

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 August 27 and 28, 2013. Other than some ongoing concern with erosion-control rock riprap degradation, the disposal cell was in good condition. No additional maintenance needs or cause for a follow-up or contingency inspection was identified.

The U.S. Department of Energy (DOE) has been evaluating the condition of the riprap 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 obtained by the annual gradation monitoring measures the number of rocks retained per sieve size. The D_{50} value measured during the 2013 gradation monitoring is 2.70 inches, which falls within the original D_{50} design size range of 2.7 to 3.9 inches for the Type B side slope riprap, as specified in the *Long-Term Surveillance Plan for the Collins Ranch Disposal Site, Lakeview, Oregon* (LTSP) (DOE/AL/62350-19F, Rev. 3, DOE, August 1994). The 2013 D_{50} value is 0.04 inch smaller than the value of 2.74 inches measured during the gradation monitoring in 2012.

9.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the site are specified in the LTSP 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 6.1	Section 9.4
Follow-Up or Contingency Inspections	Section 7.0	Section 9.5
Routine 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 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, warning/no-trespassing 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 August 27 and 28, 2013. A. Houska, C. Goodknight, and D. Nordeen of the S.M. Stoller Corporation, the Legacy Management Support contractor for the DOE Office of Legacy Management in Grand Junction, Colorado, conducted the inspection. J. Dayvault of the DOE Office of Legacy Management, D. Engstrom of the Oregon Department of Energy, and Z. Cruz and M. Meyer of NRC 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 may affect site integrity, and to determine the need, if any, for maintenance or additional inspections and monitoring. Rock gradation monitoring of the erosion control rock riprap on the west side slope is also conducted as part of the inspection at the site.

9.4.1 Site Surveillance Features

Figure 9-1 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 9-1 by photograph location (PL) numbers.

9.4.1.1 Entrance Gates, Entrance Signs, and Access Road

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 locked gate across the access road on the adjacent privately owned land limits access to the site. The site access road is a gravel-surfaced road in good condition, as shown in PL-1.

The site 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

The 12 perimeter signs were in good condition and clearly visible from outside the site, with the exception of perimeter sign P2, which was partially blocked by vegetation. The vegetation will be removed during a 2014 site visit.

The site boundary fence is generally in good condition, but some loose and broken wire strands, and two loose t-posts were noted. Tightening and maintenance of the fence will likely be performed during 2014, as will some removal of vegetation near, and involved in, the fence line (PL-2).

9.4.1.3 Site Markers

The two site markers—SMK-1, located near the site entrance, and SMK-2 on top of the disposal cell—are in good condition (PL-3).

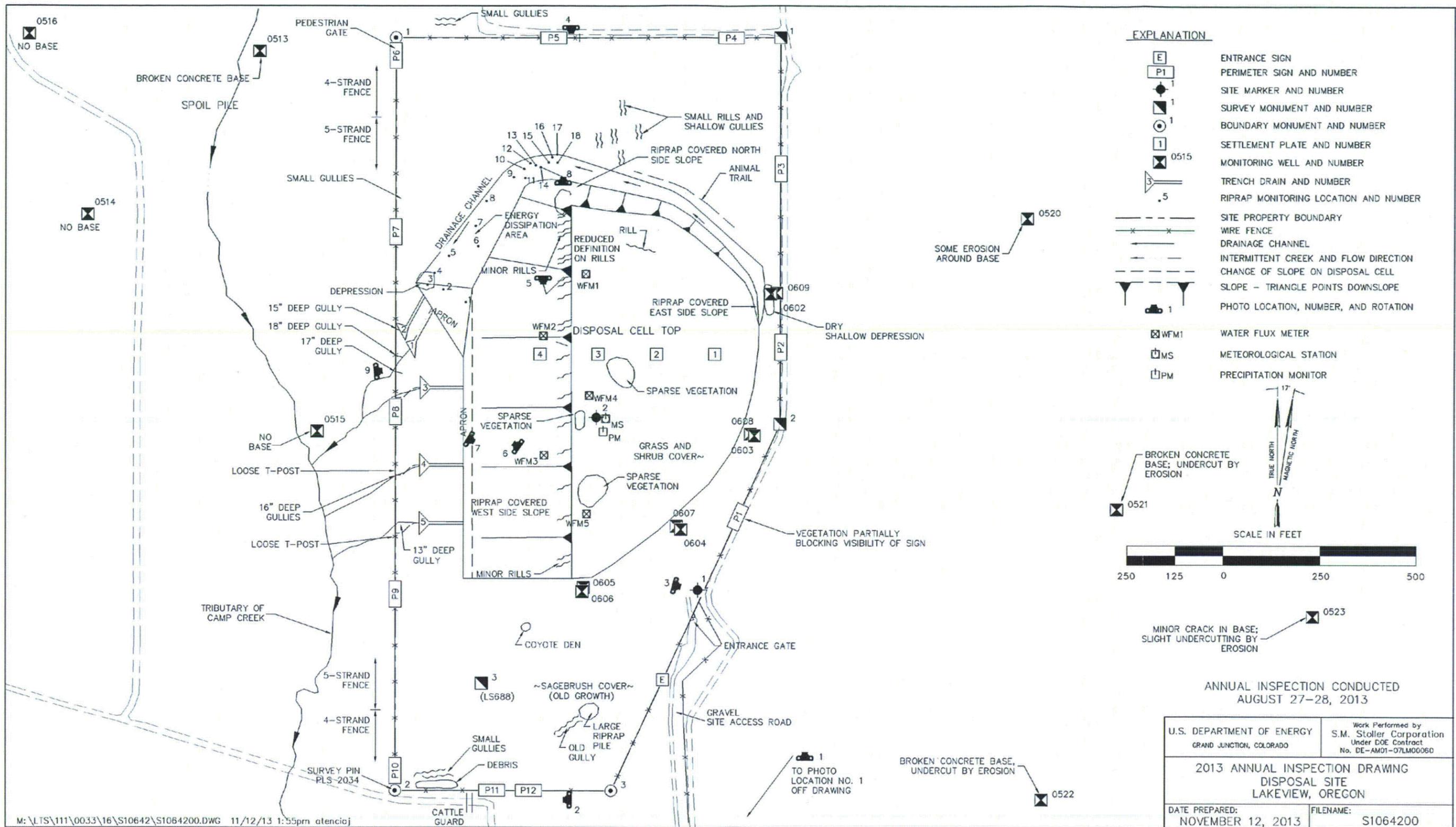


Figure 9-1. 2013 Annual Compliance Drawing for the Lakeview Disposal Site

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9.4.1.4 Survey Monuments and Boundary Monuments

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

9.4.1.5 Monitoring Wells

The groundwater monitoring network comprises eight onsite point-of-compliance wells (four monitoring well pairs: 0602/0609, 0603/0608, 0604/0607, and 0605/0606) located east and south of the cell and one upgradient compliance well (0515) located offsite to the west of the disposal site. All nine wells were inspected and observed to be locked, labeled, and in good condition.

Seven additional DOE-owned monitoring wells (0513, 0514, 0516, 0520, 0521, 0522, and 0523) are on privately owned property near the site but are not part of the groundwater compliance monitoring network. These wells were also inspected and observed to be locked and labeled, but in fair condition. Of the five offsite wells with concrete surface pads, three are 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 (referred to as “transects” in the LTSP) to ensure a thorough and efficient inspection: (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. PL-4 provides a good overview of the site layout.

Within each area, inspectors examined specific site surveillance features, drainage structures, vegetation, and other features. Inspectors examined each area 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 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 by the 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 in the region during the past year.

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 1.5 feet. These areas are intermittently located across the top slope and are likely caused by the soil infilling 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 at the site along the top of the west side slope appeared to be reduced in depth and definition during this inspection. The crest of the west side slope is shown on PL-5. The extent of rilling on the west side slope will continue to be monitored during future annual inspections. 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.

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 Side Slopes and Adjacent Drainage Channel, Apron, and Trench Drains

Deterioration of the basalt riprap at the site is probably due to physical weathering and chemical processes. The extent of rocks crumbling on the surface appears to have increased in the mid-1990s, and inspections will continue to include rock monitoring. No evidence of cell settlement, displacement, or slumping was observed.

- 9A Addendums to the LTSP commit DOE to annually determining the D_{50} value of the west side slope riprap through gradation monitoring to ensure that the riprap is large enough to protect the disposal cell from a major precipitation event. This gradation monitoring method measures the number of rocks retained per sieve size. In 2013, the gradation monitoring was performed for the 17th consecutive year, as shown in PL-5, PL-6, and PL-7. 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 were collected at 20 random locations, and approximately 25 rocks were sampled at each location. An evaluation of the rock size measurement data indicates that the west side slope riprap D_{50} is 2.70 inches with a 95 percent confidence interval between 2.45 and 2.96 inches. The 2013 D_{50} value is 0.04 inch smaller than the value of 2.74 inches measured during the 2012 gradation monitoring. Figure 9-2 is a graph that shows the results of the gradation monitoring since 1997. As shown on the graph, the downward curve of D_{50} values appears to have somewhat leveled off over the past 10 years. Earlier results appear to indicate a gradual overall decrease in the cover rock D_{50} size.

The annual photographic monitoring of the 18 photograph points for long-term rock monitoring was conducted in the energy dissipation area (EDA). PL-8 shows the rock at monitoring point location 14. 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 type used in the EDA and drainage channel areas is much more homogeneous than the varied rock types 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 rocks used in the EDA are 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 were observed this year in the upgradient portion of the drainage channel, but their presence will not obstruct water flow. This vegetation is routinely evaluated at 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 would be periodically expected in this area due to the runoff control features' normal fluctuations. No ponded water was observed. Some sporadic areas of soil cracking were observed in the areas west of the trench drains, but the grasses covering this area are dense and provide erosion protection.

