14.0 Rifle, Colorado, Disposal Site

14.1 Compliance Summary

The Rifle, Colorado, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Disposal Site was inspected on June 12, 2014. The disposal cell and all associated surface water diversion and drainage structures were in good condition and functioning as designed. Minor fence repairs will be conducted prior to the next inspection. Two signs on the evaporation pond need to be replaced. Inspectors identified no other maintenance needs or cause for a follow-up inspection.

Pore water continues to be pumped from the disposal cell into a lined evaporation pond to maintain the cell water level below the action level of 6,016 feet above mean sea level. Maximum water levels in the monitoring standpipes remained below the action level in 2014. The evaporation pond liner was inspected and repaired in early 2014, and it was in good condition at the time of the inspection.

14.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the site are specified in the *Long-Term Surveillance Plan for the Estes Gulch Disposal Site near Rifle, Colorado* (LTSP) (DOE/AL/62350-235, Rev. 1, U.S. Department of Energy [DOE], November 1997) 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 14-1 lists these requirements.

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 3.0	Section 14.4
Follow-Up Inspections	Section 3.4	Section 14.5
Maintenance and Repairs	Section 4.0	Section 14.6
Groundwater Monitoring	Section 2.6	Section 14.7
Cell Pore-Water-Level Monitoring	Appendix	Section 14.8
Corrective Action	Section 5.0	Section 14.9

Table 14-1. License Requirements for the Rifle Disposal Site

14.3 Institutional Controls

The 205-acre disposal site (Figure 14-1) is owned by the United States of America and was accepted under U.S. Nuclear Regulatory Commission general license (10 CFR 40.27) in 1998. The site is managed in accordance with requirements for UMTRCA Title I sites. DOE, as the licensee, is responsible for the site's custody and long-term care. Institutional controls at the site include federal ownership of the property and the following features that are inspected annually: access-control fencing, perimeter warning signs along the disposal cell boundary, and a locked gate at the entrance to the site.

14.4 Inspection Results

The site, north of Rifle, Colorado, was inspected on June 12, 2014. The inspection was conducted by R. Dayvault and S. Woods of Stoller Newport News Nuclear, Inc. (SN3), a wholly owned subsidiary of Huntington Ingalls Industries, Inc. SN3 is the DOE Legacy Management Support contractor. R. Bush (DOE Site Manager) and M. Cosby of the Colorado Department of Public Health and Environment attended 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 chapter refer to items summarized in Table ES-1 of the "Executive Summary."

14.4.1 Site Surveillance Features

Figure 14-1 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 14-1 by photograph location (PL) numbers.

14.4.1.1 Access Road, Entrance Gates, and Entrance Sign

The site is accessed by driving northwest of Rifle for 5 miles on State Highway 13 and turning northeast on an improved gravel road. A perpetual right-of-way across U.S. Bureau of Land Management property provides access to the site. Two locked gates are present on the access road: a reinforced tubular metal gate about 1,700 feet south of the site that limits public access to the site area, and a tubular metal gate at the site fence. The access road, entrance gates, and entrance sign were in good condition.

14.4.1.2 Perimeter Fence and Perimeter Signs

A barbed-wire fence, located at the south end of the site, extends to the edge of steep-sided arroyos that bound the site on the east and west and acts as a deterrent for easy access to the site.
14A Fence damage noted during the 2013 inspection was repaired, but new damage and bent fence posts were observed during the 2014 inspection. The posts were straightened during the inspection, and the fence will be repaired prior to the next inspection. The areas on both sides of the fence are heavily grazed by cattle, which is the reason for the persistent damage to the fence. Barbed-wire personnel gates at the southeast corner of the site were open, as has been observed the past few years; the inspectors closed the gates.

Perimeter signs are positioned along the fence and the edge of the disposal cell. A few signs have bullet damage but all were legible.

14.4.1.3 Site Markers

Two granite site markers, one just inside and left of the entrance gate (SMK-1) and the other on the disposal cell (SMK-2), were in good condition.



