

8.0 Gunnison, Colorado, Disposal Site

8.1 Compliance Summary

The Gunnison, Colorado, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Disposal Site was inspected on June 11, 2014. The disposal cell and all associated surface water diversion and drainage structures were in excellent condition and functioning as designed. Six riprap test areas on the cell apron and diversion ditches were visually inspected; no rock degradation was noted when compared to 2012 photos. Inspectors identified no maintenance needs or cause for a follow-up inspection.

Cell performance groundwater monitoring is required every 5 years. No monitoring was conducted in 2014; the next monitoring event will occur in 2016.

8.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the site are specified in the *Long-Term Surveillance Plan for the Gunnison, Colorado, Disposal Site (LTSP)* (DOE/AL/62350-222, Rev. 2, U.S. Department of Energy [DOE], April 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 8-1 lists these requirements.

Table 8-1. License Requirements for the Gunnison Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 3.0	Section 8.4
Follow-Up Inspections	Section 3.5	Section 8.5
Maintenance and Repairs	Section 5.0	Section 8.6
Groundwater Monitoring	Section 4.0	Section 8.7
Corrective Action	Section 6.0	Section 8.8

8.3 Institutional Controls

The 92-acre site (Figure 8-1) 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, survey and boundary monuments, perimeter warning signs, a site perimeter fence, and a locked gate at the site entrance.

8.4 Inspection Results

The site, southeast of Gunnison, Colorado, was inspected on June 11, 2014. The inspection was conducted by S. Campbell and R. Johnson of Stoller Newport News Nuclear, Inc. (SN3), a wholly owned subsidiary of Huntington Ingalls Industries, Inc. SN3 is the DOE Legacy Management Support contractor. D. Steckley (DOE Site Manager) and M. Cosby of the

Colorado Department of Public Health and Environment attended the inspection. T. Collens and E. Jackson from DOE Headquarters also 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.

8.4.1 Site Surveillance Features

Figure 8-1 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 8-1 by photograph location (PL) numbers.

8.4.1.1 Site Access, Entrance Gate, and Entrance Sign

Access to the site is off Gunnison County Road 42 onto U.S. Bureau of Land Management (BLM) Road 3068 to the site entrance gate. The road to the site is a gravel road maintained by BLM and was in acceptable condition.

The entrance gate is a barbed-wire gate in the stock fence that surrounds the site. The entrance gate, located along the south portion of the perimeter fence, was secured by a padlock and chain to the adjoining post and was in good condition (PL-1).

An entrance sign is bolted to a perimeter fence post next to the entrance gate. The sign was in excellent condition.

8.4.1.2 Perimeter Fence and Perimeter Signs

A barbed-wire fence delineates the site; most of it is set along the property boundary. The fence was in good condition (PL-2). Two locked barbed-wire gates—one on the north fence line and the other on the east fence line—provide access to offsite monitoring wells. The gates were locked and in good condition.

Forty-five perimeter signs are bolted to the perimeter fence posts. Several perimeter signs have bullet holes but were legible. The other signs were in good condition.

8.4.1.3 Site Markers

The site has two granite site markers. Site markers SMK-1 (just inside the entrance gate; PL-3) and SMK-2 (on top of the disposal cell) were in excellent condition.

8.4.1.4 Survey Monuments and Boundary Monuments

The three combined survey/boundary monuments (SM-1/BM-1, SM-2/BM-2, and SM-3/BM-3) and eight additional boundary monuments (BM-4 through BM-11) were in excellent condition.

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8.4.1.5 Monitoring Wells

Sixteen wells constitute the groundwater monitoring network for the site. The wells were secure and in excellent condition (PL-4). The Gunnison County landfill operators have placed concrete barriers to protect monitoring well 0716, which is located on landfill property, from landfill activities (PL-5). The edge of a spoil pile is approximately 30 feet from the barriers, and it appeared to be same size as observed during the previous inspection.

8.4.2 Inspection Areas

In accordance with the LTSP, the site is divided into four inspection areas to ensure a thorough and efficient inspection. The inspection areas are: (1) the top of the disposal cell; (2) the disposal cell side slopes, apron, and diversion channels; (3) the area between the disposal cell and the site boundary; and (4) 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.

8.4.2.1 Top of the Disposal Cell

The rock-covered top of the disposal cell was in excellent condition (PL-6). There was no evidence of erosion, settling, slumping, or rock degradation. Several isolated patches of grass are randomly distributed over the disposal cell cover; however, these shallow-rooted plants are not a cause for concern. Two small tree saplings were removed from the cover; no other deep-rooted plants were observed on the disposal cell.

8.4.2.2 Disposal Cell Side Slopes, Apron, and Diversion Channels

The riprap-covered side slopes, apron, and diversion channels were in good condition (PL-7 and PL-8). No evidence of slumping, settling, rock degradation, or encroachment of vegetation was observed.

The condition of the riprap in six monitoring test areas was visually inspected. The test areas, each approximately 1 square meter in area, are in critical flow path locations in the apron and diversion channels (PL-9). The corners of each monitoring plot are marked with orange paint; the corners were repainted during the inspection. The riprap in all of the test areas was in excellent condition. When the rocks were compared to the photos taken of them in 2012, there was no evidence that individual rocks had split or otherwise been degraded. Annual photographing and comparing of these test areas was performed through 2002 in accordance with the LTSP; after that, the LTSP requires the test areas to be photographed every 5 years through 2017. The next and final set of photos will be taken in 2017.

Precipitation runoff from the cell occasionally ponds in a low-lying area along the southeast corner of the cell. The riparian-type vegetation that has become established there indicates that the area retains moisture much of the time. Water collection in this area does not pose a problem because the cell is designed to drain to the southeast, and any water that ponds there is below the elevation of the encapsulated tailings material. This location was dry at the time of the inspection.

8.4.2.3 Area Between the Disposal Cell and the Site Boundary

There are reclaimed and undisturbed areas between the disposal cell and the site perimeter. Both types of areas were in good condition (PL-10). No erosion concerns were observed. In general, reclaimed areas have good vegetation coverage, consisting mostly of grass. Shrubs and forbs are much less abundant and less diverse in reclaimed areas than they are in undisturbed areas.

8.4.2.4 Outlying Area

The area within 0.25 mile of the site boundary was observed from the site perimeter. Gunnison County owns the land that adjoins the site boundary to the north and east, and uses the land for a municipal landfill. The nearest landfill operations continue to be approximately 400 feet from the northeast corner of the DOE property boundary. Although landfill activities do not impact the site, future inspections will continue to monitor the level of activity occurring near the DOE property boundaries and site surveillance features (e.g., fences and monitoring wells). There were no other new activities in the immediate vicinity that would impact the site.

8.5 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.

8.6 Maintenance and Repairs

No maintenance items were identified.

8.7 Groundwater Monitoring

DOE monitors groundwater at the site to demonstrate compliance with U.S. Environmental Protection Agency (EPA) groundwater protection standards in 40 CFR 192.03 and to demonstrate that the disposal cell is performing as designed. The monitoring network consists of 16 wells, including six point-of-compliance wells to monitor cell performance, two wells to monitor background groundwater quality, and eight wells for water level measurements (Table 8-2).

Table 8-2. Monitoring Wells at the Gunnison Disposal Site

Point-of-Compliance (POC) and Background Wells	Water Level Wells
0720 (POC)	0630
0721 (POC)	0634
0722 (POC)	0663
0723 (POC)	0709
0724 (POC)	0710
0725 (POC)	0712
0609 (background)	0714
0716 (background)	0715

The indicator analyte for cell performance at the site is uranium. This analyte was selected on the basis of its presence in tailings pore fluid, its relatively high mobility in groundwater, and its low concentration in upgradient (background) groundwater. The target concentration for uranium is 0.013 milligram per liter (mg/L). The basis for this value is the maximum observed concentration of uranium in background samples determined before long-term surveillance and maintenance activities began. The maximum concentration limit for uranium that EPA established in Table 1 to Subpart A of 40 CFR 192 is 0.044 mg/L.

In accordance with the LTSP, groundwater monitoring was required annually from 1998 through 2001 and every 5 years thereafter. The most recent sampling event was conducted in 2011, so monitoring was not required in 2014. The next sampling event will occur in 2016. To date, uranium concentrations in all wells have been substantially below the target concentration, indicating that the disposal cell continues to perform as an efficient containment system.

8.8 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.

8.9 Photographs

Photograph Location Number	Azimuth	Photograph Description
PL-1	45	Site entrance gate.
PL-2	150	Perimeter fence along west property boundary.
PL-3	25	Site marker SMK-1.
PL-4	45	Monitoring well 0720 near west side of disposal cell.
PL-5	90	Monitoring well 0716 near county landfill spoil pile.
PL-6	330	Top slope of disposal cell.
PL-7	205	West side slope and apron of disposal cell; Riprap Test Area No. 3 in foreground.
PL-8	295	East diversion channel.
PL-9	90	West diversion channel; Riprap Test Area No. 6 in foreground.
PL-10	170	Disposal cell and natural vegetation in an undisturbed area.



GUD 6/2014. PL-1. Site entrance gate.



GUD 6/2014. PL-2. Perimeter fence along west property boundary.



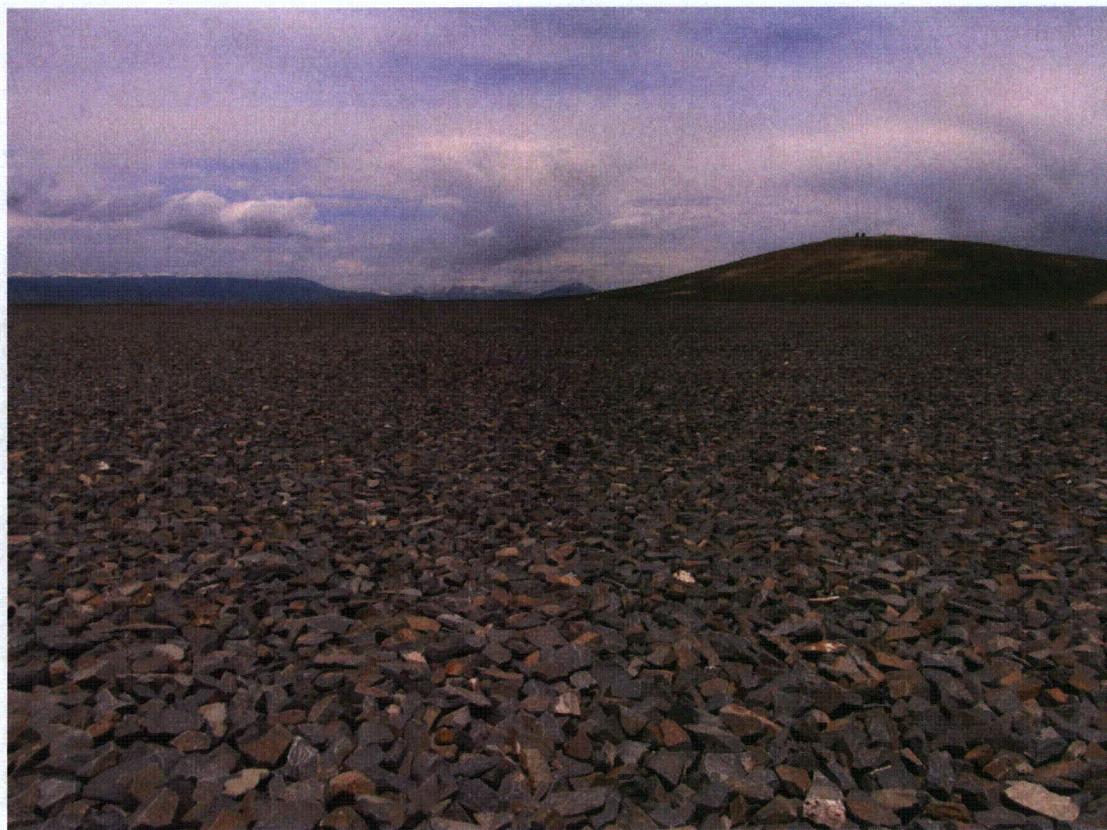
GUD 6/2014. PL-3. Site marker SMK-1.