9.4.2.3 Site Perimeter and Outlying Area

This area includes the seeded grass area extending from the disposal cell to the site boundary, the site 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 headcutting that was proceeding from the Byers property onto the DOE property, some minor headcutting is still evident, although it did not appear to be recent. Several small gullies have formed in heavily grazed areas downslope of the fence line onto the Byers property and were identified during previous inspections, as shown in PL-9. No indication of recent erosion was observed. Although no repairs were warranted at the time of the inspection, minor maintenance will likely be performed in this area during 2014.

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 2012 inspection. No maintenance is required in this area, but the area will be monitored during future inspections.

The landowner had cleared an open trail area along the exterior of the south and southeast site fence since the previous inspection.

LAKEVIEW TYPE B RIPRAP

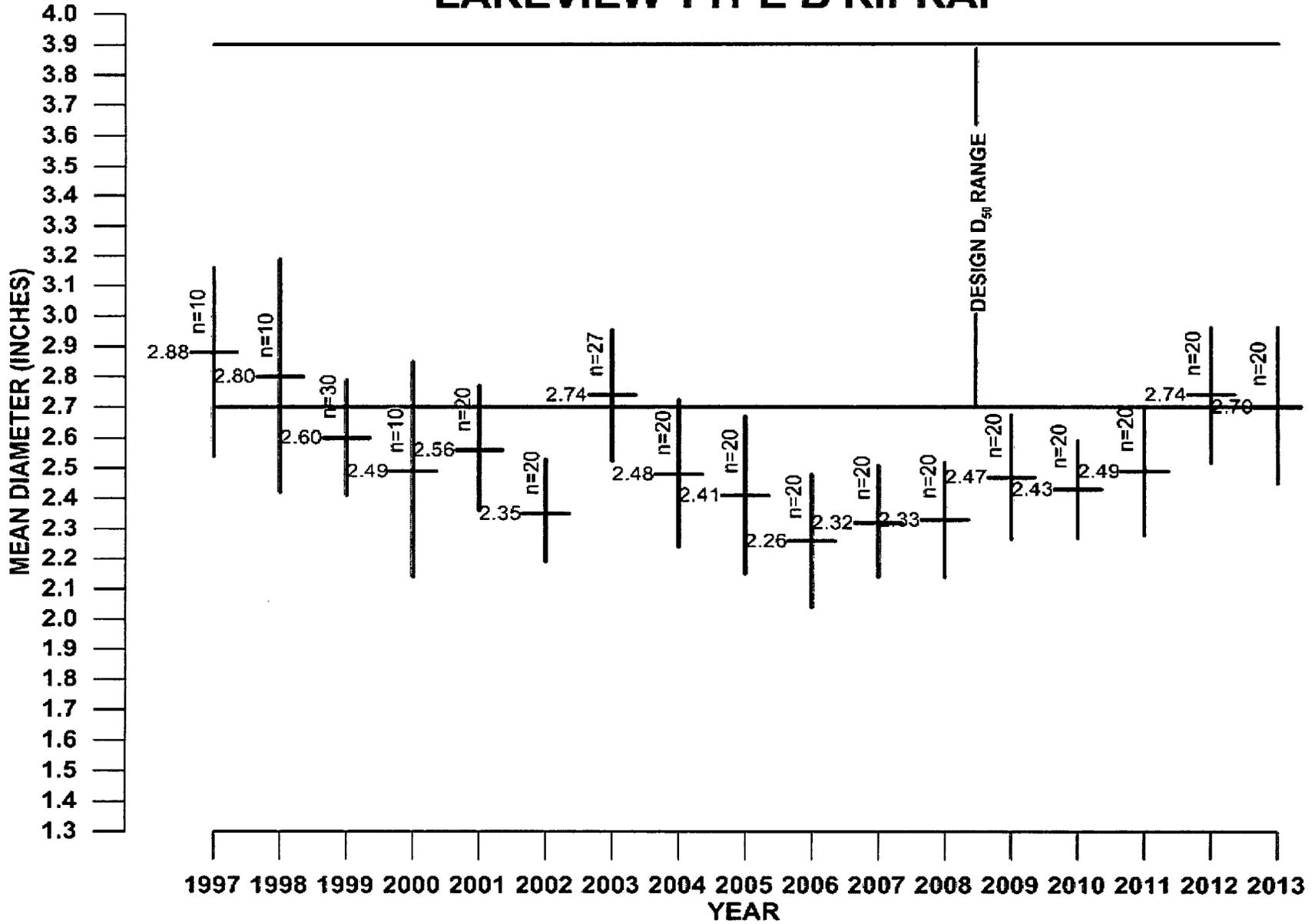


Figure 9-2. Riprap Gradation Monitoring

9.5 Follow-Up or Contingency Inspections

DOE will conduct follow-up inspections if (1) an annual inspection or other site visit reveals a condition that must be reevaluated during a return to the site, or (2) a citizen or outside agency notifies DOE that conditions at the site are substantially changed.

No need for a follow-up or contingency inspection was identified during the inspection.

9.6 Maintenance and Repairs

No extensive maintenance needs were identified during the inspection.

9.7 Environmental Monitoring

9.7.1 Groundwater Monitoring

- 9A 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. No groundwater monitoring was performed in 2013. The most recent sampling event was performed in 2009. Constituents analyzed every 5 years include arsenic, cadmium, and uranium. Maximum concentration limits 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 detected in the monitoring wells were well below their respective limits in 2009. They also were consistent with sampling results from 2004 and remained within the historical range. Based on the monitoring results to date, there is no indication of any degradation of groundwater in the vicinity of the site. The next cell performance groundwater monitoring is scheduled for 2014. Results from that event will be included in the Annual Site Inspection and Monitoring Report.

9.8 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

No corrective action was required in 2013.

9.9 Photographs

Photograph Location Number	Azimuth	Description
PL-1	N/A	Gravel site access road. View to north.
PL-2	270	View to west along south fence line. Shrub involvement with fence shown.
PL-3	105	Site marker SMK-1 near entrance gate.
PL-4	180	View to south across site from north site fence. North and west rock side slopes, and energy dissipation area are shown.
PL-5	180	View to south from intersection of top slope and west side slope. Rock monitoring being conducted on west side slope.
PL-6	305	Rock monitoring on west side slope with NRC and State of Oregon representatives observing. View to west.
PL-7	120	NRC and DOE representatives on west side slope.
PL-8	N/A	Riprap photo-monitoring location 14 in EDA.
PL-9	85	Gullying at west fence line showing erosion around fence stake.



LKV 8/2013. PL-1. Gravel site access road. View to north.



LKV 8/2013. PL-2. View to west along south fence line. Shrub involvement with fence shown.



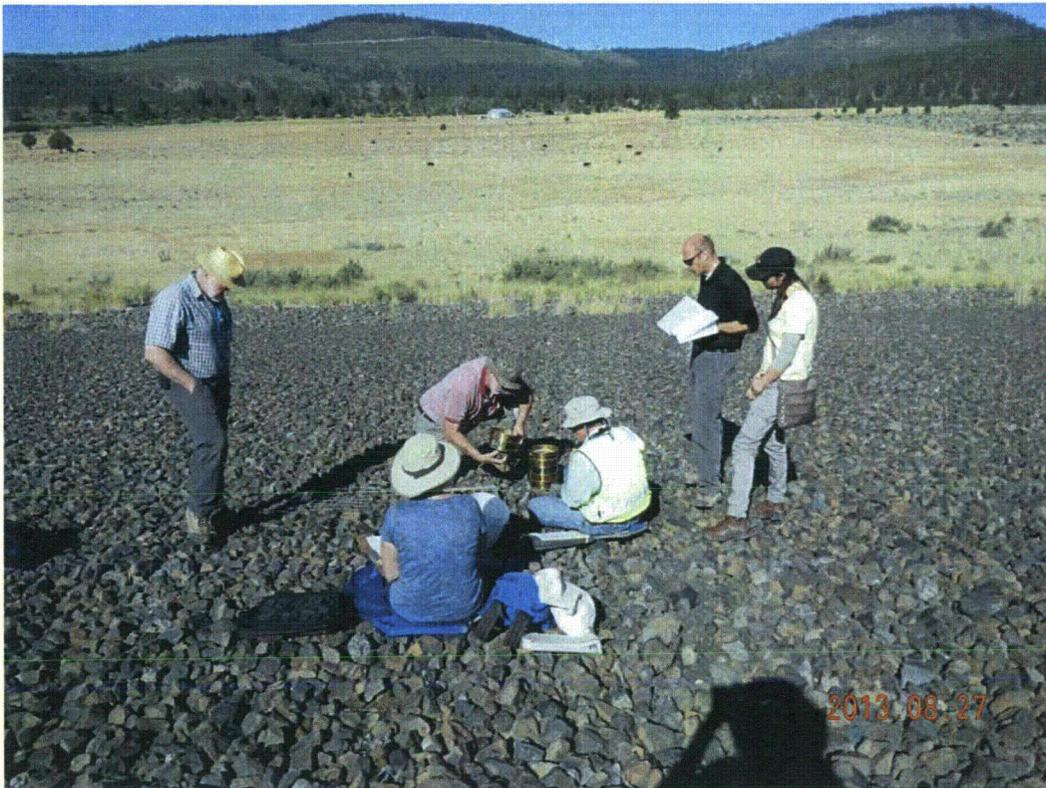
LKV 8/2013. PL-3. Site marker SMK-1 near entrance gate.



LKV 8/2013. PL-4. View to south across site from north site fence. North and west rock side slopes, and energy dissipation area are shown.



LKV 8/2013. PL-5. View to south from intersection of top slope and west side slope. Rock monitoring being conducted on west side slope.



LKV 8/2013. PL-6. Rock monitoring on west side slope with NRC and State of Oregon representatives observing. View to west.