Figure 14-1. 2014 Annual Inspection Drawing for the Rifle Disposal Site

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14.4.1.4 Survey Monuments and Boundary Monuments

Three survey monuments and 15 boundary monuments delineate this site. Boundary monuments are set at corners along an irregular site boundary. According to the LTSP, 20 corner monuments were set along the site boundary; however, previous field investigations indicated that only 15 monuments were actually set because of the rough terrain. Consequently, boundary monument locations BM-8, BM-9, BM-13, BM-17, and BM-20 were only marked with wooden laths and are not included as part of the annual inspection. Several of the survey and boundary monuments at the site are difficult to locate because deadfall and underbrush obscure them, or steep terrain makes accessing them dangerous. All survey and boundary monuments inspected were in good condition.

14.4.1.5 Standpipes

Three standpipes (MW-01, MW-02, and MW-03), located on the south side slope of the disposal cell, are used to control and monitor pore-water levels in the disposal cell. Cell pore water is pumped from MW-03 into an evaporation pond. The standpipes were in good condition.

14.4.1.6 Evaporation Pond

A synthetically lined evaporation pond was constructed adjacent to the cell in 2001 to receive water pumped from standpipes MW-02 and MW-03 (only MW-03 is currently pumped). Water was flowing into the pond at the time of the inspection (PL-1). A meteorological station was installed alongside the pond several years ago and is functioning normally.

14B A detailed inspection of the exposed pond liner was conducted earlier during the year by a subcontractor experienced in this work and repairs to holes and tears were completed. The pond and its repaired liner, surrounding security fence, and locked gate were in good condition. Two warning signs on the security fence were down and will be replaced before the next inspection.

14.4.2 Inspection Areas

In accordance with the LTSP, the site is divided into four areas to ensure a thorough and efficient inspection. The inspection areas are: (1) the top of the disposal cell and interceptor trench, (2) the toe ditch and toe ditch outlet, (3) onsite reclaimed areas, and (4) the outlying area.

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

14.4.2.1 Top of Disposal Cell and Interceptor Trench

Rock armor, consisting of river cobbles and boulders, covers the 71-acre disposal cell and generally remains in excellent condition overall. No evidence of subsidence, differential settling, or slumping was found. Because of the steep slope of the cell cover, particularly in the north portion of the cell, there appeared to be a potential for slope instability. Five years of surveys, concluded in 2011, were conducted in three dimensions to detect any movement of the cover rock; the surveys confirmed that the rock cover is stable. Linear disturbances present on the north portion of the cell cover are remnants of vehicle tracks that formed in the cover rock during monitoring well decommissioning activities in 2002.

During the 2010 inspection, it was noted that a few cobbles or boulders showed signs of frost action and had begun to crack. Degradation of a few cobbles and boulders was also noted during the 2014 inspection and will continue to be monitored. This is not considered a concern at this time because most of the rock on the cell consists of very competent igneous and metamorphic rock that should remain protective for the expected life of the cell. However, if increased rock degradation becomes apparent, one or more study plots may be established.

Several small pinyon pine trees are growing on the south slope of the disposal cell. These trees will be controlled if it is determined that they affect the integrity of the cell. Small, isolated patches of grasses and annual weeds were present on the cell cover and side slope but are not a concern. No deep-rooted plants or noxious weeds were observed in these areas.

A revegetated interceptor trench was constructed at the top of the disposal cell to protect the cell from storm-water and snowmelt run-on. Recent minor erosion was observed in 2014 where the interceptor trench plunges into a large canyon to the west of the site (PL-2). Overall, however, the trench was functioning as designed and in good condition.

14.4.2.2 Toe Ditch and Toe Ditch Outlet

A toe ditch runs along the downslope (south) edge of the disposal cell and is armored with the same rock that protects the disposal cell. The toe ditch diverts surface runoff from the disposal cell offsite to the east. The ditch was in good condition and was functioning as designed.

Minor erosion, anticipated in the design, is still evident in the channel at the outlet below the toe ditch. Bedrock is now exposed in this area. Rock previously placed in the outlet to stabilize the erosion has dropped into and armored the eroded area. No new erosion has occurred in several years, and the outlet was stable at the time of the inspection. This area is heavily used by cattle because water tends to collect after runoff events.