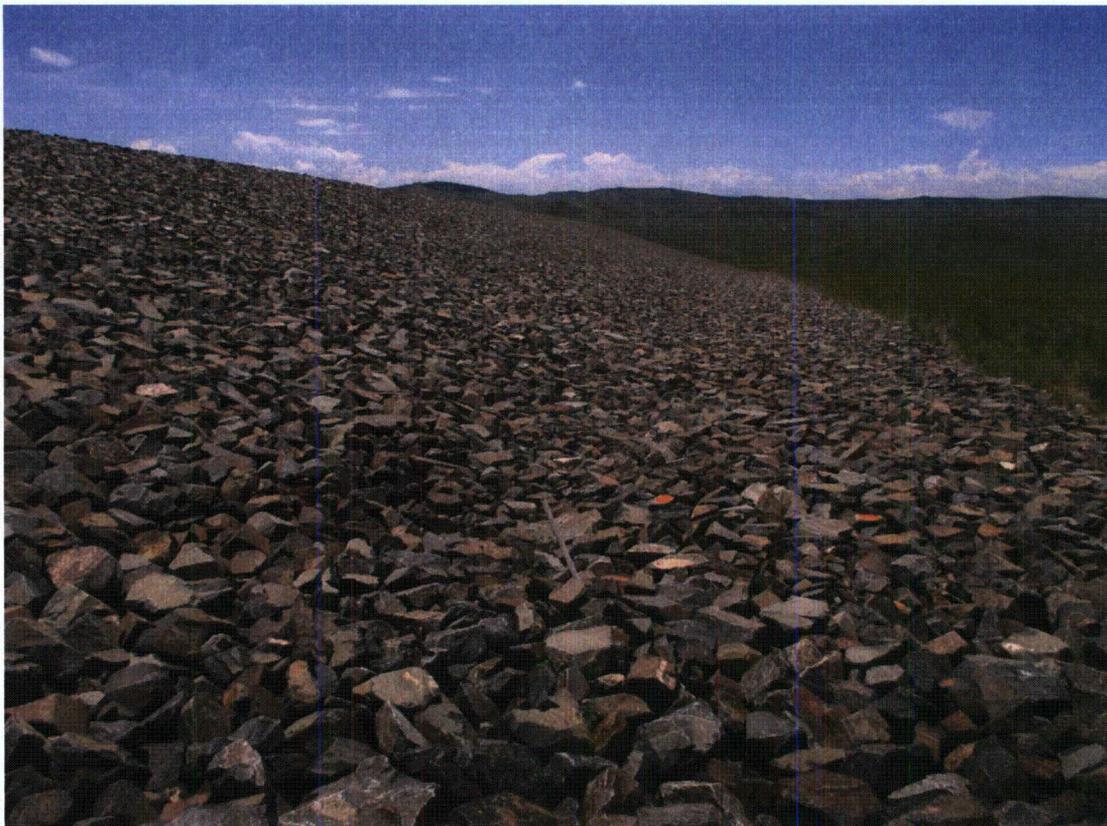
GUD 6/2014. PL-4. Monitoring well 0720 near west side of disposal cell.



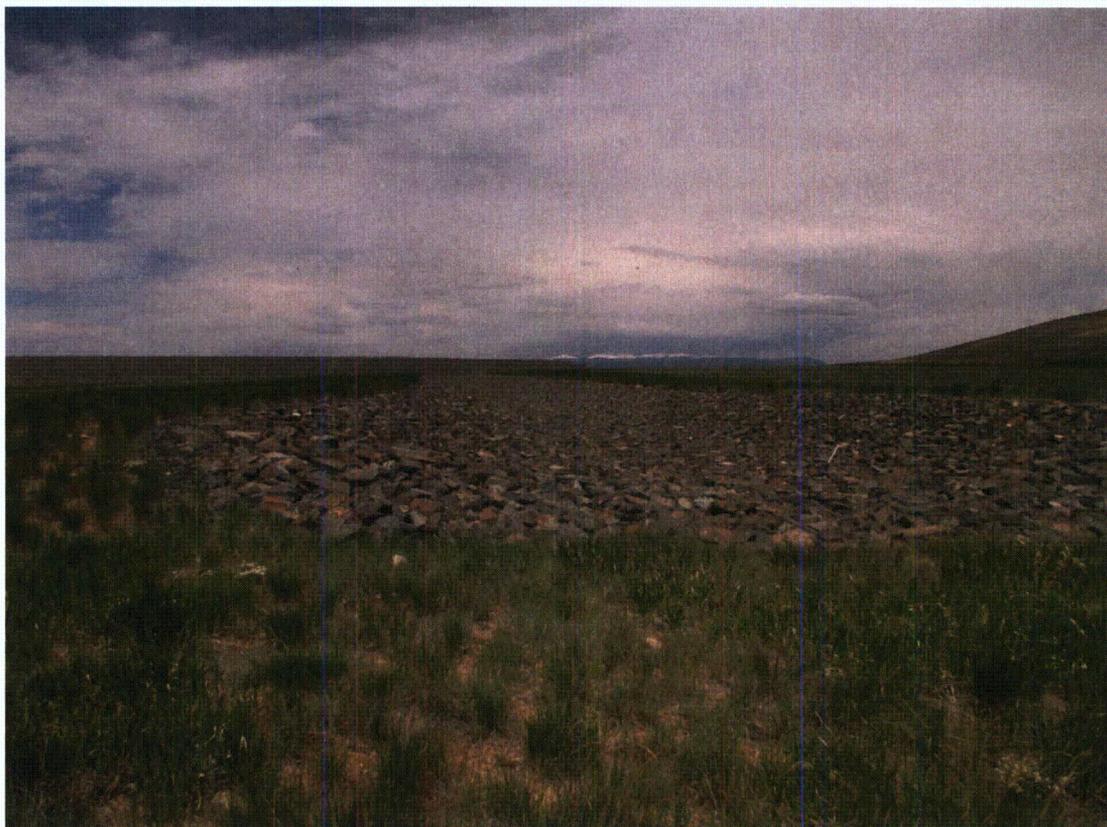
GUD 6/2014. PL-5. Monitoring well 0716 near county landfill spoil pile.



GUD 6/2014. PL-6. Top slope of disposal cell.



GUD 6/2014. PL-7. West side slope and apron of disposal cell; Riprap Test Area No. 3 in foreground.



GUD 6/2014. PL-8. East diversion channel.



GUD 6/2014. PL-9. West diversion channel; Riprap Test Area No. 6 in foreground.



GUD 6/2014. PL-10. Disposal cell and natural vegetation in an undisturbed area.

9.0 Lakeview, Oregon, Disposal Site

9.1 Compliance Summary

The Lakeview, Oregon, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Disposal Site was inspected September 16, 2014. Other than some ongoing concern with erosion-control rock riprap degradation, the disposal cell was in good condition. Some fence repairs and vegetation removal may be conducted during a 2015 site visit. Inspectors identified no other maintenance needs or cause for a follow-up or contingency inspection.

Disposal cell riprap is evaluated annually to ensure continued long-term protection of the cell from erosion during a severe precipitation event. The degradation of the rock riprap, observed at the site since the mid-1990s, has been monitored as part of the annual inspections to determine the mean diameter (D_{50}) value of the riprap on the west side slope. The D_{50} value measured during the 2014 gradation monitoring falls within the original D_{50} design size range for the Type B size side slope riprap, and is 0.14 inch larger than the value measured during the gradation monitoring in 2013. Therefore, the riprap continues to meet gradation requirements.

Groundwater quality in the uppermost aquifer at the site is monitored once every 5 years to demonstrate that the disposal cell is not leaching contaminants into the aquifer. Groundwater monitoring was conducted in 2014, and the results confirmed that there is no degradation of the aquifer near the cell.

9.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the site are specified in the *Long-Term Surveillance Plan for the Collins Ranch Disposal Site, Lakeview, Oregon* (LTSP) (DOE/AL/62350-19F, Rev. 3, U.S. Department of Energy [DOE], August 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). These requirements are listed in Table 9-1.

Table 9-1. License Requirements for the Lakeview Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 6.0	Section 9.4
Follow-Up or Contingency Inspections	Section 7.0	Section 9.5
Maintenance and Repairs	Section 8.0	Section 9.6
Groundwater Monitoring	Section 5.3	Section 9.7
Corrective Action	Section 9.0	Section 9.8

9.3 Institutional Controls

The 40-acre site (Figure 9-1) is owned by the United States of America and was accepted under the U.S. Nuclear Regulatory Commission (NRC) general license (10 CFR 40.27) in 1995. 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, survey and boundary monuments, perimeter warning signs, a site perimeter fence, and locked gates at the site entrances.

9.4 Inspection Results

The site, northwest of Lakeview, Oregon, was inspected on September 16, 2014. The inspection was conducted by C. Goodknight and K. Turley of the Stoller Newport News Nuclear, Inc. (SN3), a wholly owned subsidiary of Huntington Ingalls Industries, Inc. SN3 is the DOE Legacy Management Support contractor. D. Engstrom of the Oregon Department of Energy 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."

9.4.1 Site Surveillance Features

The locations of site surveillance features are shown on Figure 9-1. 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 9-1 by photograph location (PL) numbers.

9.4.1.1 Access Road, Entrance Gates, and Entrance Sign

Access to the site is gained by traveling a gravel road that heads west off County Road 2-16B. DOE was granted a perpetual easement on the approximately 1.2 mile access road between the county road and the DOE property boundary. A lockable gate across the access road on the adjacent privately owned land limits access to the site. The site access road was in good condition (PL-1).