LKV 8/2013. PL-7. NRC and DOE representatives on west side slope.



LKV 8/2013. PL-8. Riprap photo-monitoring location 14 in EDA.



LKV 8/2013. PL-9. Gullying at west fence line showing erosion around fence stake.

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 16, 2013. The disposal cell was in excellent condition. Erosion was again noted on adjacent state-owned property and reported to the state representatives who attended the inspection. Steep areas to the north and west of the disposal cell remain stable and vegetated. An ongoing concern at this site is the control of noxious weed populations; five species of noxious weeds were present during the annual inspection and are being controlled with herbicide or biocontrol insects. No additional maintenance needs or cause for a follow-up or contingency inspection was identified.

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, January 2005) and in procedures that the U.S. Department of Energy (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 or Contingency Inspections	Section 3.4	Section 10.5
Maintenance and Repairs	Section 3.5	Section 10.6
Groundwater Monitoring	Section 3.7	Section 10.7
Corrective Action		Section 10.8

10.3 Institutional Controls

The 18-acre disposal site 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 disposal site consist of federal ownership of the property, warning/no trespassing signs (referred to as perimeter signs) placed along the property boundary, and a locked gate across the access road that leads to the site from Idaho State Highway 21. Verification of these institutional controls is part of the annual inspection, and the results are included in this report. The site is not fenced, but the topography and forest vegetation prevent vehicle access around the access gate or along the site perimeter.

10.4 Inspection Results

D. Traub and L. Sheader of the S.M. Stoller Corporation, the Legacy Management Support contractor for the DOE office in Grand Junction, Colorado, conducted the inspection on July 16, 2013. M. Kautsky, of the DOE Office of Legacy Management also attended the inspection.

C. Cody and D. Nygard, both of the Idaho Department of Environmental Quality, were on site during the inspection.

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

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 Entrance Gate, Entrance Sign, and Access Road

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 (PL-1).

10.4.1.2 Perimeter Fence and Perimeter Signs

Eighteen perimeter signs delineate the perimeter of the site. The 18 perimeter signs are on steel posts along the site boundary. Bullet holes previously have been identified in perimeter signs P2, P3, and P15, and the entrance sign near site marker 1. Bullet indentations have been identified on perimeter sign P13. These signs remain legible and do not need to be replaced.

Ponderosa pine saplings are encroaching on perimeter sign P1 and making it less visible. Several years ago trees near the sign were cut to enhance visibility.

10.4.1.3 Site Markers

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

10.4.1.4 Survey Monuments and Boundary Monuments

Seven monuments define the site boundary. Three are combined survey and boundary monuments (SM-1/BM-1, SM-2/BM-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 [PL-3], which is immediately adjacent to perimeter sign P9) to allow inspectors to locate the monuments more easily in the field. All are in excellent condition.

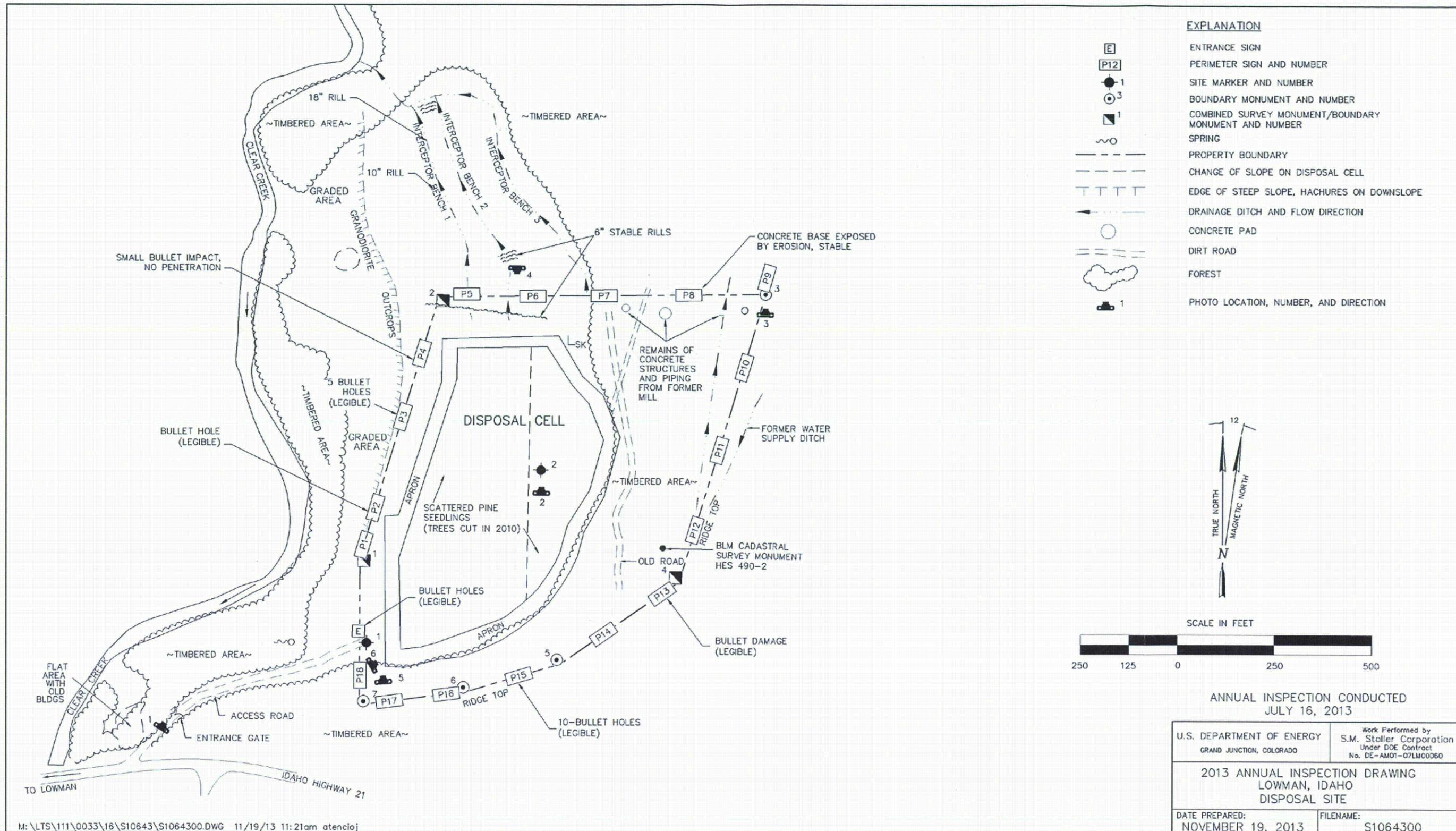


Figure 10-1. 2013 Annual Inspection Drawing for the Lowman Disposal Site

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10.4.1.5 Monitoring Wells

Groundwater monitoring is no longer required at the site according to the revised LTSP (January 2005). All seven wells were decommissioned in August 2006 in accordance with State of Idaho groundwater protection requirements.

10.4.2 Inspection Areas

The site is divided into three inspection areas (referred to as “transects” in the LTSP) to ensure a thorough and efficient inspection: (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 for evidence of settlement, erosion, slumping, or other processes that might affect the site’s integrity, protectiveness, or long-term performance.

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 slope of the disposal cell. An apron of larger riprap surrounds the disposal cell on all sides. The riprap is in excellent condition (PL-4, PL-5, and PL-6). No evidence of instability, such as subsidence, slumping, or cracking, was observed on any of 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, trees large enough to damage the disposal cell cover if knocked down by storms are routinely removed. 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 site are stable and vegetated with well-established ponderosa pines and grasses. The slopes north and west of the site that were highly disturbed during site remediation are currently stable and well vegetated.

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 to 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. Erosion of drainage channels west of the DOE site was pointed out to inspectors from the Idaho Department of Environmental Quality during the 2012 inspection and again during the 2013 visit. The area along Idaho Highway 21 east of the site does not indicate any new development.

10.5 Follow-Up or Contingency Inspections

DOE will conduct follow-up inspections if (1) an annual inspection or other site visit reveals a condition that must be reevaluated during a return to the site, or (2) a citizen or outside agency notifies DOE that conditions at the site are substantially changed.

No follow-up or contingency inspections were required in 2013.

10.6 Maintenance and Repairs

Other than the erosion identified on state land north of the cell, no maintenance needs were identified.

10.7 Environmental Monitoring

10.7.1 Vegetation Monitoring

10A Infestations of six state-listed noxious weed species have been present historically on and adjacent to the site:

- Dalmatian toadflax—this weed has been treated with herbicide annually since 2003. In 2008 DOE purchased and released *Mecinus janthinus*, a stem-boring weevil that targets this species. Few Dalmatian toadflax plants persist on the site, and this species is considered to be controlled by the insect.
- Spotted/diffuse knapweed—this weed has also been treated with herbicide annually since 2003. Knapweed plants are not abundant, but they occur throughout the site and will continue to be controlled with herbicide.
- Canada thistle—not found on the site since 2011, several plants were identified on the disposal cell in 2013. They will be controlled with herbicide.
- Rush skeletonweed—this species was present on and near the site in small numbers in 2013, and individual plants were heavily grazed. They will be controlled with herbicide.
- Oxeye daisy—several infestations of oxeye daisy are present on the site and have been treated with herbicide since 2010. Additional treatment is planned in 2013.
- Hoary alyssum—this weed was not identified on the site during the 2013 inspection.

The County has targeted and treated sulfur cinquefoil and medusahead, which have also been found on the site. Locations of these weeds, as well as one location of bull thistle, will be reported to the County for control.

10.8 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

No corrective action was required in 2013.

