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 29, 2014. The disposal cell and all associated surface water diversion and drainage structures were in good condition. A missing entrance sign was replaced, sediment was removed from under a gate, a damaged portion of the perimeter fence was repaired, and weeds and deep-rooted shrubs on the disposal cell were treated with herbicide. Trash and tumbleweeds along the perimeter fence will be removed. Inspectors identified no other significant maintenance needs or cause 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* 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
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 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 29, 2014. The inspection was conducted by M. Kastens and L. Sheader of Stoller Newport News Nuclear, Inc. (SN3), a wholly owned subsidiary of Huntington Ingalls Industries, Inc. SN3 is the DOE Legacy Management Support contractor. J. Nofchissey of the Navajo Abandoned Mine Lands/Uranium Mill Tailings

Remedial Action (AML/UMTRA) Department and D. Miller and G. Jay of SN3 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 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 chapter 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

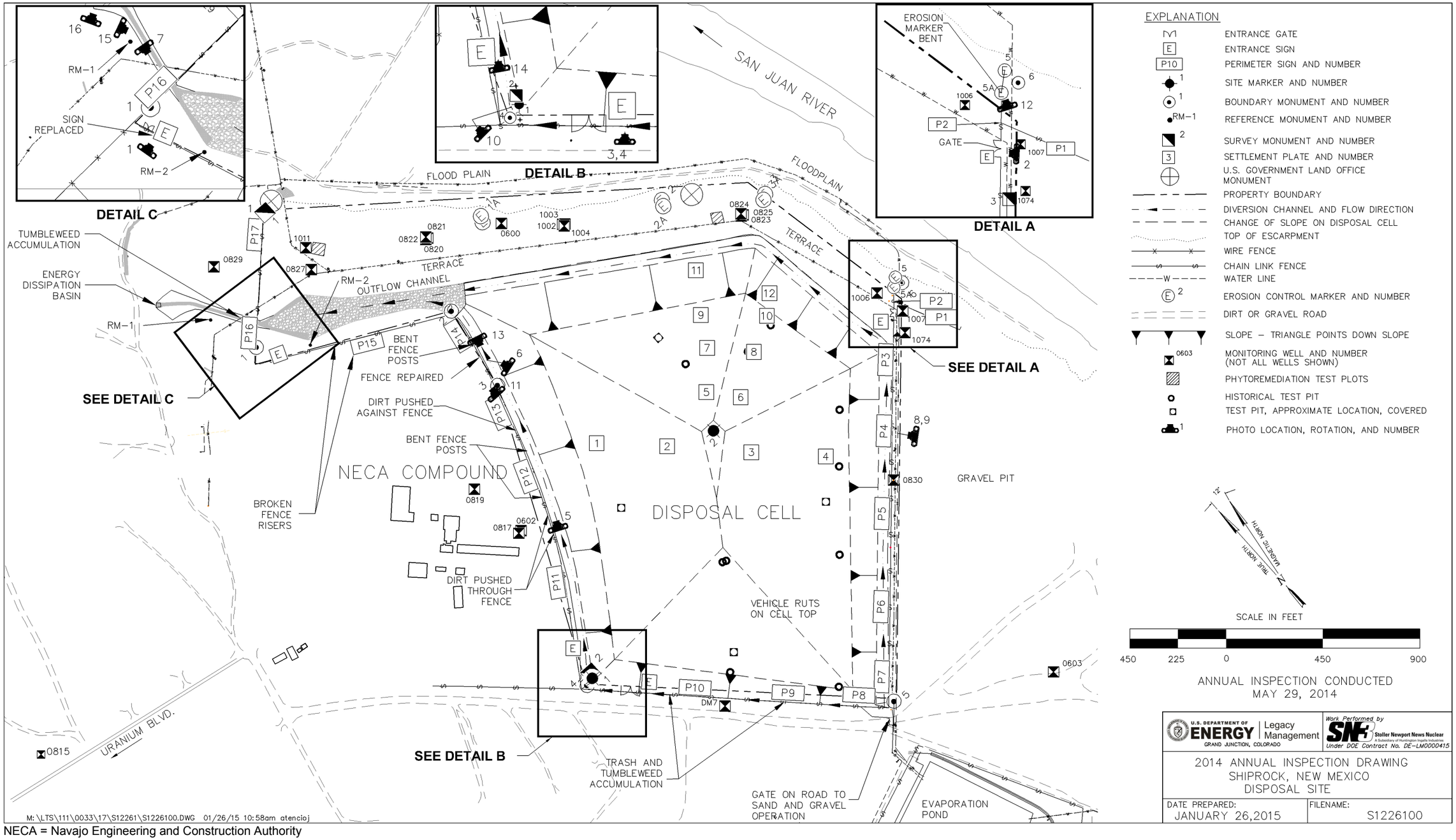
All access roads were in good condition. Three gates allow entrance to the site through the perimeter fence: the east gate (the current main entrance gate near the terrace escarpment), the north gate (an auxiliary access gate), and the west gate (the former entrance gate). Access to the main (east) entrance gate is gained by traveling through a gravel pit. The three gates were intact and functional. Sediment had been removed from the bottom of the west gate prior to the inspection and the gate was operable.