The site entrance gate and the pedestrian gate were locked and in good condition. The site's entrance sign was in good condition and clearly visible. No recent indication of vandalism was observed at the site during the inspection.

9.4.1.2 Perimeter Fence and Perimeter Signs

A wire fence is located along the site boundary. The perimeter fence was generally in good condition, but some loose and broken wire strands, and some loose t-posts, were noted. Tightening and minor maintenance of the fence may occur in 2015, as will some removal of vegetation near, and involved in, the fence line.

Twelve perimeter signs attached to steel posts set in concrete are along the perimeter fence. The signs were in good condition and clearly visible from outside the site, with the exception of perimeter sign P1, which was partially blocked by vegetation. The vegetation will be removed during a 2015 site visit.

9.4.1.3 Site Markers

The two site markers, SMK-1 near the site entrance and SMK-2 on top of the disposal cell, were in good condition.

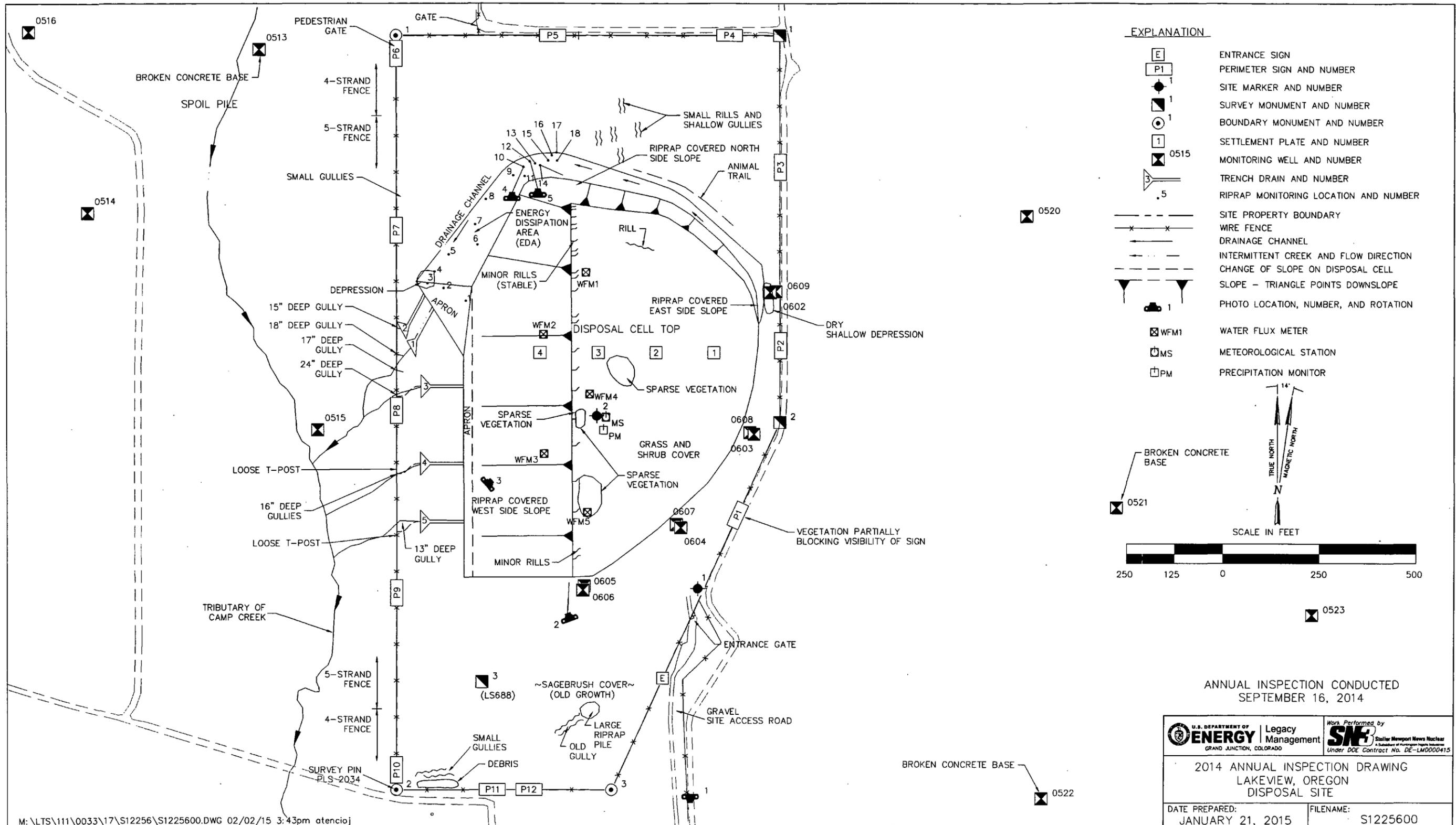


Figure 9-1. 2014 Annual Inspection Drawing for the Lakeview Disposal Site

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9.4.1.4 Survey Monuments and Boundary Monuments

The three survey monuments and three boundary monuments were in good condition.

9.4.1.5 Monitoring Wells

The groundwater monitoring network comprises eight onsite point-of-compliance (POC) wells located east and south of the cell and one upgradient well located offsite to the west of the disposal site. All nine wells were inspected and were locked, labeled, and in good condition.

Seven additional DOE-owned monitoring wells exist on privately owned property near the site but are not part of the groundwater compliance monitoring network. These wells were also inspected and were locked, labeled, and in fair condition. Of the five offsite wells with concrete surface pads, three of the pads were cracked or broken and had some soil undercutting from water and wind erosion.

9.4.2 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 top of the disposal cell; (2) the side slopes of the disposal cell and adjacent drainage channel, aprons, and trench drains; and (3) the site perimeter and 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.

9.4.2.1 Top of Disposal Cell

At the time of cell construction, the entire cell top slope was covered in 12 inches of Type A size riprap, and 4 inches of soil was placed over the riprap. The soil was included to allow for a grass cover to be established, which would help minimize the visual impacts of the cell. The design for the top of the disposal cell has created conditions that favor the growth of deep-rooted plants. The growth of shrubs is favored by movement of precipitation through the riprap, bedding, and compacted soil (radon barrier) layers. Grasses and forbs (rabbitbrush, sagebrush, and bitterbrush plants) growing on the top of the disposal cell have gradually increased over the years, and areas of deeper-rooted wheatgrasses have spread. Some sparsely vegetated areas still remain on the top of the disposal cell. In general, the vegetation at the site appeared to be drier than in previous years, which would be expected given the drought conditions experienced in the region in 2014.

Riprap was observed through the soil on the top slope in numerous small areas during the inspection. The areas ranged in size from approximately 4 inches to 2.5 feet. These areas are intermittently located across the top slope and are likely caused by the infilling of the soil into the riprap-void spaces below. No structural or cell performance concerns are associated with the riprap becoming visible on the top slope.

The beginning development of soil checkerboard erosion patterns was observed sporadically in some of the more sparsely vegetated areas on the top slope; no changes were noted during this year's inspection. This minor erosion pattern could indicate that water on the top slope is

attempting to channelize, or it could be associated with the soil settling into the riprap voids beneath the soil. No structural or cell performance concerns are associated with this condition because the riprap rock cover is continuous beneath the top-slope soil cover, the slope crests, and the side slopes. However, future inspections will monitor this condition.

The contact boundary between the cell top and side slopes was inspected and generally appears stable and uniform except at the northernmost corner of the side slopes, where some soil has been transported off the top slope, allowing for some grass to establish at the top of the side slopes. Approximately 25 minor erosion rills previously noted along the west edge (slope crest) of the top slope appeared to be reduced in depth and definition during this inspection. No structural or cell performance concerns are associated with the minor encroachment of the grass onto the side slope or the presence of the minor rills because the riprap rock cover is continuous beneath the top-slope soil cover, the slope crests, and the side slopes. The extent of rilling along the slope crest will continue to be monitored.

No evidence of active animal burrowing on the top slope or evidence of cell settlement, displacement, or slumping was observed during the inspection.

9.4.2.2 Disposal Cell Side Slopes and Adjacent Drainage Channel, Apron, and Trench Drains

Deterioration of the basalt rock riprap is occurring and is likely due to physical weathering and chemical processes. The crumbling rocks on the surface appear to have increased in the mid-1990s, and rock monitoring continues to be performed.

Addendums to the LTSP commit DOE to annually determining the D_{50} value of the west side slope rock riprap through gradation monitoring to ensure that the riprap is large enough to protect the disposal cell from erosion during a major precipitation event. This gradation monitoring method measures the number of rocks retained per sieve size. With NRC's consent, an additional sieve size (1 inch) has been included in the monitoring since 2009. Sampling locations are randomly selected before each monitoring event. Particle size distribution by count data was collected at 20 random locations, and approximately 25 rocks were sampled at each location.

- 9A In 2014, the gradation monitoring was performed for the 18th consecutive year. Figure 9-2 is a graph that shows the results of the gradation monitoring since 1997. Using the results shown in Figure 9-2, the average D_{50} value for the 18-year period of monitoring is 2.55 inches. An evaluation of the 2014 rock size measurement data indicates that the west side slope riprap D_{50} is 2.84 inches with a 95 percent confidence interval between 2.67 and 3.01 inches. The D_{50} value is 0.14 inch larger than the value of 2.70 inches measured during the 2013 gradation monitoring. The west side slope is shown in photo PL-2 and monitoring is shown in photo PL-3.

The annual photographic monitoring of the 18 photograph locations for long-term rock monitoring was conducted in the energy dissipation area (EDA). Rocks at photo-monitoring locations 10 and 12 are shown in photo PL-4 and photo PL-5. Minor rock degradation has been observed since monitoring began at the original 10 photograph locations established in 1997 and at the eight additional locations established in 2000. The rock used in the EDA and drainage channel areas is much more homogeneous than the varied rock used on the side slopes, and appeared in good condition.

Water previously observed at times in the large depression in the EDA at the lower end of the drainage channel was absent. Water is potentially a concern because inundation may accelerate deterioration of the large riprap by the freeze-thaw process, although the rock used in the EDA is apparently not as susceptible to freeze-thaw as other rock types present on the cell.

Minor amounts of grass have encroached on the riprap on the side slopes, on the upper (eastern) part of the drainage channel, on the EDA at the lower end of the drainage channel, and on the western apron area. The relatively sparse plant growth in the drainage channel will not affect the function of the channel and is not considered a problem. A few small bushes are located in the upgradient portion of the drainage channel, but their presence will not obstruct water flow. This location is evaluated during each inspection. Should the potential for flow obstruction become a concern in the future, maintenance activities would be performed. An area of dense, long grass exists near trench drains 1 and 3, which suggests wetter conditions and would be periodically expected in this area due to the presence of the runoff control features. No ponded water was observed. Some sporadic areas of soil cracking were observed in soils in the areas west of the trench drains, but the grasses covering this area are dense and provide erosion protection.

No evidence of active animal burrowing on the side slopes or evidence of cell settlement, displacement, or slumping was observed during the inspection.