10.9 Photographs

Photograph Location Number	Azimuth	Description
PL-1	60	Entrance gate.
PL-2	0	Site marker 2 on cell top.
PL-3	15	Boundary marker 3 at perimeter sign 9.
PL-4	180	General site view from north to south.
PL-5	10	General site view from south to north.
PL-6	60	General site view from south-southwest to north-northeast.



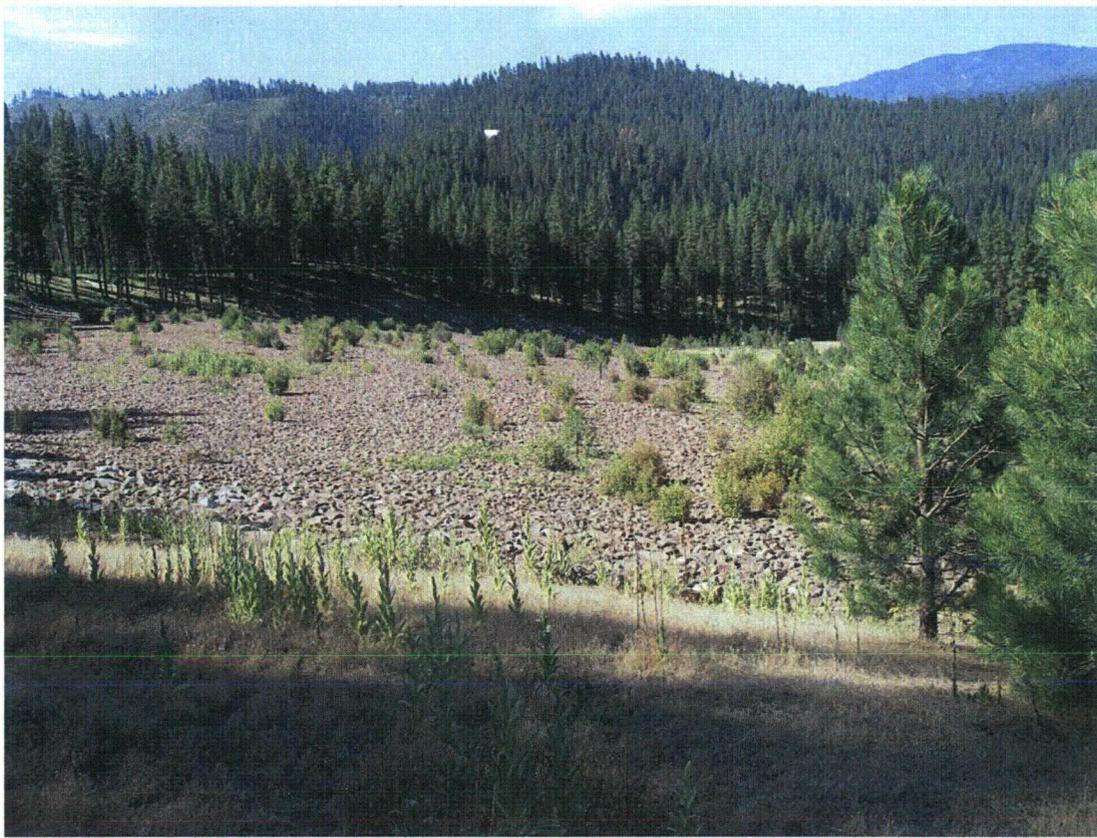
LOW 7/2013. PL-1. Entrance gate.



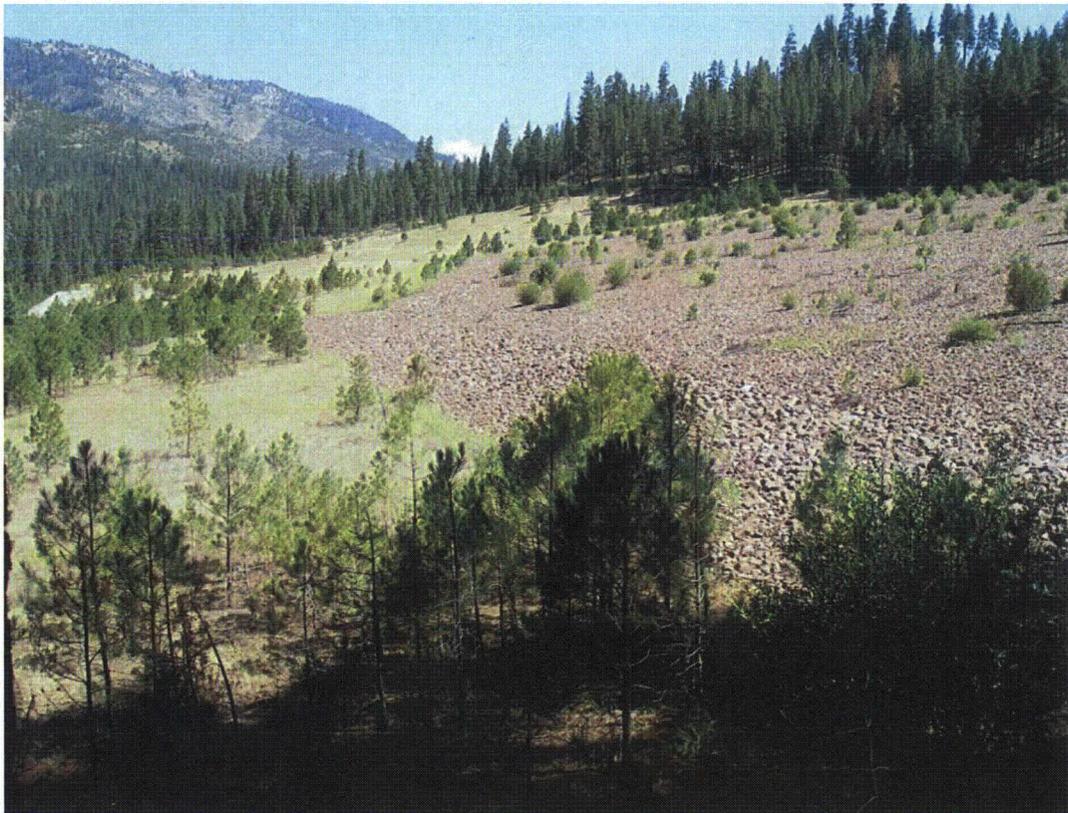
LOW 7/2013. PL-2. Site marker 2 on cell top.



LOW 7/2013. PL-3. Boundary marker 3 at perimeter sign 9.



LOW 7/2013. PL-4. General site view from north to south.



LOW 7/2013. PL-5. General site view from south to north.



LOW 7/2013. PL-6. General site view from south-southwest to north-northeast.

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 6, 2013. The disposal cell and all associated diversion and drainage structures were in good condition and functioning as designed. No significant change was noted to the erosion that has occurred directly downgradient of the outlets to Swale No. 1 and Diversion Channel No. 1; the riprap continues to be protective. No deep-rooted plants were found growing on the disposal cell during this year's inspection. Perimeter signs P5, P6, and P25 have bullet holes but remain legible. Perimeter sign P1 remains missing and needs to be replaced; however, it is not of immediate concern, as several additional perimeter warning signs along this side of the site are visible from the road. A broken top strand in the perimeter fence at two locations needs repair. Nine boundary monuments determined to have been placed incorrectly north and northwest of the site should be removed and three new monuments installed along the correct property boundary that coincides with the perimeter fence line in this portion of the site.

During the inspection, no activity was noted in the surrounding area that raises concern about the integrity of the site, and no cause for a follow-up or contingency inspection was identified.

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	Section 3.3	Section 11.4
Follow-Up or Contingency Inspections	Section 3.5	Section 11.5
Routine Maintenance and Repairs	Section 3.6	Section 11.6
Groundwater Conditions	Section 2.5	Section 11.7
Corrective Action	Section 3.6	Section 11.8

11.3 Institutional Controls

The 251-acre site 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, as defined by DOE Policy 454.1, consist of federal ownership of the property, a site perimeter fence, warning/no-trespassing (perimeter) signs along the property boundary, and a locked gate at the

site entrance. Verification of these institutional controls is part of the annual inspection. Inspectors found no evidence that these institutional controls were ineffective or violated.

11.4 Inspection Results

S.C. Hall and C. Bahrke of the S.M. Stoller Corporation, the Legacy Management Support contractor for the DOE office in Grand Junction, Colorado, conducted the inspection on August 6, 2013. J. Nguyen of the DOE Office of Legacy Management, M. Cosby (Colorado Department of Public Health and Environment), Robert Evans (NRC), and D. Ravelojaona (Stoller) 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 may affect site integrity, and to determine the need, if any, for maintenance or additional inspections and monitoring.

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 is graveled, hard packed, and 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 U.S. Bureau of Land Management (BLM) right-of-way (ROW) permit. No road maintenance was necessary in 2013.

11.4.1.2 Gates and Fencing

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. The second gate is located directly west of perimeter sign P3 in the northwest corner of the property. 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. Maintenance of the perimeter

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fence was performed in 2009 and 2011; several breaks, loose wires, and a bent post were repaired, and a lower strand was added to the fence where it crosses Gullies No. 1, 2, 3, and 4 to keep cattle from accessing the site. This modification appears to have been successful in preventing cattle from accessing the site. With the exception of broken top strands at two locations, the fence was in good condition.

11.4.1.3 Signs

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

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. Perimeter sign P1 along the dirt road is missing and needs to be replaced. The remaining signs were in good condition.

11.4.1.4 Site Markers

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

Originally, four boundary monuments were used to define the property. Because these four monuments did not adequately represent the site property boundary, nineteen additional monuments were installed in September 2002 to better define the boundary. A 2008 real property assessment identified an error in the property boundary along the north and northwest portion of the site. The assessment determined that the property boundary, as it was depicted following the 2002 land survey, did not match the legal description included in the BLM permanent withdrawal for the site. The correct property boundary along the north and northwest portion of the site follows the perimeter fence line. As a result, the site base map was corrected and the LTSP was revised and submitted to NRC for acceptance. Because of this error, the nine incorrectly placed boundary monuments should be removed north and northwest of the site, and three new monuments should be installed along the correct property line (i.e., the fence line). All boundary monuments checked were observed to be in good condition (PL-3).