16A Entrance signs are present in pairs—one pictorial and one textual—near each gate. A missing pictorial sign at the north gate was replaced prior to the inspection. All entrance signs were in place and legible at the time of the 2014 inspection, but some had faded or cracked surfaces or had bullet damage (PL-1 through PL-4). These signs will be replaced in the next few years as they become illegible.

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 (PL-5), 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. During the 2013 inspection, a large hole in the fence was found between signs P13 and P14. This hole was repaired prior to the 2014
16B inspection (PL-6). Damaged fence sections will continue to be monitored and repaired when necessary to maintain site security.

Trash and tumbleweeds continually accumulate in many places along the perimeter fence, particularly along the southwest fence line and a section of fence across the outflow channel (PL-7). Accumulations large enough to represent a fire hazard or increase the possibility of damage to the fence will be removed. During the inspection, inspectors picked up trash along the inside of the perimeter fence and also placed rocks in several gaps beneath the fence that were potentially large enough to allow site access.



NECA = Navajo Engineering and Construction Authority

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

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Seventeen pairs of 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, most of the southeast- and southwest-facing textual signs had faded radiation symbols (PL-8), and many of the pictorial signs had cracked and faded surfaces (PL-9). These signs will be replaced as they become illegible.

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-10).

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 a reference post to help inspectors find them, were in good condition (PL-11).

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 (PL-12). 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-13). No evidence of 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. 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 had not changed significantly since the 2013 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. Several woody shrubs were growing on the northwest side slope and diversion channel of the disposal cell (PL-14), and one small shrub was observed on the cell
16C top. These plants were treated with herbicide in early June 2014.

Diversion channels around the base of the disposal cell were in good condition and contained scattered vegetation. Non-woody plants were growing in the outflow channel, and woody vegetation was growing on the banks of the channel. Vegetation within the diversion and outflow channels was treated with herbicide in early June 2014.

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 erosion was evident in 2014. 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 as part of 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 (PL-15). A portion of erosion control fabric had previously come loose and been removed from one of the side slopes of the channel (PL-16). This area remained stable and does not need to be re-covered. Fences and warning signs posted in Bob Lee Wash are maintained under the groundwater compliance strategy and are not examined during the annual inspection.

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. In 2014, DOE performed erosion repairs in the area southwest of the disposal site to protect features associated with the evaporation pond; these activities had no adverse impact on the integrity of the disposal cell or its site surveillance features.

16.5 Follow-Up or Contingency Inspections

DOE will conduct follow-up or contingency 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.

16.6 Maintenance and Repairs

A missing entrance sign was replaced and a hole in the security fence was repaired prior to the 2014 annual inspection. Annual weeds and woody shrubs on the disposal cell were sprayed with herbicide and a noxious weed was removed. Accumulations of tumbleweeds and trash along the site perimeter fence will be removed. There are several faded or damaged signs, which will be replaced when they become illegible.

16.7 Environmental Monitoring

16.7.1 Groundwater Monitoring

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

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 were observed growing on the disposal
16D cell top and were treated with herbicide in late May and early June 2014. Additionally, a noxious weed growing on the northwest-facing side slope of the disposal cell and was removed.