9.4.2.3 Site Perimeter and Outlying Area

This inspection area includes the seeded grass area extending from the disposal cell to the site boundary, the site perimeter fence, and the area within 0.25 mile surrounding the site.

Gullies that formed in seeded areas extending west of trench drains 1 through 5 were filled with rock in 2000. Although the rock has generally arrested the head cutting that was proceeding from the private property onto the DOE property, some minor head cutting is still evident but it did not appear to be recent. Several small gullies have formed in heavily grazed areas downslope of the fence line onto the private property and were identified during previous inspections. No indication of recent erosion was observed. Although no repairs are warranted at this time, minor preventative maintenance may be performed in this area during 2015.

Small gullies were identified in past years along the southern side of the site inside the fence. These gullies are located downhill of an inclined road that intersects the fence line near a cattle guard and probably represent overflow along the road during rain events. This area has not shown evidence of recent erosion. No maintenance is required in this area.

Several small rills and shallow gullies were observed onsite in the area north of the cell, where grass reestablishment has been limited, but appear unchanged from the previous inspection. No maintenance is required in this area, but the area will continue to be monitored.

LAKEVIEW TYPE B RIPRAP

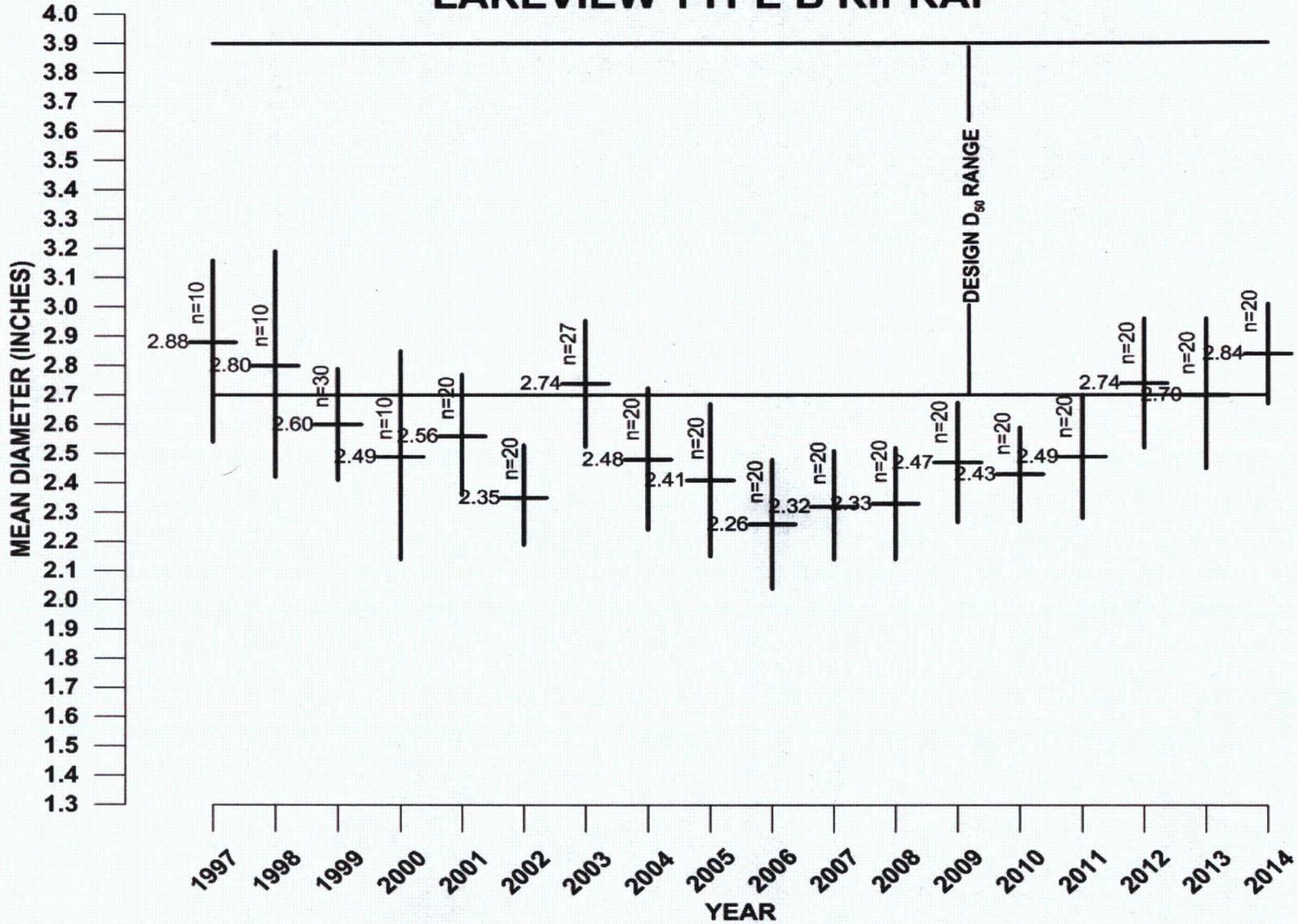


Figure 9-2. Riprap Gradation Monitoring

9.5 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.

9.6 Maintenance and Repairs

No maintenance was conducted in 2014. Minor repairs to the perimeter fence, removal of vegetation along the fence, and some minor preventative erosion maintenance along the west property fence may be performed in 2015.

9.7 Groundwater Monitoring

9B DOE monitors groundwater quality in the uppermost aquifer at this site once every 5 years to demonstrate that the disposal cell is not leaching contaminants into the aquifer. The most recent sampling event was performed in May 2014.

Nine monitoring wells are in the groundwater monitoring network. Eight POC wells (four monitoring well pairs: 0602/0609, 0603/0608, 0604/0607, and 0605/0606) are east of the cell. Upgradient well 0515 is west of the disposal site. Monitoring wells 0602, 0603, 0604, and 0605 continued to be dry and could not be sampled.

Seven additional DOE-owned monitoring wells (0513, 0514, 0516, 0520, 0521, 0522, and 0523) exist on privately owned property near the site but are not sampled because they are not part of the groundwater compliance monitoring network.

Constituents analyzed every 5 years include arsenic, cadmium, and uranium. Their maximum concentration limits (MCLs), established by the U.S. Environmental Protection Agency in Table 1 to Subpart A of 40 CFR 192, are 0.05 milligram per liter (mg/L) for arsenic, 0.01 mg/L for cadmium, and 0.044 mg/L for uranium. Concentrations of these constituents continued to remain significantly below their respective limits in 2014. Arsenic concentrations were similar to the 2009 results (Figure 9-3), all but one cadmium concentration result were below the laboratory detection limit of 0.00012 mg/L (Figure 9-4), and uranium concentrations remained stable or slightly increased (Figure 9-5). Based on the monitoring results to date, there is no indication of any degradation of groundwater near the site. The next cell performance monitoring is scheduled for 2019.

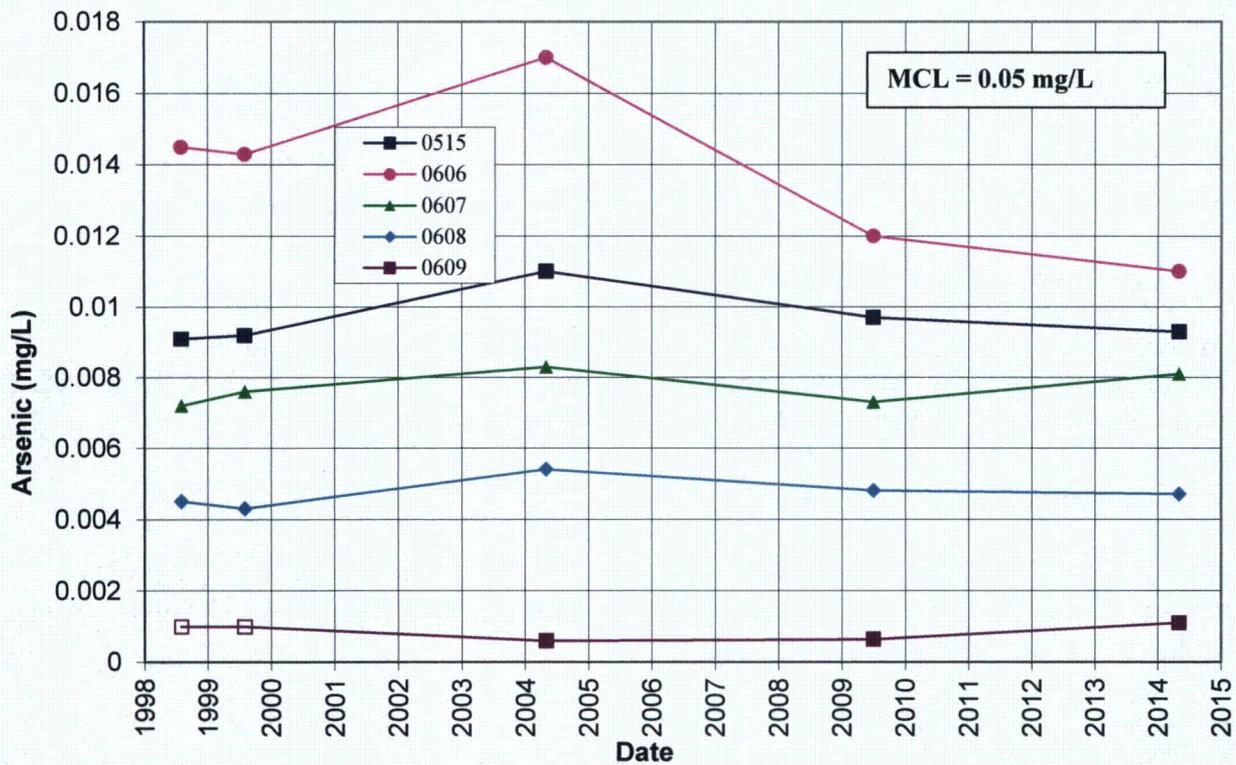


Figure 9-3. Time-Concentration Plot of Arsenic in Groundwater at the Lakeview Disposal Site