11.4.1.6 Settlement Plates

Nine settlement plates were installed on the disposal cell top during construction to detect any significant settlement resulting from slimes (i.e., fine-grained wet tailings) that were placed in

the south central part of the cell. The former tailings slimes were compacted before completion of the radon barrier, but the potential for additional consolidation and possible stress to the radon/infiltration barrier still existed.

From 2000 through 2004, in accordance with the LTSP, DOE conducted annual land surveys of the settlement plates and presented the results in the annual compliance report to NRC. The annual land surveys verified that no significant settlement had occurred on the disposal cell top. Therefore, having met the 5-year post-construction settlement survey requirement stipulated in the LTSP, DOE notified NRC and discontinued the annual land surveys of the settlement plates. Surveying of the settlement plates will resume if visual observations of the disposal cell during the annual inspections indicate a cause for concern.

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: (1) the disposal cell; (2) other areas inside the site boundary; and (3) the site perimeter and outlying areas.

Within each area, inspectors examined the specific site surveillance features 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 roughly pentagonal disposal cell measures about 1,600 feet (ft) by 2,400 ft and is located in the center of the site. The above-grade disposal cell rises to a height of approximately 30 ft and is capped with an approximately 7 ft thick multiple-component cover. The cover consists of a 1.5 ft thick radon/infiltration barrier directly over the tailings, overlain by a 4 ft thick compacted soil layer for protection from freeze-thaw cycles, a 0.5 ft thick bedding layer to promote drainage, and an 8- to 12-inch-thick layer of riprap to prevent erosion of the underlying materials. 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). In 2008 two slight depressions were thought to have been noted on the disposal cell top between settlement plates 6 and 7; these depressions could not be identified in subsequent inspections, including during the 2013 inspection. At the time, these areas were thought to be a result of inconsistencies in grade that occurred during cell construction and not from settlement of the underlying materials. Inspections will continue to include visual monitoring of this area to determine if any settlement of the disposal cell is actually occurring.

Minor accumulations of various shallow-rooted plants were observed on the disposal cell top and side slopes. No deep-rooted plants were found growing on the disposal cell in 2013 (growth of deep-rooted plants on the disposal cell is controlled in accordance with the LTSP). Noxious weeds found onsite continued to be treated with herbicide in 2013. The effectiveness of this treatment has become evident over time.

The LTSP advises inspectors to look for seeps on the east and southeast side slopes of the disposal cell because slimes were encapsulated in this portion of the cell. In 2013, no seeps were observed at the toe of the disposal cell in this area. However, cattails continue to be observed growing at this location (PL-8), indicating the presence of moisture that is likely the result of repeated surface runoff from the cell rather than from seepage from the cell; standing water has been observed in this area during past inspections and was noted again in 2013. In 2003, a sample of the evaporites from this location was collected for laboratory analysis; no constituents attributable to the cell contents were reported to be present. Observation of this area will continue.

11.4.2.2 Other Areas Inside the Site Boundary

The final surface conditions at the Maybell disposal site are a combination of rock armoring and contouring to achieve the necessary surface water drainage control and erosion protection to satisfy design longevity requirements. Other revegetated surfaces at the site have been planted with a mix of native and adaptive grasses to provide soil stability. Vegetation diversity and density in graded and disturbed areas between the disposal cell and the site boundary continues; no noxious weeds were observed. Abundant signs of wildlife are present onsite and in the surrounding area.

The rock-armored diversion channels, swales, and gullies were in good condition (PL-9 and PL-10). Erosion directly downgradient of the outlets to Diversion Channel No. 1 and Swale No. 1 that has exposed the underlying geo-fabric had not changed significantly. Riprap placed within the outlets continues to provide protection against headcutting. This erosion presents no threat to the integrity of the disposal cell but monitoring of it will continue. Minor rills noted 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 any significant new erosion or sediment moving offsite into Johnson Wash. Gabions and riprap installed in 2000, and reinforced in 2001 and 2002, to control erosion in drainage structures east of the cell continue to remain effective.

In 2006, lode mining claim locator stakes were first discovered onsite inside the perimeter fence. Additional locator stakes were found onsite in the years following, including several on the disposal cell in 2011. Two more stakes were found onsite in 2012. No additional stakes were found in 2013. BLM has informed DOE that these stakes were not actual claims, rather they were what are referred to as lode mining claim locators; 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 Site Perimeter and Outlying Areas

The area outside the site boundary for 0.25 mile was visually inspected. 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 (PL-11). Over time, slumping of the pit wall resulted in the pit encroaching several feet onto what is now DOE property. 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. Continued observation will be performed to ensure that any additional sloughing of the pit wall does not damage the perimeter fence that runs along the south property line. This encroachment is visually monitored annually and periodically documented with photographs to determine if any further slumping of the pit wall is occurring. In 2013, there was no evidence of any additional encroachment of the pit onto the site. However, windblown sand continues to accumulate along the northern crest of the pit wall along the fence line (PL-12).

In September 2004 DOE received written concurrence from BLM that the ROW reservation directly north of the site had revegetated successfully and that the permit for the reclaimed reservation area has been relinquished. At the request of a local rancher (who holds a BLM grazing permit for the area surrounding the site), the fenced-in former ROW area is being used occasionally for livestock management. In 2013, it was observed that vegetation in former ROW area continued to be well established and there was no evidence of overgrazing.

11.5 Follow-Up or Contingency Inspections

DOE will conduct follow-up inspections if (1) an annual inspection or other site visit reveals a condition that must be reevaluated during a return to the site, or (2) a citizen or outside agency notifies DOE that conditions at the site are substantially changed.

No need for follow-up or contingency inspections was identified during the inspection.

11.6 Maintenance and Repairs

- 11A Repair of a broken top strand of barbed-wire at two locations in the perimeter fence on the east side of the site is needed. The fence remains functional. This minor fence repair will be performed sometime in the future when additional repairs warrant action.
- 11B Perimeter sign P1 is missing and will be replaced in the future. It is not of immediate concern, as several additional perimeter warning signs are along this side of the site and are visible from the road.

Maintenance in 2013 consisted of treating noxious weeds.

11.7 Environmental Monitoring

11.7.1 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.

Groundwater level monitoring was conducted in accordance with the LTSP from November 1995 through March 2004 to determine if transient drainage from the disposal cell was interacting with the local groundwater system. In 2004, following the required 5-year monitoring period, water-level measurements were discontinued because there was no evidence that transient drainage was interacting with the local groundwater system near the disposal cell. By letter dated January 5, 2005, NRC concurred with this conclusion and agreed that groundwater level monitoring was no longer needed. In May 2006, the four remaining monitoring wells at the site were decommissioned in accordance with State of Colorado requirements. In November 2007, the LTSP was revised to reflect regulatory concurrence to discontinue water level monitoring, and the revised document was submitted to NRC for acceptance.

11.8 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 in 2013.

11.9 Photographs

Photo Location Number	Azimuth	Photograph Description
PL-1	180	Site entrance sign; disposal cell in background.
PL-2	NA	Site marker No. 2.
PL-3	NA	Boundary monument No. 1.
PL-4	330	Southwestern portion of the disposal cell; confluence of Diversion Channels No. 1 and 2 in foreground.
PL-5	40	Southeastern portion of the disposal cell; Diversion Channel No. 1 in foreground.
PL-6	350	Northeastern edge of the disposal cell top.
PL-7	215	Southeastern edge of the disposal cell top.
PL-8	45	Cattails growing adjacent to the base of the east side slope of the disposal cell; standing water within apron in foreground.
PL-9	320	Armored Gully No. 1; disposal cell in background.
PL-10	355	Confluence of Diversion Channels No. 1 and 2.
PL-11	270	Perimeter fence along southern property boundary; north end of Johnson Pit in background.
PL-12	90	Windblown sand accumulation along the south perimeter fence at crest of the northern wall of the Johnson Pit; encroachment of pit in background.



MAY 8/2013. PL-1. Site entrance sign; disposal cell in background.



MAY 8/2013. PL-2. Site Marker No. 2.