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

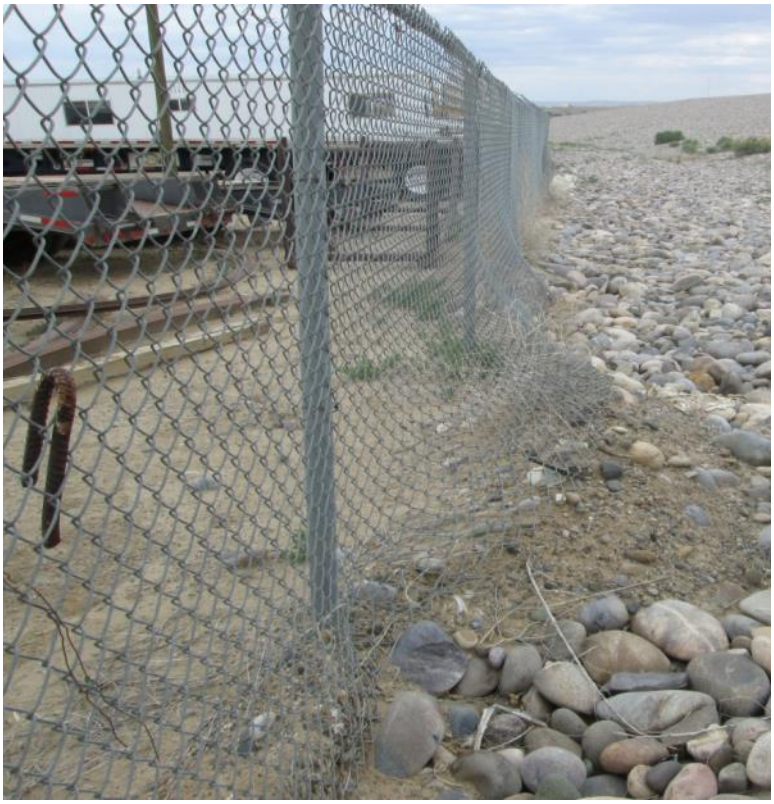
Photograph Location Number	Azimuth	Photograph Description
PL-1	35	North entrance gate; note faded radiation symbol on textual sign.
PL-2	315	Main (east) entrance gate.
PL-3	45	Bullet holes in west entrance textual sign; note faded radiation symbol and phone numbers.
PL-4	45	Bullet holes in west entrance pictorial sign; note cracked and faded surface.
PL-5	25	Dirt pushed through fence fabric between perimeter signs P11 and P12; no change from previous years.
PL-6	345	Repaired hole in fence, between perimeter signs P13 and P14.
PL-7	145	Tumbleweed accumulation in outflow channel.
PL-8	320	Textual perimeter sign P4, showing faded radiation symbol.
PL-9	320	Pictorial perimeter sign P4, showing faded and cracked surface.
PL-10	0	Repaired cracks in base of site marker SMK-1.
PL-11	0	Boundary monument BM-1.
PL-12	25	Erosion control markers 5A and 5; 5A (foreground) is bent.
PL-13	195	Cell side slope and fence near perimeter sign P14.
PL-14	35	Diversion ditch and northwest side slope of disposal cell.
PL-15	115	Outflow channel.
PL-16	20	Loose erosion control fabric along outflow channel side slope.

SHP 5/2014. PL-1. North entrance gate; note faded radiation symbol on textual sign.

SHP 5/2014. PL-2. Main (east) entrance gate.

SHP 5/2014. PL-3. Bullet holes in west entrance textual sign; note faded radiation symbol and phone numbers.

SHP 5/2014. PL-4. Bullet holes in west entrance pictorial sign; note cracked and faded surface.



