condition at the time of the 2010 inspection.

All three survey monuments were inspected and in good condition. As was the case in previous inspections, only boundary monument BM–1 was located in 2010. The five remaining boundary monuments were buried by windblown sand or inadvertently removed during past construction activities. Because DOE does not own the land, the presence or exact location of these boundary monuments is not critical to managing the disposal site. However, if locating all boundary monuments becomes important in the future, DOE will subcontract a licensed surveyor to find or reestablish the monuments. In the interim, no action will be taken. The perimeter fence also defines the site boundary along all sides except the east and northeast, where the edge of the terrace escarpment serves as a boundary.

Erosion Control Markers—The four sets of erosion control markers (ECMs) along the edge of the terrace escarpment were in good condition except for the marker near the east entrance gate (ECM–5A on Figure 16–1). This marker was previously damaged by a vehicle, but the marker is still functional and does not require repair at this time.

Monitoring wells—Cell performance groundwater monitoring is not required by the LTSP for this site. Numerous monitoring wells are present along the terrace and at off-site locations, however. These wells are not included in the annual inspection because the DOE groundwater restoration staff maintains the wells during the frequent sampling events. All wells encountered during the 2010 inspection were secure, locked, and in good condition.

16.3.1.2 Transects

To ensure a thorough and efficient inspection, inspectors divided the site into three areas called "transects": (1) the disposal cell (including the riprap-covered top and side slopes, diversion channels, and outflow channel), (2) the terrace area north and northeast of the disposal cell, and (3) the outlying area.

The area inside each transect was inspected by walking a series of traverses. Within each transect, the inspectors examined specific site-surveillance features, drainage structures, vegetation, and other features. Inspectors also looked for evidence of settlement, erosion, or other modifying processes that might affect site integrity or long-term performance.

Disposal Cell, Diversion Channels, and Outflow Channel—The riprap-covered top and side slopes of the cell are in good condition; no evidence of settling or slumping was found. A conical depression was identified along the southeast edge of the disposal cell cover (PL–3). Since the 2009 inspection, several similar conical depressions have been found, but these appear to be vestiges of test pits dug for initial cell cover studies. Although no displacement of materials is apparent in these areas, these depressions will be measured and monitored in the future, and

follow-up actions will be taken if necessary. The depressions were mapped during the 2010 inspection with a Global Positioning System (GPS) unit and pit locations are shown on Figure 16–1. The condition of the historical test pits will continue to be monitored during future annual inspections.

Vehicle ruts are apparent on the surface of the cell (PL–4); these ruts were probably formed in the fall of 2008 during vegetation spraying. This treatment was effective, as all vegetation on the cell cover and in the diversion channels and outflow channel was dead at the time of the 2010 inspection.

Diversion channels around the base of the disposal cell were in good condition. Minor buildup of tumbleweeds in the outflow channel is not a concern at this time because it is not expected to inhibit flow.

Site drainage is ultimately directed toward the outflow channel at the northwest corner of the site. The outflow channel was reconstructed in 2003 to repair damage caused by severe storms in 2001 and 2002, and an energy dissipation basin was constructed immediately above Bob Lee Wash. An erosion area along the southwest bank of the off-site portion of the outflow channel, fully repaired in 2008, was in good condition. The lower, steeper portion of the off-site outflow channel and the energy dissipation structure also remained in good condition. However, erosion control fabric installed on the side slopes of the lower channel had come loose along one edge; this section of fabric requires repair (PL–5).

In general, shallow-rooted vegetation growing in the diversion and outflow channels (e.g., cheatgrass, Russian thistle, Indian ricegrass) does not impede the flow of water and, therefore, is not removed. However, woody vegetation in the outflow channel does require periodic removal. Scattered tamarisk plants were cut and treated with herbicide in late September 2008. No weed control activities were conducted in 2010.

Terrace Area and Site Perimeter—The terrace comprises the area north and east of the disposal cell between the cell and the escarpment. The escarpment, more than 300 feet from the eastern edge of the disposal cell, is prone to slumping. Four sets of erosion control markers along the terrace escarpment allow stability to be monitored. Fractures and incipient slumps commonly occur in the Mancos Shale bedrock along the escarpment northwest of erosion control marker ECM–1A. No new erosion was evident in 2010.

The noxious weeds have been treated on the terrace since 2004, but desirable native vegetation was allowed to establish. In 2008, because of the abundance of undesirable vegetation, the terrace was treated with a soil sterilant. Little live vegetation remained at the time of the 2009 inspection. In addition to native vegetation and annual weeds, saltcedar and halogeton were observed on the steep slopes of the escarpment below the terrace, but control of these plants is not recommended because of their inaccessibility and because they stabilize the slope.

Outlying Area—A sand and gravel pit operated by NECA is located immediately southeast of the disposal cell. Gravel mining operations ceased in 2009, but gravel stockpiles were still present during the 2010 inspection. Inspectors will continue to monitor sand and gravel operations to ensure that gravel pit activities do not encroach upon or adversely impact the disposal site and perimeter area.

In 2002, DOE constructed an 11-acre lined evaporation pond (across the public access road) as part of the ongoing groundwater treatment program. A chain-link security fence encloses the area. Although the activities associated with the treatment of contaminated groundwater at this site are not within the scope of the LTSP, the pond is monitored for general condition and security as part of the annual inspections. At the time of the 2010 inspection, the pond liner appeared intact, and the pond was full of water.

The security fence was functional, with some damage along the southwestern edge. Tumbleweeds and trash had accumulated in several areas along the fence, and removal is planned in 2010.The contact information on the entrance sign is out of date and will be corrected.

16.3.2 Follow-Up or Contingency Inspections

DOE will conduct follow-up inspections if (1) an annual inspection or other site visit reveals a condition that must be reevaluated during a return to the site, or (2) a citizen or outside agency notifies DOE that conditions at the site are substantially changed.

No follow-up or contingency inspections were required in 2010.

16.3.3 Routine Maintenance and Repairs

Trash removal and minor fence repairs occurred at the site in 2010. The repairs identified in this report will be completed during the 2011 inspection.

16.3.4 Groundwater Monitoring

In accordance with the LTSP, groundwater monitoring is not required at the Shiprock site. The LTSP concluded that the site is located over an aquifer (the alluvial aquifer) that is not useful as a source of water for drinking or any other beneficial purpose because of its poor quality, limited areal extent, and low yield. An effective confining layer (Mancos Shale) and upward hydraulic gradient provide protection to the underlying aquifer. Based on these findings, no additional hydrogeologic investigations were planned for the disposal site, and no cell performance monitoring of groundwater was proposed as part of the long-term surveillance program.

16.3.5 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 corrective action was required in 2010.

16.3.6 Photographs

Table 16–2. Photographs Taken at the Shiprock Disposal Site

Photograph Location Number	Azimuth	Description
PL–1	260	Vertical gap approximately 6 inches wide in west access gate.
PL–2	235	Two six-inch gaps under fence near P3.
PL–3	160	Historical test pit on disposal cell cover
PL–4	285	Disposal cell cover showing vehicle ruts and dead vegetation.
PL–5	60	Loose erosion fabric on slope of hill above outflow channel.

SHP 6/2010. PL–1. Vertical gap approximately 6 inches wide in west access gate.

SHP 6/2010. PL–2. Two- six-inch gaps under fence near P3.

SHP 6/2010. PL–3. Historical test pit on disposal cell cover .

SHP 6/2010. PL–4. Disposal cell cover showing vehicle ruts and dead vegetation.

SHP 6/2010. PL–5. Loose erosion fabric on slope of hill above outflow channel.

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