14.4.2.3 Onsite Reclaimed Areas

Disturbed areas around the edges and south of the disposal cell were reseeded in 1996 and, overall, have been successfully reclaimed. The vegetation is composed primarily of desirable grasses and shrubs. Prior to 2012, there was little evidence of cattle or sheep grazing within the site boundaries. This changed dramatically in 2012 when heavy grazing by cattle was observed. This year, vegetation was heavily grazed again by cattle. The impacts of grazing at the site was evaluated by DOE in a separate report, and mitigation was deemed impractical and unnecessary at this time.

Three arroyos are present in the reclaimed area south of the disposal cell. A rock apron was placed between the stock fence and the headcuts in these arroyos to prevent headward migration toward the disposal cell. As erosion has migrated into the rock apron, the rock has self-armored the arroyos and effectively stabilized them from further erosion. This area will continue to be monitored.

Rills noted during previous inspections in the vicinity of perimeter sign P13 were unchanged. The runoff collected by the rills flows along the interface between the cell cover riprap and the adjacent reclaimed soil area. The runoff has scoured a small channel that currently averages about 1 foot wide and less than 1 foot deep, exposing some of the gravel bedding material of the cell cover. This small channel has stabilized and does not threaten the integrity of the disposal cell; however, it will continue to be monitored.

14.4.2.4 Outlying Area

The area beyond the site for a distance of 0.25 mile was visually inspected for signs of erosion, development, or other disturbance. The primary land use in the area is grazing and wildlife habitat. Extensive grazing had also occurred on this area. No activity or development was observed that might affect site integrity or the long-term performance of the disposal cell.

14.5 Follow-Up 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 inspection was identified.

14.6 Maintenance and Repairs

Minor fence repairs were conducted prior to the inspection, and more will be performed before the next inspection. Holes and tears in the evaporation pond liner were repaired.

14.7 Groundwater Monitoring

Monitoring of groundwater quality is not required at this site because groundwater in the uppermost aquifer is classified as limited use, and the disposal cell is geologically isolated from the first usable aquifer by approximately 380 feet of low-permeability siltstones, shales, and sandstones. The nine monitoring wells that had been at the site were decommissioned in 2002.

14.8 Cell Pore-Water-Level Monitoring

In accordance with the LTSP, DOE monitors pore-water levels from transient drainage in the disposal cell at standpipes MW-02 and MW-03, installed at the downgradient end of the cell on the south side slope. This monitoring is performed to ensure that water in the cell does not rise above a geotextile liner that was installed in the toe of the cell at an elevation of 6,020 feet.

The LTSP Appendix included a contingency plan if the water level in the disposal cell reached an action level of 6,016 feet in elevation. In 2001, when the action level of 6,016 feet was reached, a cell dewatering system and associated evaporation pond were installed as required by the LTSP.

Pumping from standpipes MW-02 and MW-03 began when water levels reached the action level in 2001. Pumping from both standpipes continued until September 2006, when it was determined that MW-02 could not sustain prolonged pumping due to consistent lack of sufficient recharge. Although pumping at MW-02 was discontinued at that time, the datalogger remains, and water-level monitoring at this standpipe continues. Water pumped from MW-03 is discharged through an above-ground plastic line to the evaporation pond. The discharge line was in good condition.

The solar-powered pump in MW-03 is normally operated June through September, and was pumping at a rate of 1–2 gallons per minute at the time of the inspection. This is generally

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consistent with active pumping rates recorded the last several years. The two solar panels that power the pump were in good condition (PL-3).

Datalogger information for the 2014 reporting period indicates that pore-water levels in both standpipes were always below the 6,016-foot action level (Figure 14-2). As observed historically, levels were highest during late fall and winter, when pumping is discontinued. In 2014, maximum water levels in MW-02 and MW-03 were 6,015.0 feet and 6,015.7 feet, respectively. Water levels declined to 6,014.7 feet and 6,014.5 feet, respectively, during pumping. According to the LTSP requirement, pumping will continue until the water levels in the standpipes stabilize at an elevation of 6,014 feet or lower.