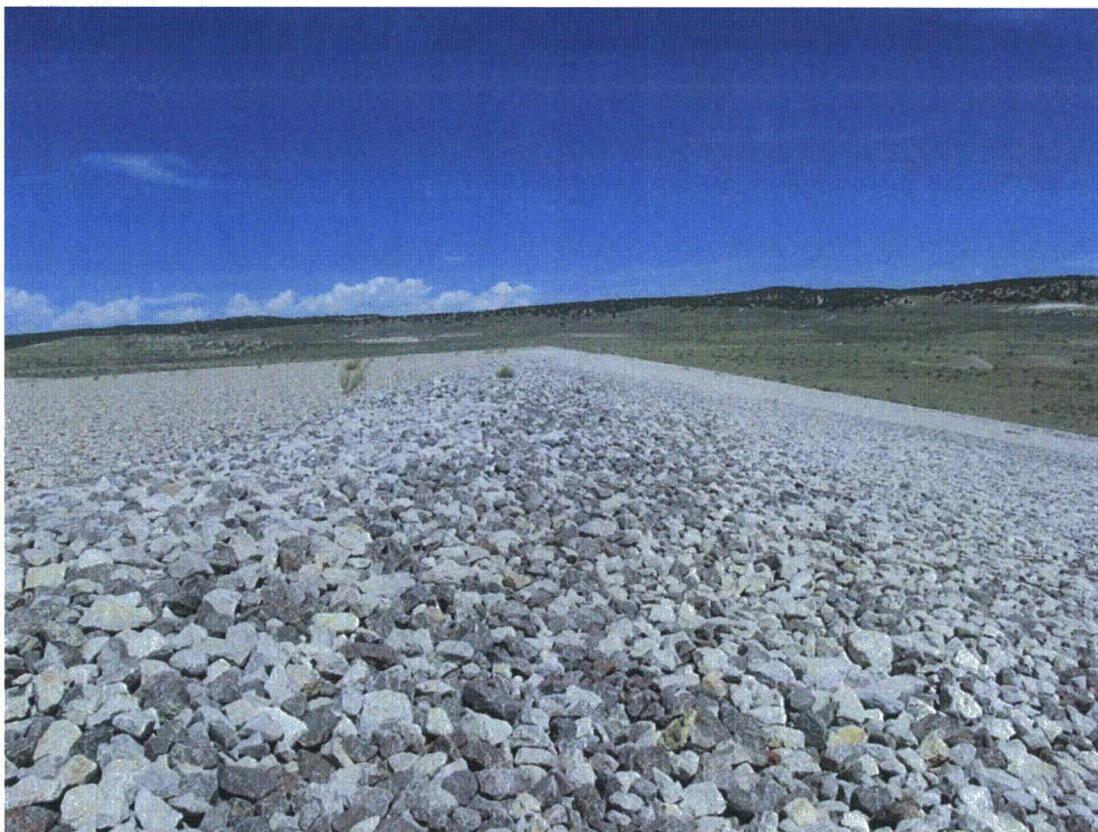
MAY 8/2013. PL-3. Boundary Monument No. 1.



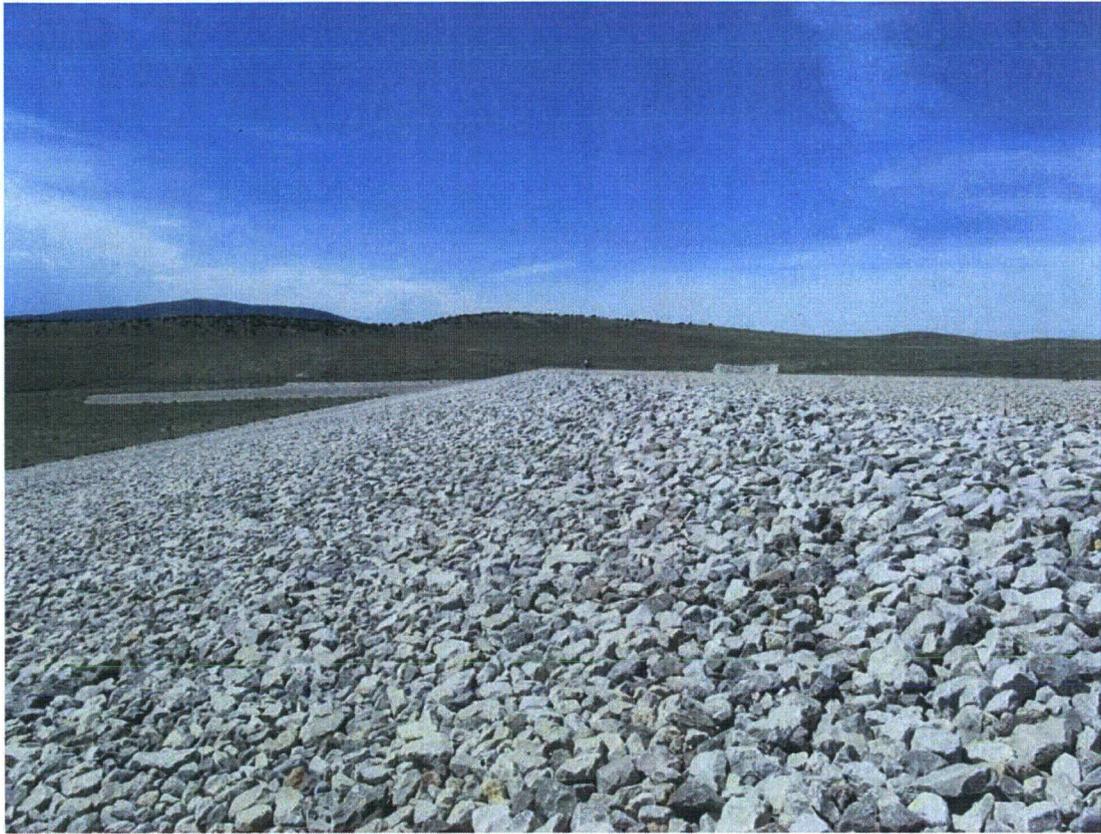
MAY 8/2013. PL-4. Southwestern portion of the disposal cell; confluence of Diversion Channels No. 1 and 2 in foreground.



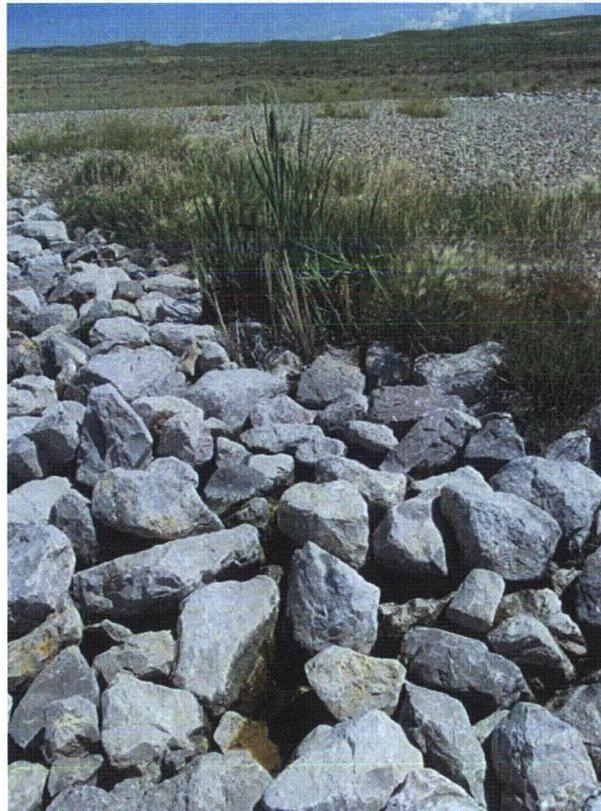
MAY 8/2013. PL-5. Southeastern portion of the disposal cell; Diversion Channel No. 1 in foreground.



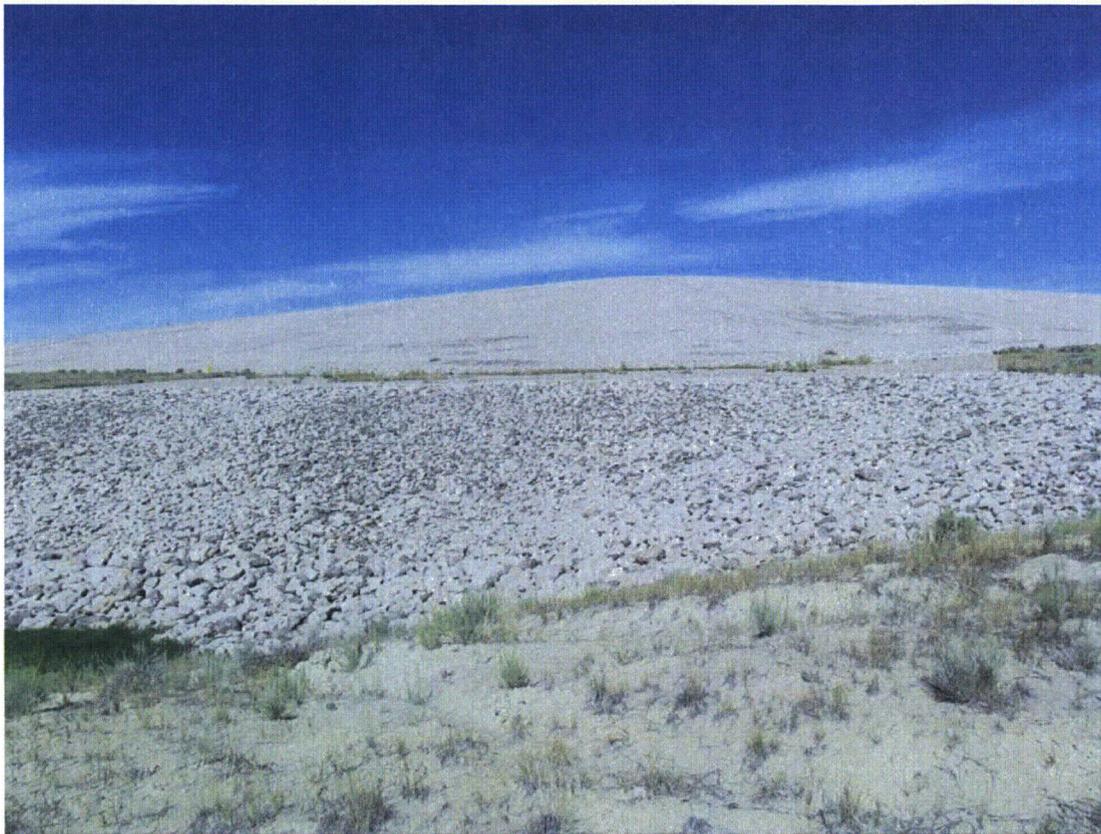
MAY 8/2013. PL-6. Northeastern edge of the disposal cell top.



MAY 8/2013. PL-7. Southeastern edge of the disposal cell top.



MAY 8/2013. PL-8. Cattails growing adjacent to the base of the east side slope of the disposal cell; standing water within apron in foreground.



MAY 8/2013. PL-9. Armored Gully No. 1; disposal cell in background.



MAY 8/2013. PL-10. Confluence of Diversion Channels No. 1 and 2.