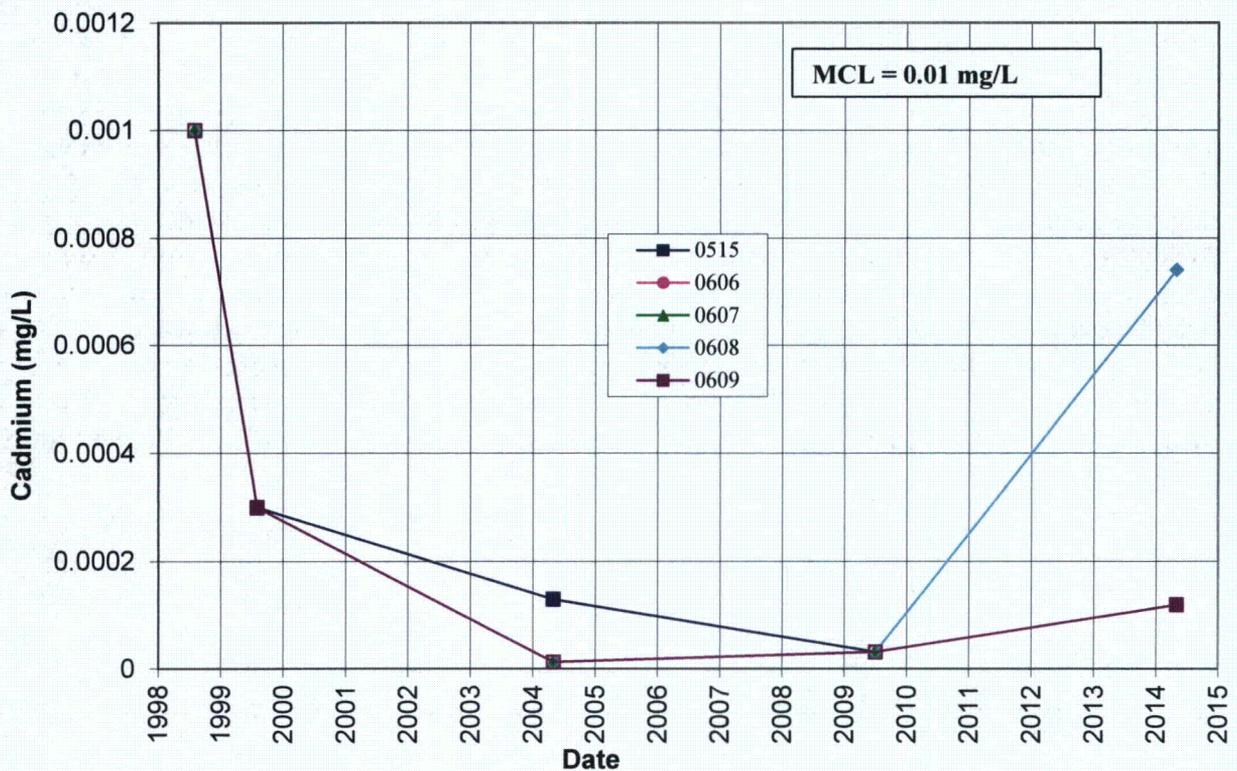


Figure 9-4. Time-Concentration Plot of Cadmium in Groundwater at the Lakeview Disposal Site

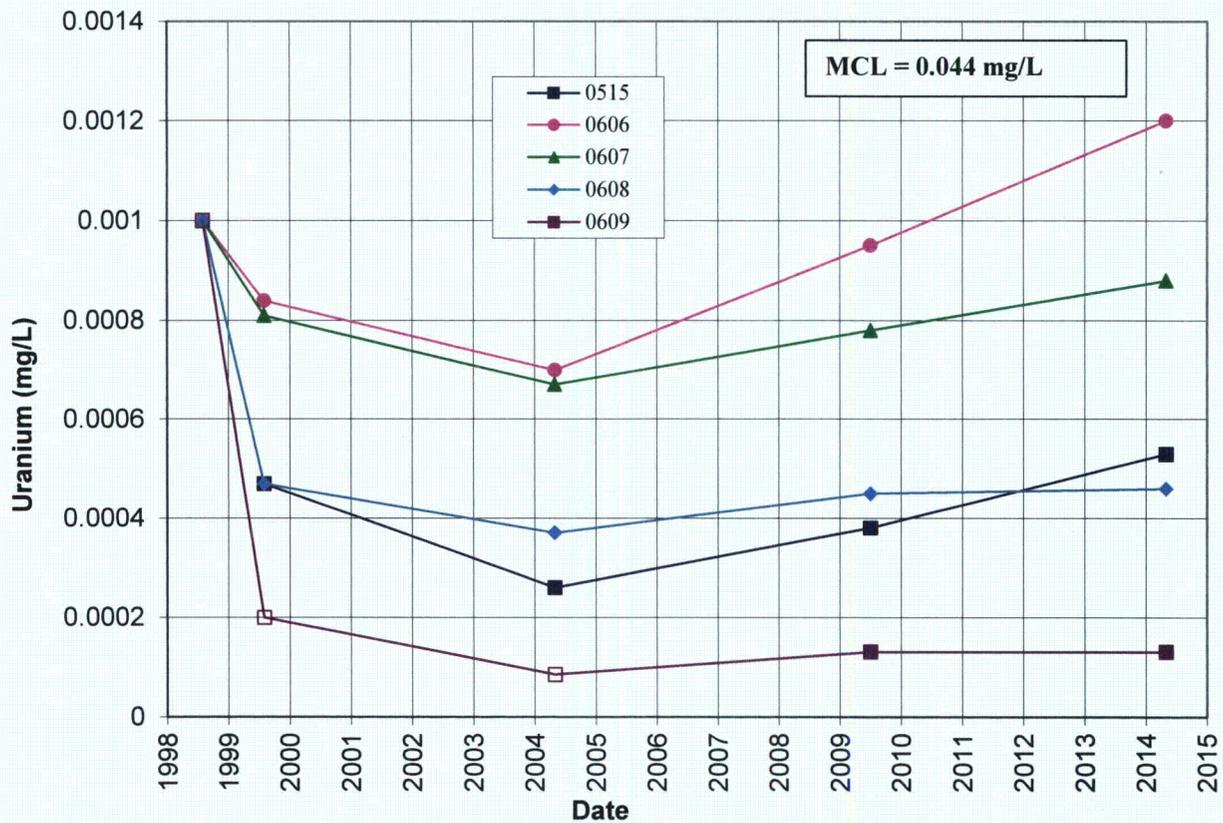


Figure 9-5. Time-Concentration Plot of Uranium in Groundwater at the Lakeview Disposal Site

9.8 Corrective Action

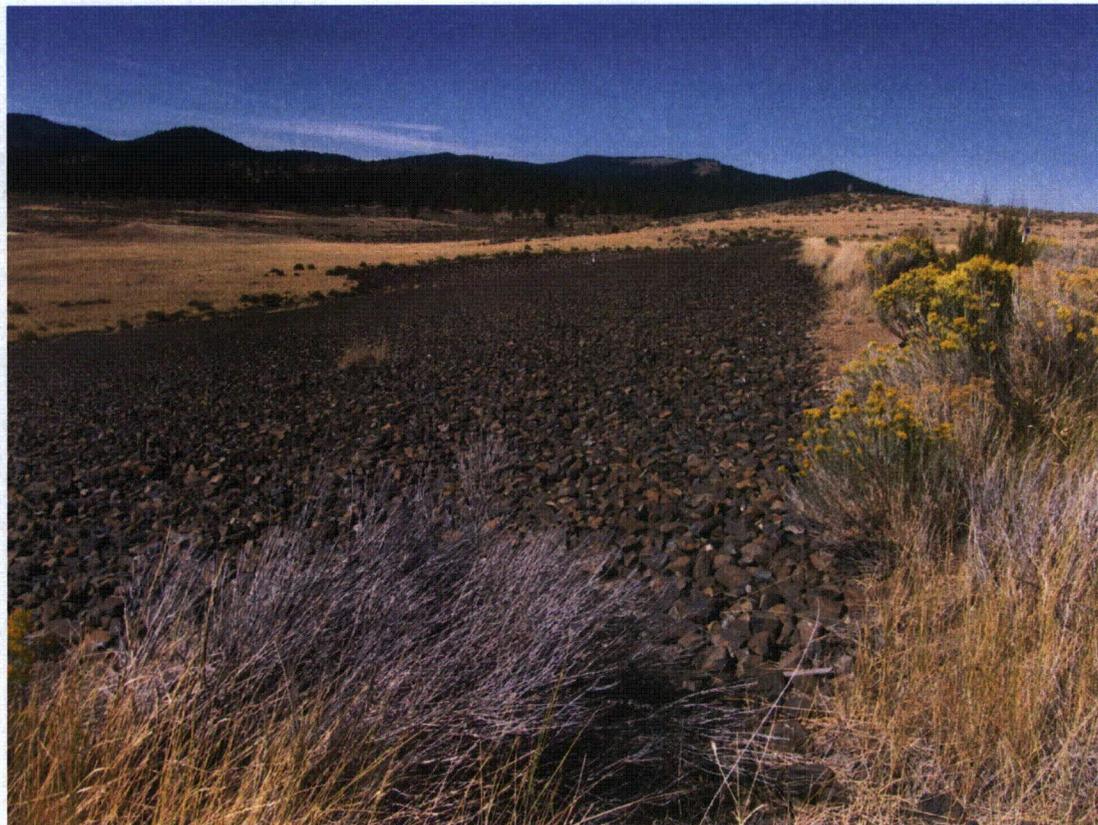
In accordance with the LTSP, corrective action is taken to correct conditions that threaten the integrity of the disposal cell or compliance with 40 CFR 192. No need for corrective action was identified.

9.9 Photographs

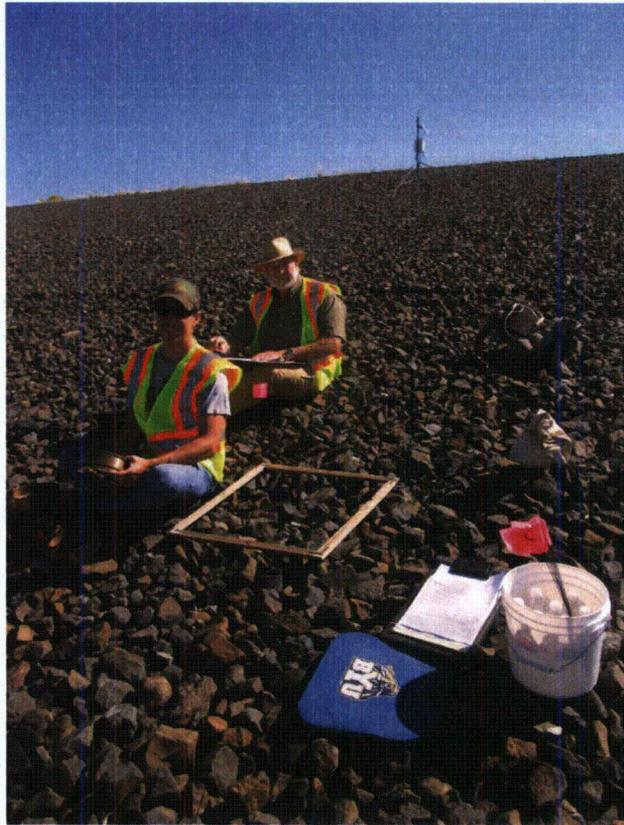
Photograph Location Number	Azimuth	Photograph Description
PL-1	180	Access road south of entrance gate.
PL-2	340	West side slope.
PL-3	50	Rock monitoring on west side slope.
PL-4	0	Riprap photo-monitoring location 10 in EDA.
PL-5	0	Riprap photo-monitoring location 12 in EDA.



