

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 May 27, 2015. The disposal cell and all associated surface water diversion and drainage structures were in good condition. The perimeter fence and gates remain functional, a gap below the north entrance gate will be eliminated by lowering the gate, and minor fence damage from wear will continue to be monitored.

Faded or damaged perimeter signs will be replaced during the next several years, and the Navajo Nation Abandoned Mine Lands/Uranium Mill Tailings Remedial Action (AML/UMTRA) phone number will be added to the west and east entrance signs. Vegetation management continues on the disposal cell to treat and eliminate deep-rooted shrubs and other weed species. Inspectors identified no other maintenance issues or need for a follow-up or contingency inspection.

16.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the site are specified in the *Long-Term Surveillance Plan for the Shiprock Disposal Site, Shiprock, New Mexico* (LTSP) (DOE/AL/62350-60F, Rev. 1, U.S. Department of Energy [DOE], September 1994) and in procedures that DOE established to comply with the requirements of 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 Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 6.0	Section 16.4
Follow-Up or Contingency Inspections	Section 7.0	Section 16.5
Maintenance and Repairs	Section 8.0	Section 16.6
Environmental Monitoring	Sections 5.0 and 6.4	Section 16.7
Corrective Action	Section 9.0	Section 16.8

16.3 Institutional Controls

The 105-acre disposal site (Figure 16-1) is held in trust by the U.S. Bureau of Indian Affairs. The Navajo Nation retains title to and ownership of the land. The site was accepted under the U.S. Nuclear Regulatory Commission 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. Institutional controls at the site include federal custody of the disposal cell and its engineered features, and the following physical features that are inspected annually: site markers, survey and boundary monuments, perimeter warning signs, a site perimeter fence, and locked gates at the site entrances.

16.4 Inspection Results

The site, located in Shiprock, New Mexico, was inspected on May 27, 2015. The inspection was conducted by M. Kastens, D. Marshall, and D. Miller of the DOE Legacy Management Support

contractor. M. Kautsky (DOE Site Manager), J. Nofchissey (Navajo Nation AML/UMTRA Office), and G. Jay (DOE Office of Legacy Management Support contractor) also participated in the inspection.

The purposes of the inspection were to confirm the integrity of visible features at the site, to identify changes in conditions that might affect site integrity, and to determine the need, if any, for maintenance or additional inspections and monitoring. Numbers in the left margin of this report refer to items summarized in Table ES-1 of the “Executive Summary.”

16.4.1 Site Surveillance Features

Figure 16-1 shows the locations of site surveillance features. 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 on Figure 16-1 by photograph location (PL) numbers.

16.4.1.1 Access Roads, Entrance Gates, and Entrance Signs

16A All access roads were in good condition. Three gates allow entrance 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 entrance gate). Access to the main (east) entrance gate is gained by traveling through a gravel pit. The three gates were intact and operable, although an unacceptably wide gap was discovered below the north gate (PL-1). Two local dogs entered the site through this gap during the inspection. The gate was lowered to reduce the gap.

Entrance signs are present in pairs—one pictorial and one textual—near each gate. All entrance signs were intact, but signs at the east (PL-2) and west gates had faded radiation symbols and were missing the Navajo Nation AML/UMTRA phone number, and the north gate had a faded radiation symbol (PL-3). Faded radiation symbols with missing phone numbers are in the process of being replaced.

16.4.1.2 Perimeter Fence and Perimeter Signs

A chain-link security fence surrounds the disposal cell and drainage features. As observed in previous years, this perimeter fence was damaged in many areas. Damaged fence sections reported in previous years include bent posts and bent fence fabric between perimeter signs P11 and P12, dirt pushed through the fence between P11 and P12, dirt mounded against the fence and a section of bent fence near P13, bent posts near P14, a broken fence riser near P15, and fence risers separated from posts between P15 and P16. An inspector noted that additional damage to the fence between perimeter signs P12 and P13, in the form of bent posts and fence fabric, had occurred during the last year (PL-4). Damaged fence sections will continue to be monitored and repaired when necessary to maintain site security.

16B A relatively long section of fence by perimeter sign P15 has a 3- to 6-inch gap beneath it (PL-5). The gap is not a concern at this time, and inspectors will continue to monitor this area to determine if the gap has widened and needs to be repaired. In several other places along the perimeter fence, inspectors placed rocks in gaps that were potentially large enough to allow site access by animals.

