

## 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 28, 2013. The disposal cell and all associated surface water diversion and drainage structures remained in good condition.

No settling, slumping, erosion, animal intrusion, riprap deterioration, or other such disturbance was evident on the top and side slopes of the cell. Five open research pits on the cell top were covered in the fall of 2012, and these areas were in good condition. Also on the cell top, vehicle ruts were visible as were several small depressions caused by subsided historical piezocone pits. No significant changes were observed since the 2012 inspection. One woody plant was growing on the cell top, and several were growing on the northwest side slope. Diversion channels and the outflow channel were in good condition. Vegetation in the channel was sparse and is not expected to obstruct drainage flow. No new erosion was evident along the terrace escarpment. No significant changes in land use associated with outlying areas were identified. The offsite portion of the outflow channel remained functional and in good condition.

All three of the site's entrance gates were intact. All perimeter signs were present, legible, and in good condition. Site structures and monuments were intact except for erosion control marker 5A, which had been bent by a vehicle but remains functional. Minor site maintenance is necessary. One pictorial entrance sign was missing from the northwest gate. Sediment had accumulated under the southwest gate, which can make the gate difficult to open. The perimeter fence, damaged in places, was functional except for one area near perimeter sign P14 that requires repair. The mesh had been cut, creating a hole that allows site access. Trash and tumbleweeds have accumulated in places along the perimeter fence. No other maintenance needs or cause for a follow-up or contingency inspection was identified.

### 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* 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 16.4
Follow-Up or Contingency Inspections	Section 7.0	Section 16.5
Maintenance and Repairs	Section 8.0	Section 16.6
Groundwater Monitoring	Section 5.0	Section 16.7
Corrective Action	Section 9.0	Section 16.8

## **16.3 Institutional Controls**

The 105-acre disposal site 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 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 (referred to as site-specific security measures in the LTSP) include federal custody of the disposal cell and its engineered features, and the following features that are inspected annually: site markers, survey and boundary monuments, warning/no-trespassing signs, a site perimeter fence, and locked gates at the site entrances.

## **16.4 Inspection Results**

L. Sheader and M. Kastens of the S.M. Stoller Corporation, the Legacy Management Support contractor for the DOE office in Grand Junction, Colorado, conducted the inspection on May 28, 2013. D. Steckley of the DOE Office of Legacy Management, L. Benally and D. Lee of the Navajo Abandoned Mine Lands/Uranium Mill Tailings Remedial Action (AML/UMTRA) Department, and D. Miller of the S.M. Stoller Corporation also participated in the inspection.

The purposes of the annual inspection were to confirm the integrity of visible features at the site, to identify changes in conditions that may affect site integrity, and to determine the need, if any, for maintenance or additional inspections and monitoring.

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

Three gates allow entrance to the site: the east gate (the current main entrance gate near the terrace escarpment), the northwest gate (an auxiliary access gate), and the southwest gate (the former entrance gate). Near each gate, entrance signs are placed in pairs, one text and one pictorial (PL-1). The pictorial sign was missing from the northwest gate. The remaining entrance signs were in good condition; on the signs, contact information for the DOE and the Navajo AML/UMTRA Department was correct. The east and northwest gates were intact and functional. Sediment continually accumulates along the bottom of the southwest gate, which can make the gate difficult to open. Access to the main (east) entrance gate is gained by traveling through a gravel pit. All access roads were in good condition.