LKD 9/2014. PL-1. Access road south of entrance gate.



LKD 9/2014. PL-2. West side slope.



LKD 9/2014. PL-3. Rock monitoring on west side slope.



LKD 9/2014. PL-4. Riprap photo-monitoring location 10 in EDA.



LKD 9/2014. PL-5. Riprap photo-monitoring location 12 in EDA.

10.0 Lowman, Idaho, Disposal Site

10.1 Compliance Summary

The Lowman, Idaho, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Disposal Site was inspected on July 14, 2014. The disposal cell was in excellent condition. Inspectors identified no maintenance needs or cause for a follow-up inspection.

10.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the site are specified in the *Long-Term Surveillance Plan for the U.S. Department of Energy Lowman, Idaho, (UMTRCA Title I) Disposal Site (LTSP)* (DOE-LM/GJ771-2005, Revision 2, U.S. Department of Energy [DOE], January 2005) 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 10-1 lists these requirements.

Table 10-1. License Requirements for the Lowman Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 3.3	Section 10.4
Follow-Up Inspections	Section 3.4	Section 10.5
Maintenance	Section 3.5	Section 10.6
Emergency Response	Section 3.6	Section 10.7
Environmental Monitoring	Section 3.7	Section 10.8

10.3 Institutional Controls

The 18-acre disposal site (Figure 10-1) 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 1994. 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 consist of federal ownership of the property and the following features that are inspected annually: a locked entrance gate, perimeter warning signs, site markers, and survey and boundary monuments.

10.4 Inspection Results

The site, near Lowman, Idaho, was inspected on July 14, 2014. The inspection was conducted by D. Traub 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. C. Cody of the Idaho Department of Environmental Quality and P. Rekow, Boise County weed control, attended portions of 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.

10.4.1 Site Surveillance Features

Figure 10-1 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 in Figure 10-1 by photograph location (PL) numbers.

10.4.1.1 Access Road and Entrance Gate

The site is at the end of a hard-packed gravel road about 650 feet north of Idaho State Highway 21. The road is in excellent condition. A locked gate spans the road about 150 feet from the state highway and is in excellent condition. The site is not fenced, but the topography and forest vegetation prevent vehicle access around the entrance gate or along the site perimeter.

10.4.1.2 Perimeter Signs and Entrance Sign

Eighteen perimeter signs are located along the site boundary. The perimeter signs and an entrance sign (PL-1) near site marker SMK-1 are on steel posts set in concrete. Several signs have bullet damage but remain legible and do not need to be replaced at this time. Perimeter signs along the east site boundary were not observed during the inspection due to nearby forest fires. P. Rekow of Boise County weed control had walked the area the week prior to the inspection and noted that the signs were all in place.

10.4.1.3 Site Markers

Two site markers are present at the site. Site marker SMK-1 (PL-1) is just inside the site's southwest boundary, and site marker SMK-2 is on top of the disposal cell. Both markers were in excellent condition.

10.4.1.4 Boundary and Survey Monuments

Seven monuments define the site boundary. Three are combined survey and boundary monuments (SM-1/BM-1, SM-2/BM-2 [PL-2], and SM-4/BM-4) and four are boundary monuments (BM-3, BM-5, BM-6, and BM-7). Steel t-posts are installed next to the survey and boundary monuments (with the exception of BM-3, which is immediately adjacent to perimeter sign P9) to help inspectors find the monuments. Due to the fire danger, only the monuments along the western boundary were verified during the inspection.

10.4.2 Inspection Areas

In accordance with the LTSP, the site is divided into three inspection areas (referred to as "transects" in the LTSP) to ensure a thorough and efficient inspection. The inspection areas are: (1) the top and side slope of the disposal cell; (2) the area between the disposal cell and the site boundary; and (3) the outlying area.

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

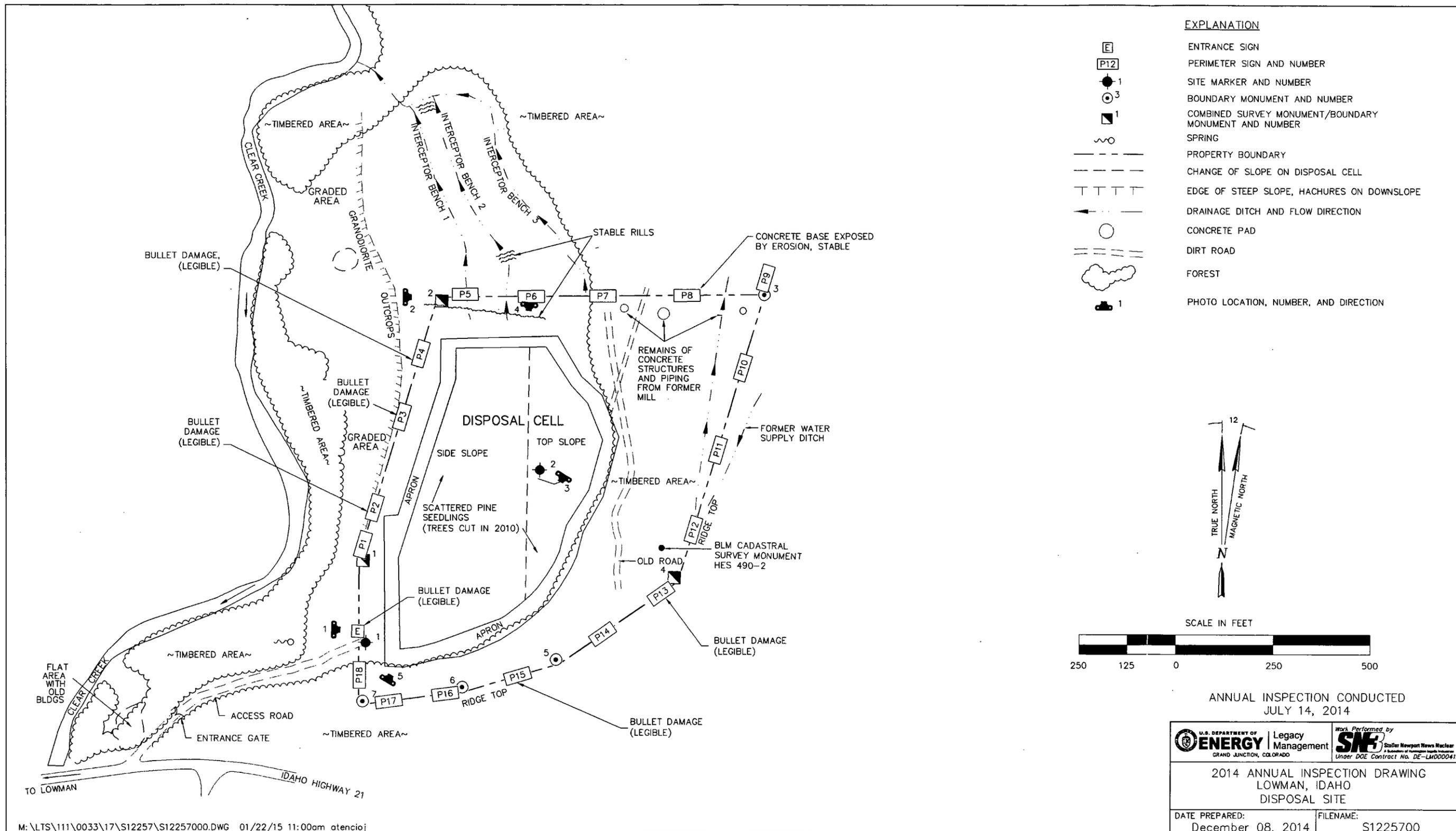


Figure 10-1. 2014 Annual Inspection Drawing for the Lowman Disposal Site

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10.4.2.1 Top and Side Slopes of the Disposal Cell

The disposal cell was completed in 1991. Basalt riprap armors the top and west-facing side slopes of the disposal cell. An apron of larger riprap surrounds the disposal cell on all sides. The riprap was in excellent condition (PL-3, PL-4, and PL-5). No evidence of instability, such as subsidence, slumping, or cracking, was observed on the cell surfaces.

Vegetation encroachment continues on the top and side slopes of the disposal cell. Encroachment is a natural process operating at this location and will be allowed to continue in accordance with the LTSP. However, high velocity winds periodically blow down mature trees in the region. Therefore, at the request of the Idaho Department of Environmental Quality, trees large enough to damage the disposal cell cover and uproot cell materials if knocked down by wind storms are routinely removed. Trees were cut down in 2010, and no large trees are currently growing on the cover.

10.4.2.2 Area Between the Disposal Cell and the Site Boundary

The steep slopes east and south of the disposal cell are stable and vegetated with well-established ponderosa pines and grasses. Surfaces north and west of the disposal cell that were highly disturbed during site remediation are stable and well vegetated. Noxious weeds are controlled in accordance with state and county requirements.

10.4.2.3 Outlying Area

An area within 0.25 mile around the site was inspected for evidence of construction, development, logging, or change in land use that might affect the site. No changes were noted in the area across Clear Creek to the west, where several summer cabins and campsites are located. The U.S. Forest Service manages the areas east and south of the site, and those areas remain relatively unchanged from previous inspections. Minor erosion has occurred in drainage channels west of the site but does not impact any site features or the disposal cell. The area along Idaho Highway 21 south of the site does not indicate any new development.

10.5 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.

10.6 Maintenance

No maintenance needs were identified.

10.7 Emergency Response

Emergency response is action DOE will take in response to “unusual damage or disruption” that threatens or compromises site safety, security, or integrity in compliance with 10 CFR 40, Appendix A, Criterion 12. No need for an emergency response was identified.

10.8 Environmental Monitoring

Groundwater monitoring was discontinued in 1999 because (1) the disposal cell is performing as designed and the site is in compliance with groundwater protection standards; and (2) no site-related contamination exists in groundwater near the site. All former monitoring wells on the site have been decommissioned.

10.9 Photographs

Photograph Location Number	Azimuth	Photograph Description
PL-1	60	Entrance sign and site marker SMK-1.
PL-2	0	Boundary monument BM-2.
PL-3	15	Side slope of disposal cell.
PL-4	180	View south of disposal cell cover and apron.
PL-5	60	View north-northeast of disposal cell.