This continued contingency operation has maintained the water level at an acceptable elevation (below the action level) and prevents water from overtopping the disposal cell liner. Dewatering of the cell will continue.



Figure 14-2. Disposal Cell Pore-Water Levels in Standpipes MW-02 and MW-03 at the Rifle Disposal Site

14.9 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.

14.10 Photographs

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Photograph Location Number	Azimuth	Photograph Description
PL-1	180	Disposal cell water entering evaporation pond.
PL-2	235	Minor erosion along interceptor trench at north end of cell.
PL-3	190	Standpipe MW-02 and its solar panel and telemetry tower; evaporation pond in background.



RFL 6/2014. PL-1. Disposal cell water entering evaporation pond.



RFL 6/2014. PL-2. Minor erosion along interceptor trench at north end of cell.



RFL 6/2014. PL-3. Standpipe MW-02 and its solar panel and telemetry tower; evaporation pond in background.

15.1 Compliance Summary

The Salt Lake City, Utah, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Disposal Site was inspected on May 14, 2014. The disposal cell was in good condition. Observations of rock quality monitoring plots indicated no obvious change from the previous year. No waste debris or indication of windblown or spillover contamination from EnergySolutions' adjacent radioactive waste disposal operations was noted. Inspectors identified no maintenance needs or cause for a follow-up inspection.

15.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the site are specified in the *Long-Term Surveillance Plan for the South Clive Disposal Site, Clive, Utah* (LTSP) (DOE/AL/62350-228, Rev. 2, U.S. Department of Energy [DOE], September 1997) and in procedures that DOE established to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). Table 15-1 lists these requirements.

Table 10-1. Electise Requirements for the ball Earle only Disposal one	Table 15-1.	License	Requirements	for the	Salt Lake	City Disposal	Site
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Requirement	Long-Term Surveillance Plan	This Report	
Annual Inspection and Report	Section 3.0	Section 15.4	
Follow-Up Inspections	Section 3.4	Section 15.5	
Maintenance and Repairs	Section 5.0	Section 15.6	
Groundwater Monitoring	Section 4.0	Section 15.7	
Corrective Action	Section 6.0	Section 15.8	

15.3 Institutional Controls

The 100-acre disposal site (Figure 15-1) is owned by the United States of America and was accepted under the U.S. Nuclear Regulatory Commission general license (10 CFR 40.27) in 1997. 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 ownership of the property and the following features that are inspected annually: site markers, boundary monuments, perimeter warning signs, a site perimeter fence, and locked gates at the site entrances.

15.4 Inspection Results

The site, 85 miles west of Salt Lake City, Utah, was inspected on May 14, 2014. The inspection was conducted by J. Gillespie and R. Cyr of Stoller Newport News Nuclear, Inc. (SN3), a wholly owned subsidiary of Huntington Ingalls Industries, Inc. SN3 is the DOE Legacy Management Support contractor. C. Bishop of the Utah Department of Environmental Quality attended the inspection. EnergySolutions provided a radiation technician to escort the inspectors.

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 chapter refer to items summarized in Table ES-1 of the "Executive Summary."

15.4.1 Site Surveillance Features

Figure 15-1 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 15-1 by photograph location (PL) numbers.

15.4.1.1 Site Access, Entrance Gates, and Entrance Signs

The disposal site is at the EnergySolutions radioactive waste facility near Clive, Utah, and is completely surrounded by EnergySolutions' active radioactive waste disposal operations. A perpetual right-of-way easement is in place that ensures DOE and its representatives continued access across EnergySolutions' property to the site. DOE provides EnergySolutions access to the disposal site to perform, as needed, periodic maintenance activities through a signed access agreement and license. EnergySolutions is to notify DOE anytime access to the site is needed.