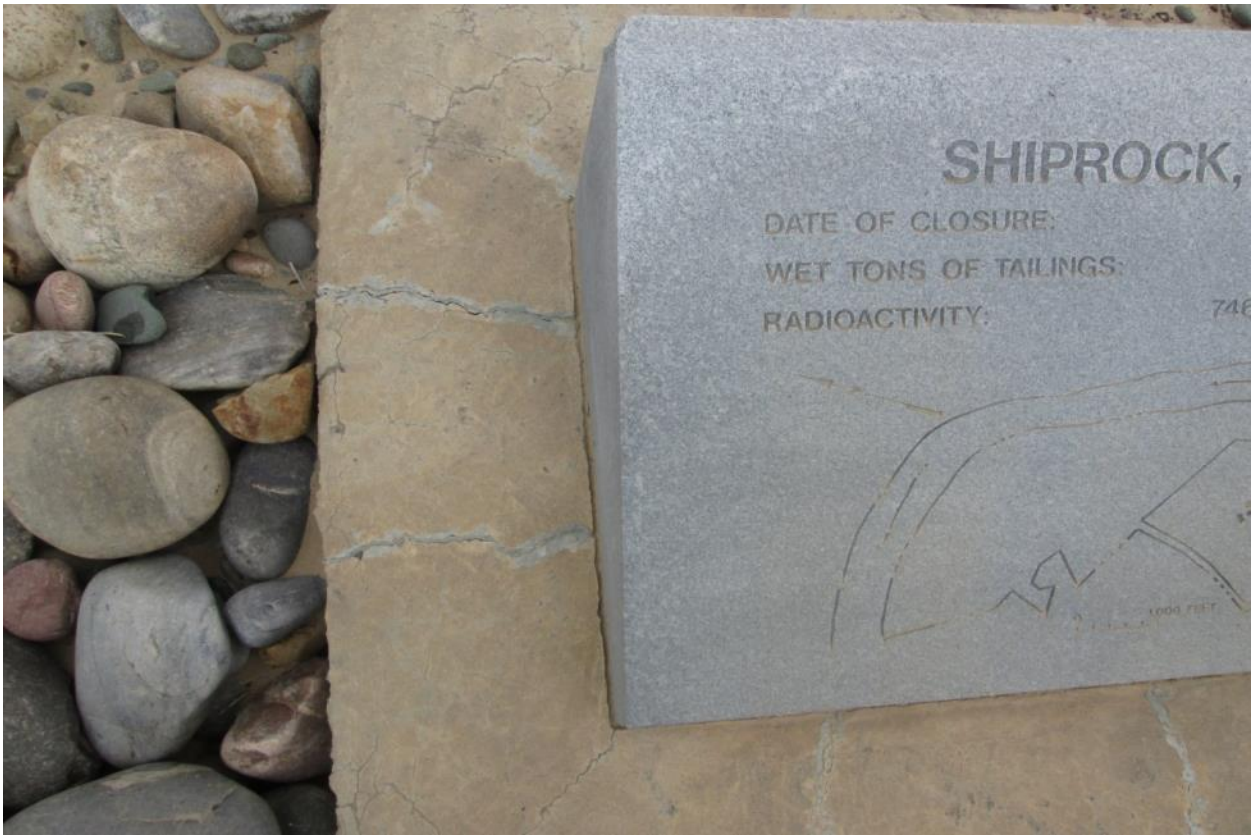
SHP 5/2014. PL-5. Dirt pushed through fence fabric between perimeter signs P11 and P12; no change from previous years.

SHP 5/2014. PL-6. Repaired hole in fence, between perimeter signs P13 and P14.

SHP 5/2014. PL-7. Tumbleweed accumulation in outflow channel.

SHP 5/2014. PL-8. Textual perimeter sign P4, showing faded radiation symbol.

SHP 5/2014. PL-9. Pictorial perimeter sign P4, showing faded and cracked surface.



SHP 5/2014. PL-10. Repaired cracks in base of site marker SMK-1.

SHP 5/2014. PL-11. Boundary monument BM-1.

SHP 5/2014. PL-12. Erosion control markers 5A and 5; 5A (foreground) is bent.

SHP 5/2014. PL-13. Cell side slope and fence near perimeter sign P14.

SHP 5/2014. PL-14. Diversion ditch and northwest side slope of disposal cell.

SHP 5/2014. PL-15. Outflow channel.

SHP 5/2014. PL-16. Loose erosion control fabric along outflow channel side slope.