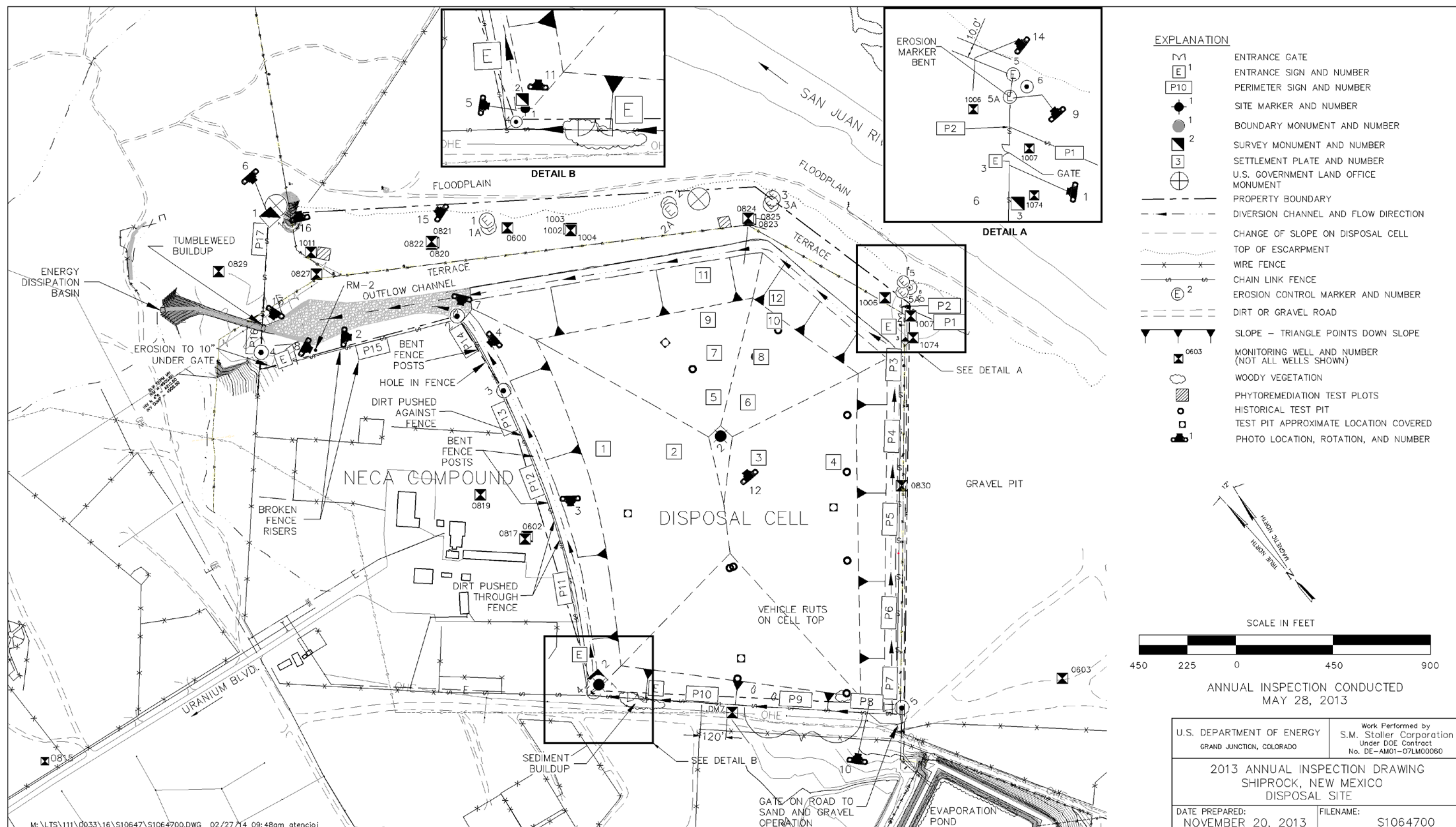


Figure 16-1. Annual Inspection Drawing for the Shiprock Disposal Site

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### **16.4.1.2 Perimeter Fence and Perimeter Signs**

As observed in previous years, the perimeter fence was damaged in many areas (PL-2). Damaged fence sections reported in previous years include bent posts and bent fence fabric between perimeter signs 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. New damage consists of two areas where dirt was pushed through the fence between P11 and P12 (PL-3) and a hole cut in the fence near P14 (PL-4). The hole requires repair. Other damaged fence sections will continue to be monitored.

Trash and tumbleweeds continually accumulate in many places along the perimeter fence, including a section of fence across the outflow channel. Accumulations large enough to represent a fire hazard or increase the possibility of damage to the fence will be removed. Inspectors placed rocks in several gaps beneath the fence that were potentially large enough to allow site access.