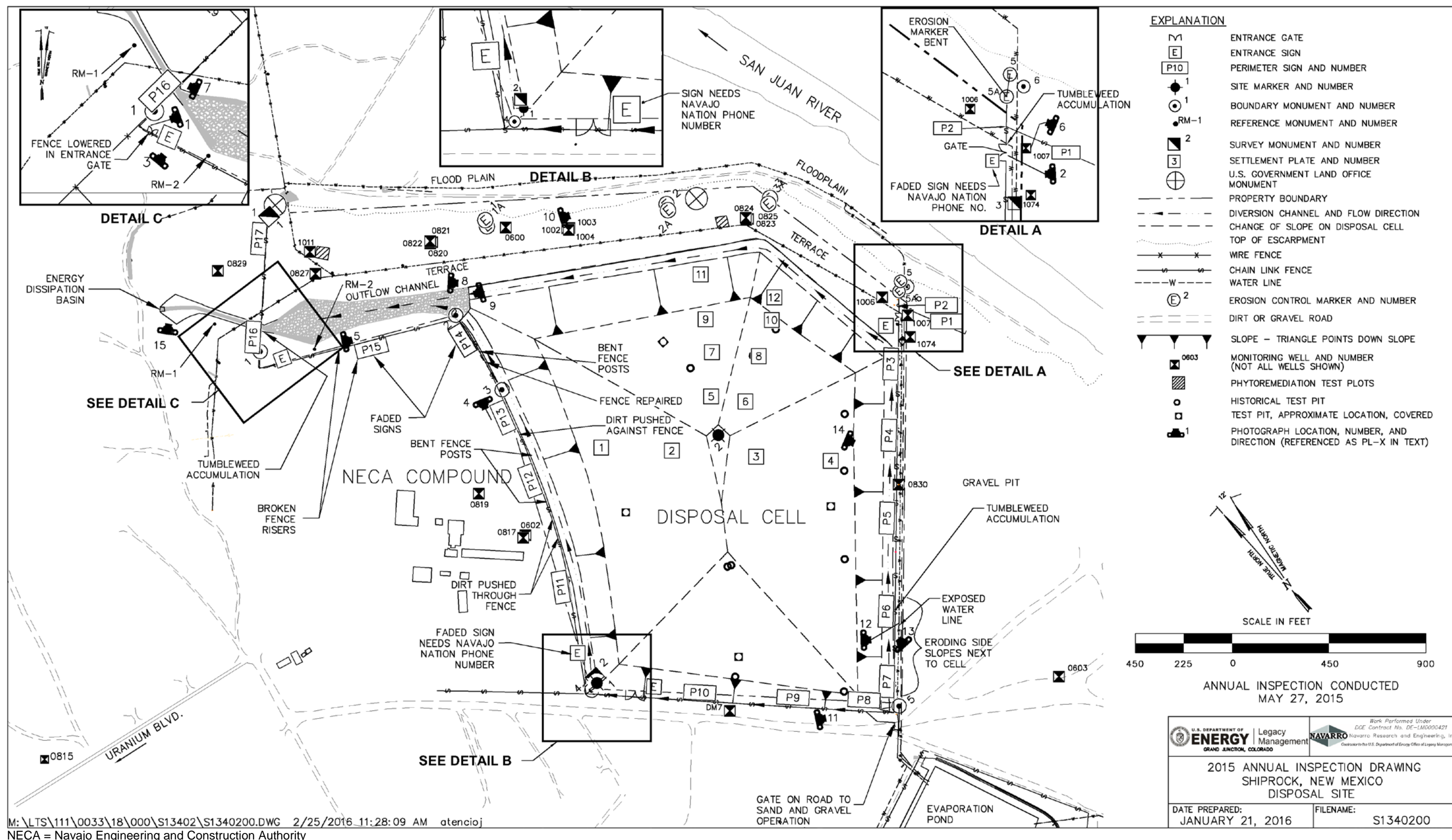


Figure 16-1. 2015 Annual Inspection Drawing for the Shiprock Disposal Site

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Trash and tumbleweeds continually accumulate in many places along the perimeter fence, although regular maintenance in recent years has kept both to a minimum. During the 2015 inspection, small accumulations of tumbleweed were noted in the perimeter fence corner by the east entrance gate (PL-6) and along the fence near perimeter sign P6 and across the outflow channel (PL-7). Accumulations large enough to represent a fire hazard or increase the possibility of damage to the fence will continue to be removed. During the inspection, inspectors picked up trash along the inside of the perimeter fence.

Seventeen pairs of perimeter signs, designated P1 through P17 (each pair consisting of one pictorial and one textual sign), are located on the fence around the perimeter of the site. All perimeter signs were in place and legible, and they showed no evidence of vandalism. However, textual signs P14 and P15 and all of the southeast and southwest facing textual signs had faded radiation symbols. Many of the pictorial signs had cracked and faded surfaces. These signs will be replaced as they become illegible.