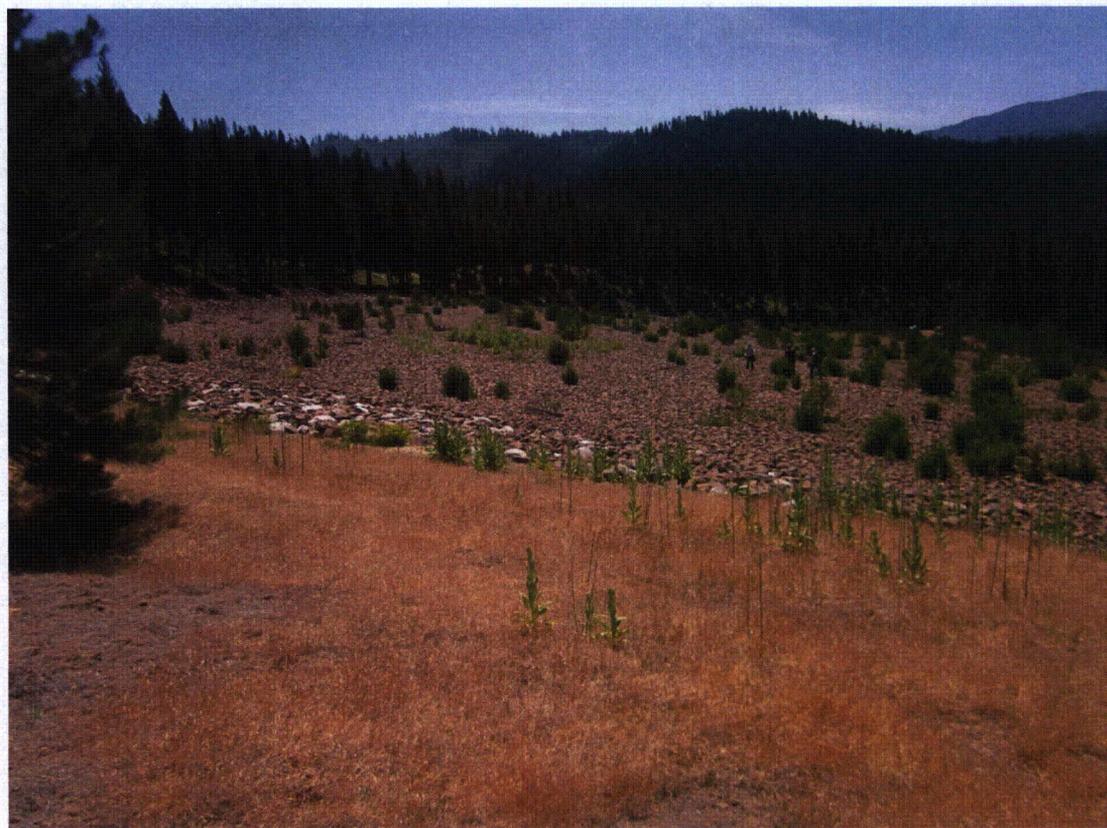
LOW 7/2014. PL-1. Entrance sign and site marker SMK-1.



LOW 7/2014. PL-2. Boundary monument BM-2.



LOW 7/2014. PL-3. Side slope of disposal cell.



LOW 7/2014. PL-4. View south of disposal cell cover and apron.



LOW 7/2014. PL-5. View north-northeast of disposal cell.

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11.0 Maybell, Colorado, Disposal Site

11.1 Compliance Summary

The Maybell, Colorado, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Disposal Site was inspected on August 5, 2014. The disposal cell and all associated diversion and drainage structures were in good condition and functioning as designed. The U.S. Bureau of Land Management (BLM) recommended in 2014 that DOE leave nine incorrectly located boundary monuments in place. A missing perimeter sign was replaced and noxious weeds on the disposal cell were sprayed with herbicide. Inspectors identified no other maintenance needs or cause for a follow-up inspection.

11.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the site are specified in the *Long-Term Surveillance Plan for the Maybell, Colorado (UMTRCA Title I) Disposal Site, Moffat County, Colorado* (LTSP) (DOE-LM/1605-2008, U.S. Department of Energy [DOE], Revision 4, April 2008) 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 11-1 lists these requirements.

Table 11-1. License Requirements for the Maybell Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Sections 3.3 and 3.4	Section 11.4
Follow-Up Inspections	Section 3.5	Section 11.5
Maintenance	Section 3.6	Section 11.6
Emergency Measures	Section 3.6	Section 11.7
Environmental Monitoring	Section 3.7	Section 11.8

11.3 Institutional Controls

The 251-acre site (Figure 11-1) is owned by the United States of America and was accepted under the U.S. Nuclear Regulatory Commission (NRC) general license at 10 CFR 40.27 in 1998. 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 consist of federal ownership of the property and the following features that are inspected annually: a perimeter fence and locked entrance gate, an entrance sign and perimeter warning signs, site markers, and boundary and survey monuments.

11.4 Inspection Results

The site, located about 25 miles west of Craig, Colorado, was inspected on August 5, 2014. The inspection was conducted by S. Hall 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. Nguyen (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."

11.4.1 Site Surveillance Features

Figure 11-1 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 in Figure 11-1 by photograph location (PL) numbers.

11.4.1.1 Site Access Road

Access to the site is via County Road 53, which runs north off U.S. Highway 40 approximately 8 miles east of Maybell, Colorado. The road has a gravel surface and was in good condition. County Road 53 ends at an unlocked gate near the northeast corner of the site (approximately 3 miles from U.S. Highway 40). From that point the road continues west as a dirt two-track directly north of the site. This road continues through a second unlocked gate and past an abandoned open-pit uranium mine, known as the Rob Pit, to the Maybell West UMTRCA Title II disposal site.

Because the access road to the Maybell site is a county road, Moffat County performs maintenance up to that point. From that point to the Maybell West site, DOE is responsible for road maintenance under a BLM right-of-way permit. No road maintenance was necessary.

11.4.1.2 Gates and Perimeter Fence

Two gates are located in the perimeter fence along the north boundary of the site. One is considered the site entrance gate and is located adjacent to the site marker and entrance sign (PL-1). The second gate is located directly west of perimeter sign P3 in the northwest corner of the property (PL-2). Both gates are standard tubular metal stock gates and were locked and in good condition.

A standard four-strand barbed-wire stock fence surrounds the disposal cell and drainage structures. The site is located in wintering grounds frequented by big game animals (primarily pronghorn, deer, and elk) and is also surrounded by open range used to graze cattle. As a result, minor damage to the perimeter fence occurs periodically. With the exception of broken top strands at two locations, the fence was in good condition. Repairs of these broken strands will occur when more significant repairs are needed.

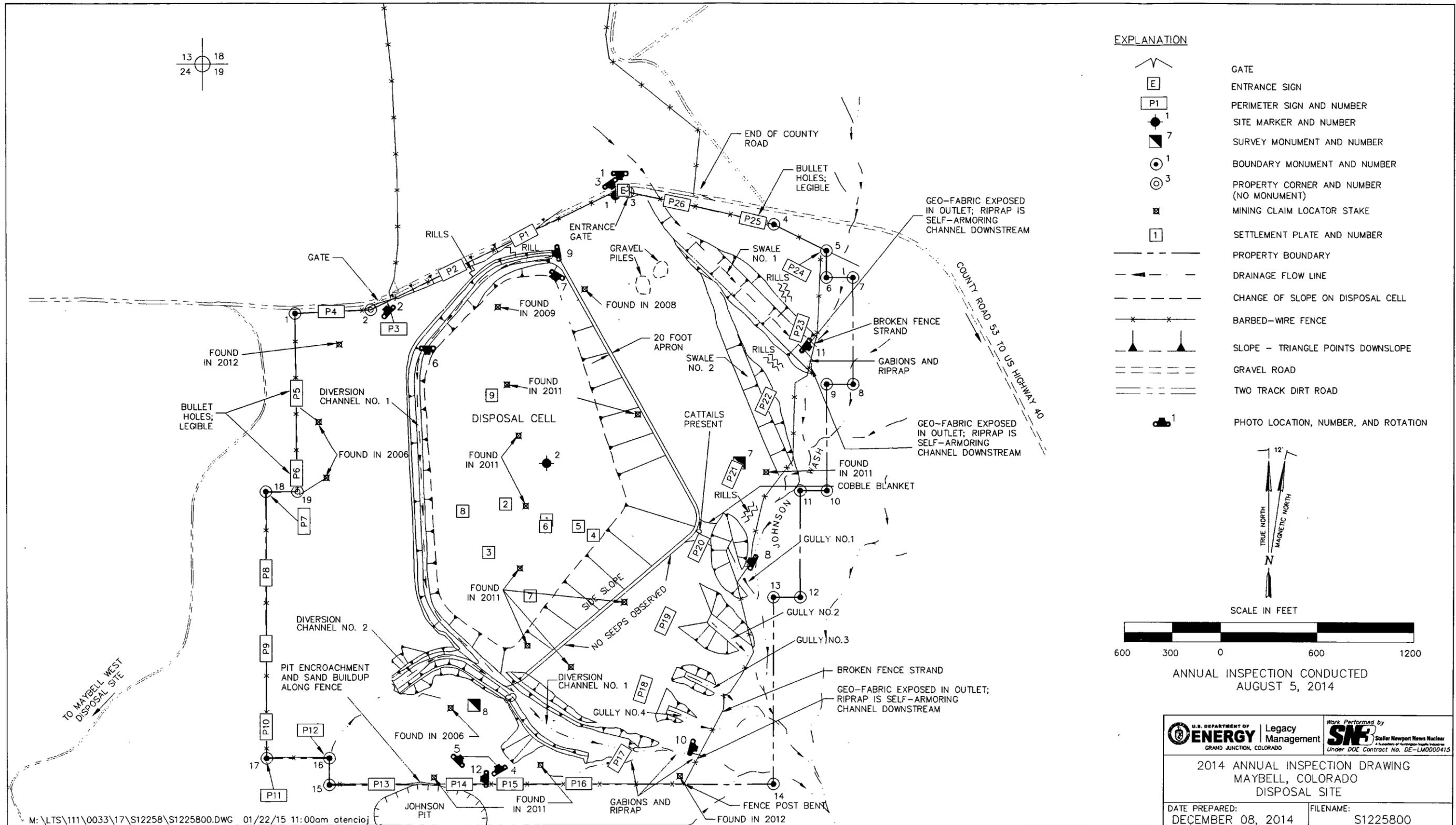


Figure 11-1. 2014 Annual Inspection Drawing for the Maybell Disposal Site

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11.4.1.3 Entrance Sign and Perimeter Signs

The entrance sign is located near the entrance gate and is mounted on a t-post in the fence line. It had a couple of bullet holes but remains legible (PL-1).

11A The site has 26 perimeter signs. On the north, west, and south sides of the site, perimeter signs are mounted on t-posts in the perimeter fence. On the east side of the site, perimeter signs are mounted on steel posts set in concrete and are located inside the property boundary approximately midway between the disposal cell and the perimeter fence. Several of the perimeter signs along the dirt road north and west of the site have bullet holes, but remain legible. Missing perimeter sign P1 was replaced. The remaining signs were in good condition.

11.4.1.4 Site Markers

Two standard granite site markers are at the site. Site marker SMK-1 is located near the entrance gate (PL-3), and site marker SMK-2 is located on top of the disposal cell. Both site markers were in good condition.