MAY 8/2013. PL-11. Perimeter fence along southern property boundary; north end of Johnson Pit in background.



MAY 8/2013. PL-12. Windblown sand accumulation along the south perimeter fence at crest of the northern wall of the Johnson Pit; encroachment of pit in background.

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12.0 Mexican Hat, Utah, Disposal Site

12.1 Compliance Summary

The Mexican Hat, Utah, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Disposal Site was inspected on April 2, 2013. The disposal cell was in excellent condition. The cell condition was unchanged from the previous year. Minor fence repair was performed near the beginning of the north diversion channel in 2012. A slight rockslide near perimeter sign P22 loosened fence strands, and fence repair was completed in 2012. At the time of the 2013 inspection, only perimeter sign P20 needed replacement due to bullet holes. Vandalism continues, as indicated by new bullet holes in P20. No additional maintenance needs or cause for a follow-up or contingency inspection was identified.

12.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the site are specified in the *Long-Term Surveillance Plan for the Mexican Hat, Utah, Disposal Site (LTSP)* (DOE/AL/62350-207, Rev. 2, U.S. Department of Energy [DOE], June 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 12-1 lists these requirements.

Table 12-1. License Requirements for the Mexican Hat Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Sections 3.3 and 3.4	Section 12.4
Follow-Up or Contingency Inspections	Section 3.5	Section 12.5
Routine Maintenance and Repairs	Section 3.6	Section 12.6
Groundwater Monitoring	Section 3.7	Section 12.7
Corrective Action	Section 3.6	Section 12.8

The inspection was also performed in accordance with approved recommendations presented in the seep monitoring evaluation report (*Resolution of Seep and Ground Water Monitoring at the Mexican Hat, Utah, UMTRCA Title I Disposal Site*, March 2006; resolution document). Annual assessment of six designated seeps was conducted during the inspection. Qualitative descriptions of the seeps included photographic documentation for yearly comparisons. In accordance with the resolution document, no samples were collected for analysis, since no significant increase of seepage or changes were observed.

12.3 Institutional Controls

The United States of America holds the 119-acre disposal site in trust for the Bureau of Indian Affairs; the Navajo Nation retains title to the land. DOE and the Navajo Nation executed a Custodial Access Agreement that conveys to the federal government title to the residual radioactive materials stabilized at the repository site and ensures that DOE has perpetual access to the site. UMTRCA authorized DOE to enter into a Cooperative Agreement (DE-FC04-85AL26731) with the Navajo Nation, and required it to be in place before bringing the site under the general license. The purpose of the Cooperative Agreement was to perform remedial actions at the former processing sites. The site 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 custody of the disposal cell and the following features that are inspected annually: site markers, survey and boundary monuments, warning/no-trespassing signs, a site perimeter fence, and a locked gate at the site entrance.

12.4 Inspection Results

The site, south of Mexican Hat, Utah, was inspected on April 2, 2013. J. Gillespie and M. Plessinger of the S.M. Stoller Corporation, the Legacy Management Support contractor for DOE's Office of Legacy Management in Grand Junction, Colorado, conducted the inspection.

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

12.4.1 Site Surveillance Features

The locations of site surveillance features are shown on Figure 12-1. 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 12-1 by photograph location (PL) numbers.

12.4.1.1 Site Access, Entrance Gate, Access Road, and Entrance Sign

The site is accessed via a short unmarked dirt road off U.S. Highway 163 that ends at a graded parking area. Erosion continues to occur along the dirt road, but the site continues to be accessible.

The entrance sign at the gate is in excellent condition (PL-1).

12.4.1.2 Fence and Perimeter Signs

A barbed-wire perimeter fence is located between the disposal cell features and the site boundary and was in good condition. Periodically, the fence is damaged by livestock or erosion and requires repair. Erosion has increased the spacing between the lowest strand and the ground surface between perimeter signs P37 and P40. An additional strand of non-barbed (wildlife-friendly) wire was added in 2010 and was in good condition. Erosion continues to migrate up to the end of the west diversion channel at perimeter signs P42 and P43 but is not a concern at this time.

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The site has 43 perimeter sign locations, and each location has a pair of signs: an upper property ownership sign and a lower radioactive materials disposal site (warning sign). The remaining perimeter signs were present and legible, although several are damaged by bullet holes or have been bent because wildlife rubbed against them. The area of perimeter signs P20 through P24 continually receives bullet damage, as evidenced at perimeter sign P20 (PL-2).

12.4.1.3 Site Markers

Two granite site markers are on the site. Site marker SMK-1 is on the ground inside the southwest security fence line. Its concrete base has several minor cracks, but repairs are not necessary at this time. Overall, the site marker was in good condition (PL-3). Site marker SMK-2, located at crest of the disposal cell, was in excellent condition (PL-4).

12.4.1.4 Survey Monuments and Boundary Monuments

The four survey monuments and 12 boundary monuments were inspected. All survey and boundary monuments were in good condition.

12.4.2 Inspection Areas

In accordance with the LTSP, the site is divided into four inspection areas (referred to as “transects” in the LTSP) to ensure a thorough and efficient inspection: (1) the riprap-covered disposal cell top; (2) the riprap-covered side slopes, toe drains, aprons, and diversion channels; (3) the area between the cell and the site boundary (perimeter signs and fencing); and (4) the outlying area (drainages and observation of seeps).

Within each area, inspectors examined specific site surveillance features, such as the entrance gate and sign, survey and boundary monuments, perimeter signs and fences, and site markers. Inspectors examined each area for evidence of erosion, settling, slumping, or other disturbances that might affect the site’s integrity, protectiveness, or long-term performance.

12.4.2.1 Disposal Cell and Adjacent Area Inside the Security Fence

The top of the disposal cell is in excellent condition (PL-5, PL-6, and PL-7). Inspectors found no evidence of differential settling, cracking, erosion, or burrowing. All visible components of the disposal cell and cover were functioning as designed. No vegetation was growing on top of the disposal cell.

12.4.2.2 Side Slopes, Toe Drains, Aprons, and Diversion Channels

The disposal cell side slopes, toe drains, aprons, and diversion channels were in excellent condition and functioning as designed.

The sloughing of red country rock and soil along the south apron (PL-8) has not increased during the past year. Because the apron in this area is immediately adjacent to the base of the steep rocky cliff face along the southern edge of the disposal cell cover, it is expected that a certain amount of sediment and unstable rock from the cliff face will, over time, continue to fall onto the apron. This area has been inspected for several years with little or no change being observed from year to year. As a best management practice, inspectors will continue to monitor this area.

Areas offsite and upgradient continue to erode and transport sediment onto the site and into the west diversion channel (PL-9). The sediment accumulation has promoted the growth of vegetation in the channel, including perennial grasses and annual weeds; however, the sediment and vegetation are not affecting the performance of these drainage structures.

Though present in the arroyos outside the site, one tamarisk plant was observed on the site during the inspection in the west diversion channel west of the cap. Its growth will be monitored, and removal of the plant may be necessary during the next scheduled maintenance effort. Tamarisk control will continue on the site.

12.4.2.3 Site Perimeter Between the Security Fence and the Site Boundary

Minor erosional rills and gullies continue to form along the western edge of the site boundary primarily upgradient of and between boundary monuments BM-7 and BM-8. This is an expected natural process and a result of the site stabilizing and coming to equilibrium with the outlying areas. Erosion in these areas will continue to be monitored, but it is not a concern unless it damages the perimeter fence or impacts the performance of the west storm water diversion channel.

Scattered trash (broken glass, bottles, cans, cardboard, and paper containers) is accumulating in the more accessible portions of the site where vehicle access is available. The most noticeable accumulations of trash continue to be along the entrance road and in the parking area, the areas on DOE property along the perimeter fence between perimeter signs P31 and P42, and the southern portion of the site between perimeter signs P22 and P27. Periodic trash removal may be necessary to maintain the integrity of the perimeter fence and to keep trash from entering the fenced area.

Tumbleweeds and trash continue to accumulate along the west and southwest sections of the perimeter fence, primarily between perimeter signs P31 and P42. However, this accumulation does not appear to be damaging the fence.

Trespassing just inside the disposal site property boundary (outside the perimeter fence) occurs in the same areas where trash accumulations are noted, as evidenced by vehicle and all-terrain vehicle tracks. Vandalism has increased, as indicated by new bullet holes in several perimeter signs. This is expected to be an ongoing problem at the site.

12.4.2.4 Outlying Area

The area surrounding the site was visually inspected for signs of erosion, development, or other disturbance that might affect site integrity or security. As discussed above, trash continues to accumulate primarily in areas immediately adjacent to the site property boundary. No other changes were observed.

12.5 Follow-Up or Contingency Inspections

DOE will conduct follow-up inspections if (1) an annual inspection or other site visit reveals a condition that must be reevaluated during a return to the site, or (2) a citizen or outside agency notifies DOE that conditions at the site are substantially changed.

No need for a follow-up or contingency inspection was identified during the inspection.

12.6 Maintenance and Repairs

- 12A The damaged P20 perimeter sign will need to be replaced. A warning sign was recommended for Seep 254 during the 2012 inspection; however, flash floods that occur periodically in this drainage would damage the sign, and placing the warning sign is no longer recommended.

12.7 Environmental Monitoring

Visible inspection of the monitored seeps is performed in accordance with the approved recommendations presented in the seep monitoring evaluation report (the resolution document). Six designated seeps are assessed annually to determine if conditions have changed significantly to warrant sampling.

In accordance with approved recommendations presented in the resolution document, inspectors conduct annual visual assessments of seep flows at the six designated seep locations. No significant increases in water flow or conditions at the seeps were noted; therefore, no sampling and analysis or evaluation is justified at this time. The seeps are primarily the result of perched water that leaked from the former processing site tailings pond for many years and, to a lesser degree, the result of transient drainage from the wet tailings placed in the disposal cell. Signs warning against drinking the water remain posted at the seep locations. The seeps had no flow during the 2013 inspection due to the drought conditions in the region.