16.4.1.3 Site Markers

Site marker SMK-1, located just inside the west gate, and site marker SMK-2, located on top of the disposal cell, were both in good condition. Minor cracks in the concrete base of SMK-1 were sealed in May 2003 and have not changed significantly.

16.4.1.4 Survey Monuments and Boundary Monuments

All three survey monuments (SM-1, SM-2, and SM-3) were located and in good condition. The concrete has been cracked at SM-1, but the crack does not threaten the integrity of the marker. Eight boundary monuments were originally installed at the site. Inspection of monument BM-7 was discontinued in 1999 because it is located offsite, on the unsafe, steep embankment below the terrace. Inspection of monument BM-8, also located beyond the site's boundary, was discontinued in 2003. Because they are offsite, inspection of these monuments will not resume. The remaining boundary monuments, marked with reference posts to help inspectors find them, were in good condition.

16.4.1.5 Erosion Control Markers

The four pairs of erosion control markers along the edge of the terrace escarpment (1, 1A, 2, 2A, 3, 3A, 5, and 5A) were in good condition except for marker 5A near the east entrance gate. This marker was previously bent by a vehicle, but it is still functional and does not require repair. Erosion control markers 4 and 4A are not inspected; they were installed on the terrace east of the disposal site, in the gravel pit. Markers 5 and 5A replaced markers 4 and 4A.

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, including the riprap-covered top and side slopes, diversion channels at the base of the cell, and the outflow channel; (2) the terrace area north and northeast of the 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.

Within each inspection area, inspectors examined specific site-surveillance features. Inspectors also looked for evidence of settlement, erosion, or other modifying processes that might affect site integrity or long-term performance.

16.4.2.1 Disposal Cell, Diversion Channels, and Outflow Channel

The riprap-covered top and side slopes of the cell were in good condition (PL-8). No evidence of slumping, erosion, animal intrusion, riprap deterioration, or other significant disturbance was found. Piezocones associated with a research project were installed on the cell cover in the past. Some of the filled piezocone pits have subsided slightly, forming shallow conical depressions in the cover. As previously reported, the surface of the cell is covered with vehicle ruts. The condition of the 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, which has enhanced vegetation establishment. Woody, deep-rooted shrubs are controlled because they potentially could damage the radon barrier. Only a few woody shrubs were growing on the northwest side slope of the disposal cell. These plants were treated with herbicide during a later visit.

Diversion channels around the base of the disposal cell were in good condition and contained scattered vegetation, including several woody shrubs. These shrubs do not affect the integrity of the channel at this time and are not a concern. In the outflow channel, non-woody plants were growing within the channel, and woody vegetation was growing on the banks of the channel. The channel itself was in excellent condition (PL-9).

16.4.2.2 Terrace Area

The terrace area is located 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 escarpment, approximately 300 feet from the eastern edge of the disposal cell, is prone to slumping. No new significant erosion was evident in 2015 (PL-10). 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 because the seeps are now being monitored as part of the groundwater compliance strategy for the site.

Northern and southern phytoremediation test plots on the terrace are no longer maintained. These plots were used for groundwater restoration studies and are not included in the annual inspection.

16.4.2.3 Outlying Area

The area within 0.25 mile of the site boundary was visually observed for erosion, changes in land use, or other phenomena that might affect the long-term integrity of the site. In 2002, DOE constructed an 11-acre lined evaporation pond near the disposal cell as part of the groundwater compliance strategy. The pond, surrounded by a chain-link security fence, is maintained under the groundwater compliance strategy. Both the fence and pond were in good condition.

Inspectors discovered newly eroded areas associated with the steep side slopes adjacent to the southern portion of the disposal cell (PL-11, PL-12). Sediment is eroding from the side slopes and being deposited on the riprap surrounding the disposal cell. Currently, this process does not

threaten the integrity of the disposal cell but will encourage the growth of weeds and vegetation along the base of the cell.

Inspectors also discovered that side slope erosion near perimeter sign P6 had uncovered a buried water pipeline used to transport contaminated water from the floodplain to the evaporation pond (PL-13). The pipeline is a feature associated with the groundwater compliance strategy and typically is not part of the annual inspection. The pipeline is located within Navajo Engineering and Construction Authority (NECA) property. NECA was consulted about the erosion damage and the pipeline and made the necessary repairs.

A gravel pit is located immediately southeast of the disposal cell (PL-14). No significant changes in land use associated with the gravel pit or with other outlying areas near the disposal cell were identified.