All personnel entering the EnergySolutions facility must sign in at the security building. Because EnergySolutions' radioactive waste disposal activities surround the site, posted radiological control areas have to be crossed to access the site. EnergySolutions, therefore, requires inspectors and other site visitors to receive a radiological hazard awareness briefing, sign a Radiological Work Permit, be issued a dosimeter, and be escorted to and from the DOE disposal cell. Typically, the escort provided by EnergySolutions is also a health physics technician. Following the inspection, personnel and equipment are scanned upon leaving the radiological control area. Prior to leaving the EnergySolutions facility, inspectors and other visitors are again monitored for any radiological surface contamination with a personnel contamination monitor. Hardhats, safety glasses, and leather work boots are also required on EnergySolutions' property.

Access to the DOE disposal cell is via a route across EnergySolutions's property to the southwest corner of the site. Four locked gates provide access to the DOE disposal cell; one in the southwest corner of the chain-link perimeter fence that EnergySolutions maintains around the entire DOE property, and three in the interior chain-link security fence DOE maintains around the disposal cell (two in the northwest corner and one in the southwest corner). The entrance gates and entrance signs were in good condition.

15.4.1.2 Fences and Perimeter Signs

Two chain-link fences are at the site. The exterior EnergySolutions perimeter fence, located along the site boundary, and the interior DOE security fence (PL-1) were in good condition. Nineteen perimeter signs are attached to the DOE fence, and all of the signs were in good condition.



Figure 15-1. 2014 Annual Inspection Drawing for the Salt Lake City Disposal Site

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15.4.1.3 Site Markers

Granite site marker SMK-1 near the northwest site entrance gate was in good condition (PL-2). The site marker is etched from windblown sand and dirt but remains legible. EnergySolutions removed vegetation to clear the area surrounding SMK-1. Site marker SMK-2, located on top of the disposal cell, was in excellent condition (PL-3).

15.4.1.4 Survey Monuments and Boundary Monuments

All four boundary monuments were in good condition. Protective casings installed over each monument by EnergySolutions (PL-4) continue to protect the monuments from damage by surrounding earth-moving activities.

15.4.2 Inspection Areas

In accordance with the LTSP, the site is divided into three inspection areas to ensure a thorough and efficient inspection. The inspection areas are: (1) the disposal cell, (2) the area between the disposal cell and the site perimeter, and (3) the outlying area.

Within each area, the inspectors examined specific site surveillance features. Inspectors also looked for evidence of erosion, settling, slumping, or other disturbances that might affect the site's integrity, protectiveness, or long-term performance.

15.4.2.1 Disposal Cell

The disposal cell top and side slopes are armored with rock riprap. The top and side slopes were in good condition, and no evidence of erosion or slumping of the side slopes was observed (PL-5 and PL-6). Several slight depressions are present in the riprap on the top slope of the cell. They appear to be remnants of heavy equipment tracks that occurred during riprap installation. These depressions continue to be monitored to ensure that settlement is not occurring. No deep-rooted plants were growing on the top or side slopes of the cell.

A minor portion of the riprap has exhibited some degradation due to weathering. Eight 1-square-meter plots were established during the 2010 inspection to visually monitor the degradation. The rock type is consistent in all the monitoring plots. Approximately 1–10 percent of the rock in the plots showed signs of weathering (PL-7 through PL-14), with no obvious change from the previous inspection. The minimal rock degradation has not reduced the effectiveness of the riprap, but the plots will continue to be monitored to ensure that the riprap protects the disposal cell as designed.

Nine settlement plates are located on the cell top; several were inspected and observed to be in good condition. Surveying of the settlement plates is not required unless settlement appears to be occurring.

15.4.2.2 Area Between Disposal Cell and Site Perimeter

The inspectors examined the area between the toe of the disposal cell and the EnergySolutions security fence on the site boundary. No evidence of erosion or significant vegetation

encroachment was seen. The surface water diversion channels along the toe of the disposal cell were functioning as designed and in good condition (PL-10).

Radiological surveys are performed on the site by EnergySolutions personnel every couple of years during site inspections to identify the potential presence of spillover or windblown radioactive contamination from surrounding radioactive waste disposal activities. Survey measurements include taking dose rate measurements at random locations across the site, and the collection of smears that are subsequently analyzed for removable alpha/beta contamination. Additionally, EnergySolutions maintains several surface soil radiological monitoring and sampling locations between its fence and DOE's fence.