Seventeen pairs of signs, designated P1 through P17, each pair consisting of one pictorial sign and one sign with text, are located on the fence around the perimeter of the site. All perimeter signs were in good condition and showed no evidence of vandalism.

### **16.4.1.3 Site Markers**

Site marker SMK-1, located just inside the southwest 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 (PL-5).

### **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 was cracked at SM-1 (PL-6), but the crack did 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. In winter 2013, the remaining six onsite boundary monuments were surveyed and uncovered as necessary. In accordance with the LTSP, reference posts were installed by each monument to facilitate future inspections (PL-7). In 2001, monument BM-1 was lost to flooding. Its reference monuments (RM-1, installed in 2003, and RM-2 [PL-8], installed in 2013) were both present and 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 damaged by a vehicle, but it is still functional and does not require repair (PL-9). 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.

#### **16.4.1.6 Monitoring Wells**

In accordance with the LTSP, cell performance monitoring of groundwater is not required at the site. Onsite wells are associated with separate groundwater restoration activities and are not included in the annual inspection.

#### **16.4.2 Inspection Areas**

To ensure a thorough and efficient inspection, the site is divided into three areas (referred to as “transects” in the LTSP): (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, 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.

##### **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-10). No evidence of settling, slumping, erosion, animal intrusion, riprap deterioration, or other significant disturbance was found. Five open research pits, described in previous annual inspection reports, were covered in fall 2012, and these areas were also in good condition. Piezocones associated with a different research project were installed on the cell cover in the past (*2004 Annual Inspection Report for the Shiprock, New Mexico, UMTRCA Title I Disposal Site*). Some of the filled piezocone pits have subsided slightly, forming conical depressions in the cover. As previously reported, the surface of the cell was covered with vehicle ruts. The condition of the depressions and vehicle ruts is monitored annually and had not changed significantly since the 2012 inspection. These features will continue to be monitored and photographed to document any changes. Inspectors noted the locations and species of plants as stipulated in the LTSP. Several small woody shrubs were growing on the northwest side slope of the disposal cell (PL-11), and one small shrub was observed on the cell top. Sediment has accumulated in the rock cover in several places (PL-12), but this is a natural, expected process.

Diversion channels around the base of the disposal cell were in good condition and contained little vegetation. Non-woody plants were growing in the outflow channel, and woody vegetation was growing on the banks of the channel; neither is likely to obstruct flow. However, tumbleweeds and trash have accumulated along the perimeter fence where it crosses the outflow channel and could potentially obstruct large flows (PL-13).

##### **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. Little vegetation grows on the terrace (PL-14). The escarpment, approximately 300 feet from the eastern edge of the disposal cell, is prone to slumping (PL-15). No new erosion was evident in 2013 (PL-16). The LTSP states that the base of the terrace escarpment should be inspected for signs of seepage. Seeps were identified during early site inspections. However, this

is no longer part of annual inspection procedures because the seeps are now being monitored under the groundwater compliance strategy for the site.

Northern and southern phytoremediation test plots have been maintained on the terrace since 2006. These plots are used for groundwater restoration studies and are not included in the annual inspection.

### **16.4.2.3 Outlying Area**

A gravel pit is located immediately southeast of the disposal cell. 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. Several previously repaired areas remained in good condition. 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 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 need for a follow-up or contingency inspection was identified in 2013.

## **16.6 Maintenance and Repair**

Based on results of the 2013 annual inspection, most maintenance items identified during the 2012 inspection have been addressed.

The following items will be addressed before the 2014 inspection:

- 16A** 1. Replace the pictorial sign missing from the northwest entrance gate.
- 16B** 2. Repair the hole in the perimeter fence near P14.
- 16C** 3. Remove accumulations of tumbleweeds and trash from the perimeter fence if accumulations are large enough to represent a fire hazard or potentially damage the fence.

Because of the sparse vegetation surrounding the disposal site and the arid, windy climate of the region, annual maintenance is expected to include removing accumulations of sediment and debris along the perimeter fence and gates. The location and severity of accumulations will vary from year to year, and annual recommendations for specific areas to be addressed will continue.