11.4.1.5 Survey and Boundary Monuments

Two survey monuments are located onsite. Survey monument SM-7 is on the bench above Johnson Wash just north of perimeter sign P21, and survey monument SM-8 is south of the disposal cell on the bench above Diversion Channel No. 2. The survey monuments were not inspected this year.

11B Originally, four boundary monuments had been installed along the property boundary. These four monuments, however, did not adequately represent the site property boundary. Therefore, additional monuments were installed in September 2002. A 2008 real property assessment noted that the 2002 land survey did not match the legal description included in the BLM permanent withdrawal for the site. BLM confirmed that the perimeter fence along the north and northwest sides of the site corresponds to the actual site boundary and that nine of the new boundary monuments outside the fence in that area were located outside the property boundary. BLM recommended in 2014 that DOE leave those nine monuments in place to avoid the cost of removing them. Figure 11-1 shows the correct boundary monuments and property corners. All boundary monuments observed during the inspection were in good condition.

11.4.2 Inspection Areas

In accordance with the LTSP, the site is divided into three inspection areas (referred to as “transects” in the LTSP) to ensure a thorough and efficient inspection. The inspection areas are: (1) the disposal cell; (2) other areas inside the site boundary; and (3) the outlying area.

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

11.4.2.1 Disposal Cell

The disposal cell covers approximately 66 acres of the approximately 250-acre disposal site property (PL-4 and PL-5). The side slopes of the disposal cell are at a 20 percent grade to create a stable slope, and the top of the disposal cell has a 3 percent grade to promote drainage toward the west. The disposal cell showed no evidence of settlement, slumping, erosion, or rock degradation (PL-6 and PL-7). Scattered shallow-rooted plants continue to establish on the disposal cell top and side slopes; these plants do not affect the integrity of the disposal cell. Deep-rooted plants and noxious weeds are controlled as required by the LTSP.

In accordance with the LTSP, inspectors looked for seeps on the east and southeast side slopes of the disposal cell because slimes were encapsulated in this portion of the cell. No seeps were observed at the toe of the disposal cell in these areas. Cattails continue to be observed growing at the toe of the east corner of the disposal cell, indicating the presence of moisture. Surface runoff from the cell discharges at this location, and standing water has been observed in this area during past inspections. No standing water was present at the time of the inspection. A 2003 laboratory analysis of evaporite minerals from this location confirmed that no constituents attributable to the cell contents were present.

11.4.2.2 Other Areas Inside the Site Boundary

The final surface conditions at the Maybell disposal site are a combination of rock-armored drainage and diversion channels and contouring of soil surfaces to achieve the necessary surface water drainage control to protect the disposal cell from erosion. The rock-armored diversion channels, swales, and gullies were in good condition (PL-8 and PL-9). Erosion directly downgradient of the outlets of Diversion Channel No. 1 and Swale No. 1 that has exposed the underlying geo-fabric had not changed significantly (PL-10 and PL-11). Riprap placed within the outlets continues to provide protection against headcutting. Minor rills adjacent to Swale No. 1 and Gully No. 1 continue to stabilize due to self-armoring and increased vegetation growth. There was no evidence of sediment moving offsite into Johnson Wash.

Apparent claim stakes were first discovered on the site during the 2006 inspection. Additional stakes were found onsite in following years, including several on the disposal cell in 2011. No new stakes have been found since 2012. BLM has informed DOE that these stakes are not actual claims, but rather they are lode mining claim locators. A lode mining claim locator is the precursor to an actual claim. If claims were to be filed, they would be considered "nuisance claims," as protections pursuant to the NRC general license for the disposal site appear to preclude any surface or subsurface activity that would jeopardize the disposal cell and its associated drainage control structures (10 CFR 40.27[d]).

11.4.2.3 Outlying Area

The area outside the site boundary for 0.25 mile was visually observed from the perimeter fence. There was no evidence of development, change in land use, or other activities that might affect the long-term performance or stability of the site.

Directly south of the site is a former open-pit uranium mine referred to as the Johnson Pit. Over time, slumping of the pit wall resulted in the pit encroaching several feet onto what is now DOE property (PL-12). This encroachment presents no threat to the integrity of the disposal cell and

occurred prior to reclamation and transfer of the site to DOE for long-term surveillance and maintenance. This encroachment is visually monitored annually and periodically documented with photographs to determine if any further slumping of the pit wall is occurring and to verify the integrity of the perimeter fence. There was no evidence of any additional encroachment of the pit onto the site at the time of the inspection. However, windblown sand continues to accumulate along the northern crest of the pit wall along the fence line.

11.5 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 follow-up inspection was identified.

11.6 Maintenance

Missing perimeter sign P1 was replaced and noxious weeds on the disposal cell were sprayed with herbicide. Broken strands of the perimeter fence will be repaired when other fence damage warrants repair. No other maintenance needs were identified.

11.7 Emergency Measures

Emergency measures are the actions that DOE will take in response to “unusual damage or disruption” that threatens or compromises site safety, security, or integrity in compliance with 10 CFR 40, Appendix A, Criterion 12. No need for emergency measures was identified.

11.8 Environmental Monitoring

11.8.1 Groundwater Monitoring

Groundwater at this site is contaminated as a result of widespread, naturally occurring uranium mineralization and mining activities not related to onsite legacy uranium-ore processing and disposal operations. The groundwater in the area is designated “limited use,” a designation given to groundwater that is not a current or potential source of drinking water because it contains widespread ambient contamination that cannot be cleaned up by methods reasonably employed in public water systems (40 CFR 192.11[e][2]). Supplemental standards established in 40 CFR 192.21(g) have been applied to groundwater at the site, and groundwater quality monitoring is not required.

11.8.2 Vegetation Monitoring

In accordance with the LTSP, annual visual inspections are conducted to verify the continued health of the onsite vegetation and to ensure that undesirable plant species (deep-rooted plants on the disposal cell cover and noxious weeds) do not proliferate on the site. No deep-rooted plants were found on the disposal cell during the inspection. Some noxious weeds were present on the cell and were later treated with herbicide.

11C

The disturbed soil surfaces on the site were revegetated with a mix of native and adaptive grasses to provide soil stability. Vegetation appeared to be healthy with continued increases in diversity and density. No noxious weeds were observed during the inspection.

11.9 Photographs

Photograph Location Number	Azimuth	Photograph Description
PL-1	180	Site entrance gate and sign; disposal cell in background.
PL-2	315	Site auxiliary gate.
PL-3	145	Site marker SMK-1.
PL-4	330	Southwest portion of the disposal cell; confluence of Diversion Channels No. 1 and No. 2 in foreground.
PL-5	45	Southeast portion of the disposal cell; Diversion Channel No. 1 in foreground.
PL-6	180	Intersection of top and west side slopes of disposal cell.
PL-7	210	Top of disposal cell.
PL-8	295	Gully No. 1; disposal cell in background.
PL-9	260	Diversion Channel No. 1.
PL-10	105	Outlet of Diversion Channel No. 1.
PL-11	125	Outlet of Swale No. 1.
PL-12	270	Perimeter fence and north end of Johnson Pit along south property boundary.



MAY 8/2014. PL-1. Site entrance gate and sign; disposal cell in background.



MAY 8/2014. PL-2. Site auxiliary gate.



MAY 8/2014. PL-3. Site marker SMK-1.



MAY 8/2014. PL-4. Southwest portion of disposal cell; confluence of Diversion Channels No. 1 and No. 2 in foreground.



MAY 8/2014. PL-5. Southeast portion of disposal cell; Diversion Channel No. 1 in foreground.



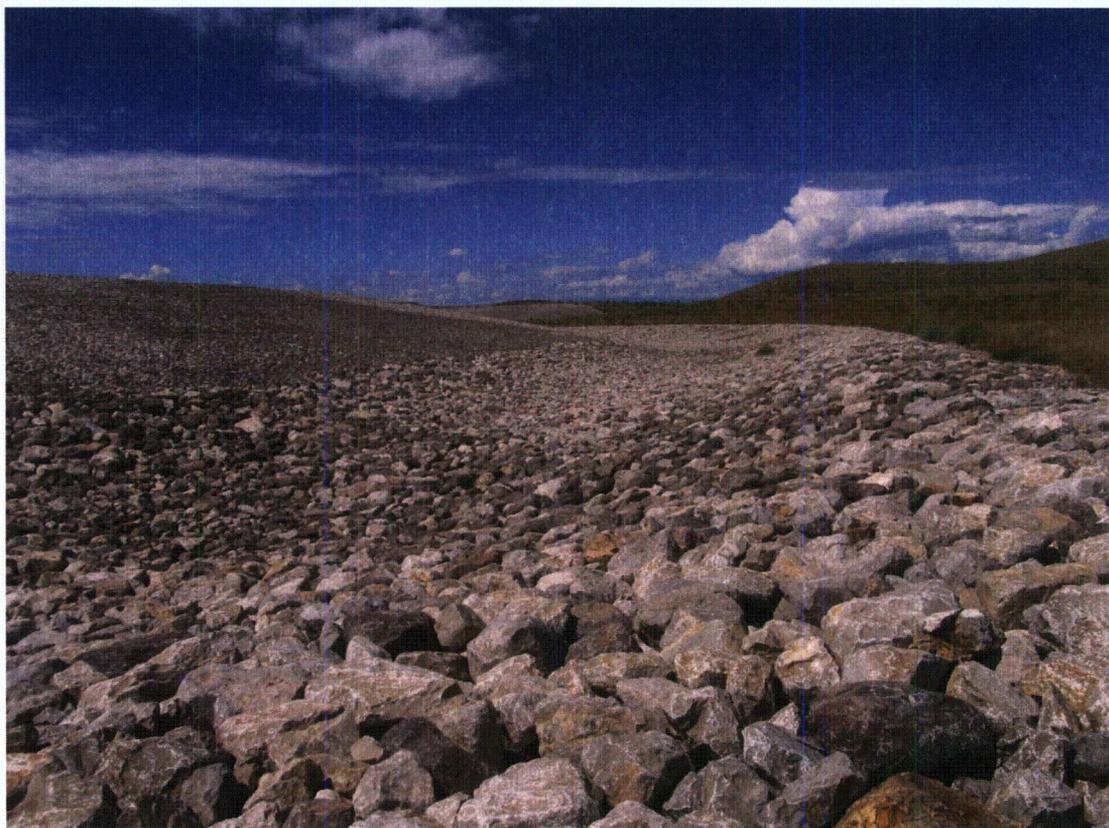
MAY 8/2014. PL-6. Intersection of top and west side slopes of disposal cell.



MAY 8/2014. PL-7. Top of disposal cell.



MAY 8/2014. PL-8. Gully No. 1; disposal cell in background.



MAY 8/2014. PL-9. Diversion Channel No. 1.



MAY 8/2014. PL-10. Outlet of Diversion Channel No. 1.



MAY 8/2014. PL-11. Outlet of Swale No. 1.



MAY 8/2014. PL-12. Perimeter fence and north end of Johnson Pit along south property boundary.