The most recent radiological survey was performed during the 2012 annual inspection. To date, survey results have been below the limits in the DOE *Radiological Control Manual* (LMS/POL/S04322). Consequently, spillover and windblown radiological contamination has not been problem. The next radiological survey is scheduled to occur during the 2015 inspection. EnergySolutions personnel conduct periodic walkthroughs of the site to remove any windblown debris.

15.4.2.3 Outlying Area

The area within 0.25 mile of the site boundary was observed from the site perimeter. A variety of features and ongoing waste disposal activities managed by EnergySolutions surround the site. The most obvious waste disposal activities are occurring directly west of the site where a Class A (low-level radioactive waste) disposal cell is being capped. On the northeast and east sides of the site, incoming wastes are unloaded from railcars and transferred to haul trucks; decontamination facilities are also present. Directly to the south is a completed low-level radioactive waste disposal cell, to the southwest is an 11e(2) waste disposal cell, and to the southeast is an operating mixed-waste treatment and disposal facility. Administration, security, and maintenance buildings lie directly to the north-northwest. A shredding facility, rotary dump, and railroad spur delivery loop are located northwest of the site. These adjacent operations and facilities are not impacting the site.

15.5 Follow-Up 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 inspection was identified.

15.6 Maintenance and Repairs

No maintenance needs were identified during the inspection.

15.7 Groundwater Monitoring

In accordance with 40 CFR 192.21(g), groundwater at the site qualified for supplemental standards. The uppermost aquifer is classified as limited use due to naturally occurring concentrations of total dissolved solids that exceed 10,000 milligrams per liter, and the site is not

contributing to contamination of any currently or potentially useful aquifer. Consequently, the LTSP does not require groundwater monitoring at the site.

15.8 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.

15.9 Photographs

Photograph Location Number	Azimuth	Photograph Description
PL-1	15	Interior fence and perimeter sign P-18.
PL-2	355	Site marker SMK-1.
PL-3	0	Site marker SMK-2.
PL-4	230	Boundary monument BM-4 with protective cover.
PL-5	140	Disposal cell top and west side slopes.
PL-6	30	Disposal cell top and north side slopes.
PL-7	340	Rock Degradation Plot No. 1.
PL-8	330	Rock Degradation Plot No. 2.
PL-9	340	Rock Degradation Plot No. 3.
PL-10	340	Rock Degradation Plot No. 4 and east diversion channel.
PL-11	0	Rock Degradation Plot No. 5.
PL-12	350	Rock Degradation Plot No. 6.
PL-13	350	Rock Degradation Plot No. 7.
PL-14	350	Rock Degradation Plot No. 8.



SLD 5/2014. PL-1. Interior fence and perimeter sign P-18.



SLD 5/2014. PL-2. Site marker SMK-1.



SLD 5/2014. PL-3. Site marker SMK-2.



SLD 5/2014. PL-4. Boundary monument BM-4 with protective cover.



SLD 5/2014. PL-5. Disposal cell top and west side slopes.



SLD 5/2014. PL-6. Disposal cell top and north side slopes.

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SLD 5/2014. PL-7. Rock Degradation Plot No. 1.



SLD 5/2014. PL-8. Rock Degradation Plot No. 2.

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SLD 5/2014. PL-9. Rock Degradation Plot No. 3.



SLD 5/2014. PL-10. Rock Degradation Plot No. 4 and east diversion channel.

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SLD 5/2014. PL-11. Rock Degradation Plot No. 5.



SLD 5/2014. PL-12. Rock Degradation Plot No. 6.

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SLD 5/2014. PL-13. Rock Degradation Plot No. 7.



SLD 5/2014. PL-14. Rock Degradation Plot No. 8.

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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.

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	

	Table '	16-1.	License	Requirements	for the	Shiprock	Disposal	Site
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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 inspection (PL-6). Damaged fence sections will continue to be monitored and repaired when necessary to maintain site security.

16B

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.



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 top. These plants were treated with herbicide in early June 2014.

16C

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 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.

16D

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.

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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.