## 16.7 Environmental Monitoring

### 16.7.1 Groundwater Monitoring

Wells along the terrace and at offsite locations are associated with groundwater restoration and are not included in the annual inspection because monitoring is not required by the LTSP. Wells are inspected and maintained by sampling teams during regularly scheduled sampling events.

In 2002 DOE constructed an 11-acre lined evaporation pond near the disposal cell. Although the LTSP does not require monitoring of the pond facilities, the evaporation pond area is inspected for general condition and security during annual inspections. At the time of the 2013 inspection, the chainlink security fence was intact and functional (although damaged in places), no damage to the pond liner was evident, and the pond was partially filled with water.

### 16.7.2 Vegetation Monitoring

Noxious weeds are actively managed at all DOE-controlled sites. At the Shiprock site, two noxious species have been found: halogeton (*Halogeton glomeratus*) and saltcedar (*Tamarix ramosissima*). In a 1999 letter to the Navajo UMTRA Department, DOE also committed to spraying annual weeds (consisting primarily of kochia [*Bassia scoparia*] and Russian thistle [*Salsola tragus*]) on the disposal cell top at the Shiprock site. No significant populations of noxious or annual weeds were observed growing on the disposal cell top or terrace area during the 2013 inspection. Small quantities of halogeton were growing on the terrace. On the steep slopes of the escarpment, some annual weeds, halogeton, and saltcedar were growing. Saltcedar is also found offsite at the bottom of the outflow channel where the channel meets Bob Lee Wash.

Control of vegetation is not recommended at the site in 2013 because infestations of halogeton are too limited to warrant treatment, weeds present on the escarpment slopes are too inaccessible to treat, and woody vegetation present on the disposal cell is not excessive.

## 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 corrective action was required in 2013.

## 16.9 Photographs

Photograph Location Number	Azimuth	Description
PL-1	320	Entrance sign at main access gate.
PL-2	110	Damaged fence line near perimeter sign P15.
PL-3	220	Dirt pushed under fence between P11 and P12.
PL-4	270	Hole cut into fence near perimeter sign P14.
PL-5	140	Site marker SMK-1.
PL-6	180	Survey monument SM-1.
PL-7	235	Boundary monument 2 with reference post.
PL-8	160	Reference monument RM-2, installed in 2013.
PL-9	n/a*	Erosion marker ECM-5A, bent but functional.
PL-10	50	Southeast slope of disposal cell.
PL-11	45	Northwest slope of disposal cell showing vegetation.
PL-12	n/a*	Sediment deposition on cell top.
PL-13	255	Fence across outflow channel with debris buildup.
PL-14	350	Terrace, view north-northeast.
PL-15	345	Terrace escarpment pedestaling; piping was also observed.
PL-16	30	View down repaired section of escarpment; no new erosion.

\*The azimuth is not given because the photo was taken at close range.



*SHP 5/2013. PL-1. Entrance sign at main access gate.*





*SHP 5/2013. PL-2. Damaged fence line near perimeter sign P15.*



*SHP 5/2013. PL-3. Dirt pushed under fence between P11 and P12.*





*SHP 5/2013. PL-4. Hole cut into fence near perimeter sign P14.*



*SHP 5/2013. PL-5. Site marker SMK-1.*





*SHP 5/2013. PL-6. Survey monument SM-1.*



*SHP 5/2013. PL-7. Boundary monument 2 with reference post..*





*SHP 5/2013. PL-8. "Reference monument RM-2, installed in 2013.*



*SHP 5/2013. PL-9. Erosion marker ECM-5A, bent but functional.*





*SHP 5/2013. PL-10. Southeast slope of disposal cell.*



*SHP 5/2013. PL-11. Northwest slope of disposal cell showing vegetation.*





*SHP 5/2013. PL-12. Sediment deposition on cell top.*



*SHP 5/2013. PL-13. Fence across outflow channel with debris buildup.*





*SHP 5/2013. PL-14. Terrace, view north-northeast.*



*SHP 5/2013. PL-15. Terrace escarpment pedestaling; piping was also observed.*



*SHP 5/2013. PL-16. View down repaired section of escarpment; no new erosion.*

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