The offsite portion of the outflow channel was functional and in good condition. A portion of erosion control fabric had previously come loose from one of the side slopes of the channel and was repaired in 2014 (PL-15). Fences and warning signs posted in Bob Lee Wash are maintained under the groundwater compliance strategy and are not examined during the annual inspection.

16.5 Follow-Up or Contingency Inspections

DOE will conduct follow-up or contingency inspections if (1) an annual inspection or other site visit identifies a condition that requires a return to the site to evaluate the condition or (2) a citizen or outside agency notifies DOE that conditions at the site or in the vicinity of the site are substantially changed. No need for a follow-up or contingency inspection was identified.

16.6 Maintenance and Repairs

A hole in the erosion control fabric covering the offsite portion of the outflow channel was repaired prior to the 2015 inspection. Accumulations of tumbleweeds and trash along the site perimeter fence will continue to be removed regularly. The faded or damaged entrance and perimeter signs will be replaced as they become illegible. In 2015, the north gate was lowered to remove the wide gap beneath it; missing Navajo Nation AML/UMTRA phone numbers are in the process of being added to the entrance signs at the east and west gates; woody shrubs on the disposal cell cover were treated with herbicide; and NECA was consulted about the exposed water pipeline and the pipeline was reburied.

16.7 Environmental Monitoring

16.7.1 Groundwater Monitoring

- 16D** Cell performance groundwater monitoring is not required by the LTSP. However, groundwater restoration is being conducted in accordance with a groundwater compliance strategy. The wells associated with the compliance strategy (along the terrace and at offsite locations) are not included in the annual inspection.

16.7.2 Vegetation Monitoring

- 16E In a 1999 letter to the Navajo AML/UMTRA Department, DOE committed to spraying annual weeds on the disposal cell top. Patches of annual weeds observed growing on the disposal cell top were treated with herbicide following the inspection.

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 Photographs

Photograph Location Number	Azimuth	Photograph Description
PL-1	285	View of 12-inch gap under north gate before repair; the gap allowed trespass by local dogs.
PL-2	310	Entrance sign at east gate; new radiation symbol and Navajo Nation UMTRA/AML phone number will be added.
PL-3	40	Entrance sign on north gate; note faded radiation symbol.
PL-4	200	Perimeter fence between perimeter signs P12 and P13, next to Navajo Engineering and Construction Authority (NECA) yard.
PL-5	120	Perimeter fence with 3- to 6-inch gap on bottom.
PL-6	335	Minor buildup of tumbleweed in perimeter fence corner near the east gate.
PL-7	295	Tumbleweed buildup in outflow channel next to perimeter fence.
PL-8	135	Northeast-facing side slope of disposal cell.
PL-9	295	Unobstructed outflow channel.
PL-10	115	View southeast of escarpment face.
PL-11	120	View of eroding slopes adjacent to the southeast and southwest perimeter fences.
PL-12	130	Eroding steep slope adjacent to southeast perimeter fence.
PL-13	NA	Soil erosion exposing buried water pipeline.
PL-14	50	Adjacent gravel pit area.
PL-15	155	Recent repairs to erosion control fabric on lower end of outflow channel.



SHP 5/2015. PL-1. View of 12-inch gap under north gate before repair; the gap allowed trespass by local dogs.



SHP 5/2015. PL-2. Entrance sign at east gate; new radiation symbol and Navajo Nation UMTRA/AML phone number will be added.



SHP 5/2015. PL-3. Entrance sign on north gate; note faded radiation symbol.



SHP 5/2015. PL-4. Perimeter fence between perimeter signs P12 and P13, next to Navajo Engineering and Construction Authority (NECA) yard.



SHP 5/2015. PL-5. Perimeter fence with 3- to 6-inch gap on bottom.



SHP 5/2015. PL-6. Minor buildup of tumbleweed in perimeter fence corner near the east gate.



SHP 5/2015. PL-7. Tumbleweed buildup in outflow channel next to perimeter fence.



SHP 5/2015. PL-8. Northeast-facing side slope of disposal cell.



SHP 5/2015. PL-9. Unobstructed outflow channel.



SHP 5/2015. PL-10. View southeast of escarpment face.



SHP 5/2015. PL-11. View of eroding slopes adjacent to the southeast and southwest perimeter fences.



SHP 5/2015. PL-12. Eroding steep slope adjacent to southeast perimeter fence.



SHP 5/2015. PL-13. Soil erosion exposing buried water pipeline.



SHP 5/2015. PL-14. Adjacent gravel pit area.



SHP 5/2015. PL-15. Recent repairs to erosion control fabric on lower end of outflow channel.