- 12B All seeps observed during the site inspection are listed in the LTSP except seep 0264, which replaced seep 0249 in 1995 because seep 0249 had insufficient flow for sampling. Historically, minimal flow is observed only at seep 0248; however, this year the area was only moist, and only dripping water was observed. The remaining seeps were all dry, with no indication of recent moisture. Some evaporites were observed, but the soil beneath was dry. Gypsum Creek sediments were moist, and there was limited exposed flowing water in the drainage. Table 12-2 provides observations and qualitative descriptions of seep flows, along with a reference to photographic documentation.

Table 12-2. Observations and Descriptions of Seeps at the Mexican Hat Disposal Site

Seep Location Number	Drainage	Photo Numbers	Observations and Descriptions of Seep Flow (Qualitative)
0248	Gypsum Creek	PL-10	Moist adjacent rock face; soils moist but no flow or pooling in the immediate area.
0251	North Arroyo	PL-12	Dry; no evidence of seep soil present; no observed flow. Minimal vegetation—primarily tamarisk (very little other riparian vegetation).
0254	South Arroyo	PL-11	Dry; no flow, or moist soil present where standing pool of water usually exists from recent rain events. Very little riparian vegetation besides tamarisk. Location is not posted.
0264	North Arroyo	PL-13	Dry; no flow.
0922	South Arroyo	PL-14	Dry; no change from previous year's inspection.

12.8 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

No corrective action was required in 2013.

12.9 Photographs

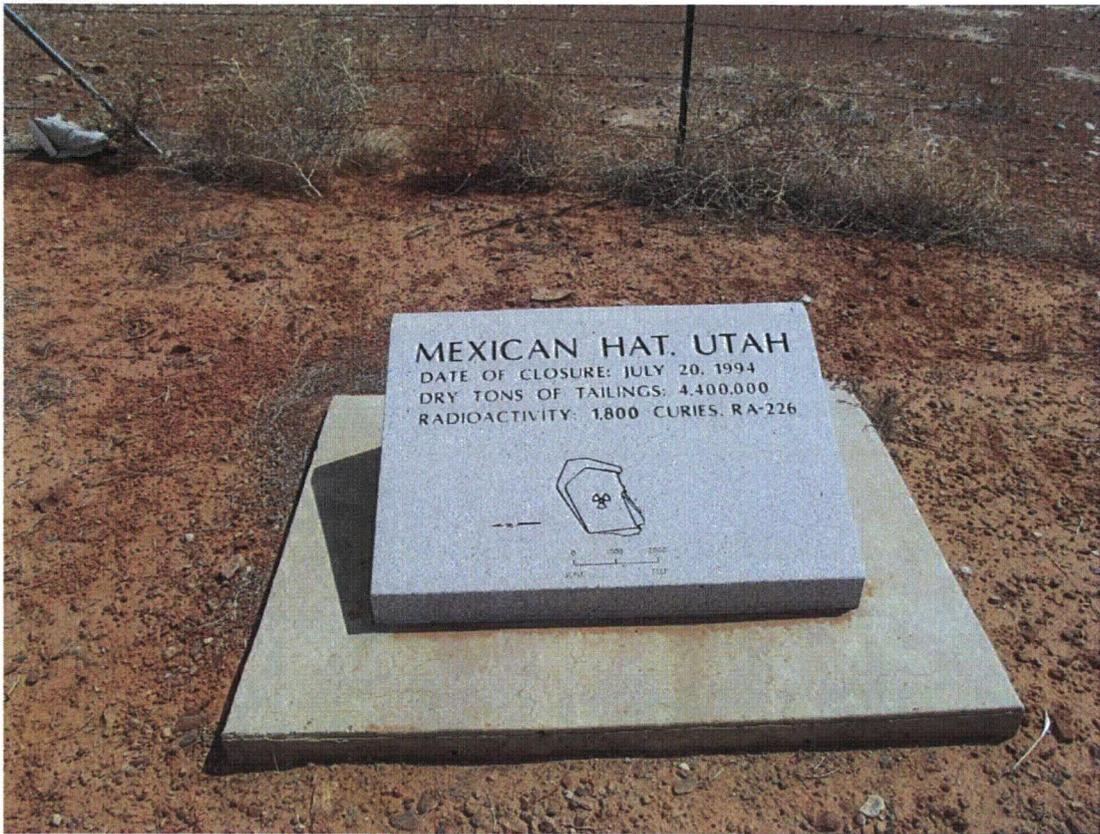
Photo Location Number	Azimuth	Photograph Description
PL-1		Site entrance sign.
PL-2		Perimeter sign P20 with bullet holes.
PL-3		Site marker SMK-1.
PL-4		Site marker SMK-2.
PL-5		South slope.
PL-6		North toe drain/northeast side slope
PL-7		Across cell top to the southwest.
PL-8		Northeast toe drain.
PL-9		West side slope.
PL-10		Seep 248 dripping conditions; no standing water.
PL-11		Seep 254 dry conditions.
PL-12		Seep 251 dry conditions.
PL-13		Seep 264 dry conditions.
PL-14		Seep 922 dry conditions.



HAT 4/2013. PL-1. Entrance sign.



HAT 4/2013. PL-2. Perimeter sign P20 with bullet holes.



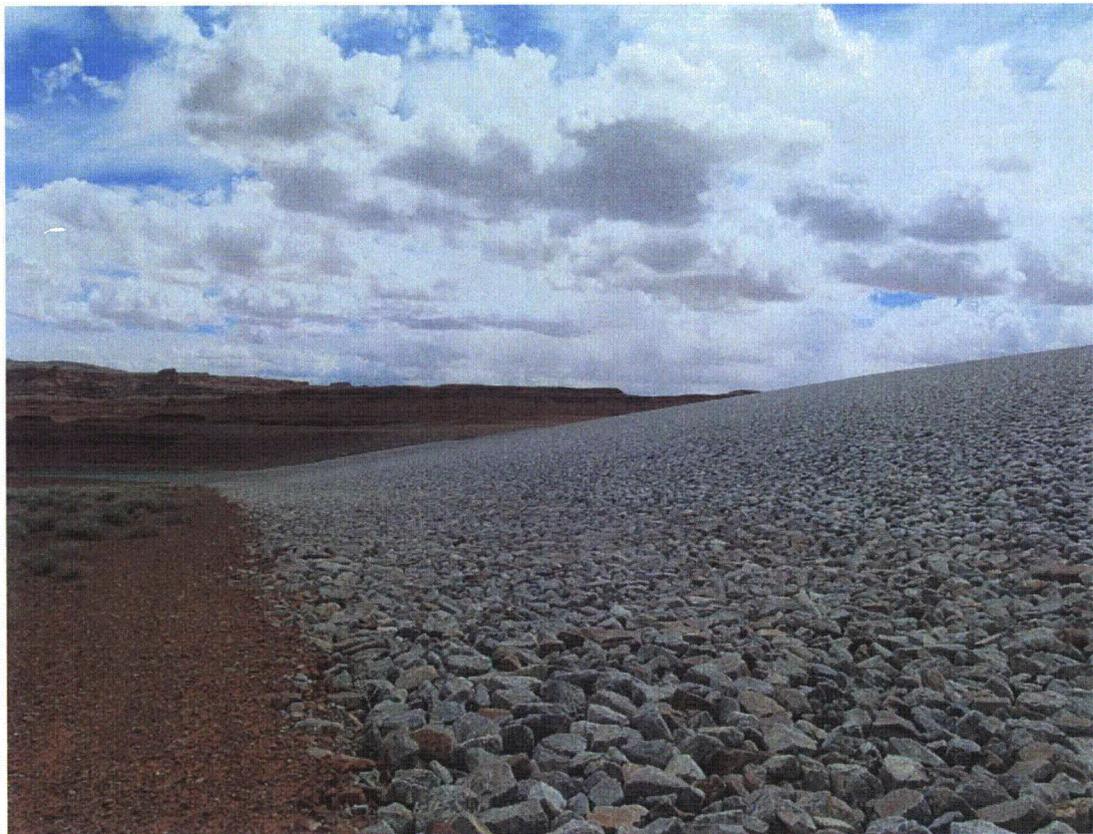
HAT 4/2013. PL-3. Site marker SMK-1.



HAT 4/2013. PL-4. Site marker SMK-2.



HAT 4/2013. PL-5. South slope.



HAT 4/2013. PL-6. North toe drain/northeast side slope.



HAT 4/2013. PL-7. Across cell top to the southwest.



HAT 4/2013. PL-8. Northeast toe drain.



HAT 4/2013. PL-9. West side slope.



HAT 4/2013. PL-10. Seep 248 dripping conditions; no standing water.



HAT 4/2013. PL-11. Seep 254 dry conditions.



HAT 4/2013. PL-12. Seep 0251 dry conditions.



HAT 4/2013. PL-13. Seep 0264 dry conditions.



HAT 4/2013. PL-14. Seep 922 dry conditions.

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13.0 Naturita, Colorado, Disposal Site

13.1 Compliance Summary

The Naturita, Colorado, Uranium Mill Tailings Radiation Control Act Title I Disposal Site was inspected on May 14, 2013, and was in excellent condition. Maintenance needs identified during the inspection were loose and broken fence wires at several locations on the perimeter fence and repair of minor erosion of the access road. The wires were repaired in October 2013, and the erosion will be repaired before the next annual inspection. No additional maintenance needs or cause for a follow-up inspection was identified.

13.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the site are specified in the *Long-Term Surveillance Plan for the Upper Burbank Disposal Cell, Uravan, Colorado* (LTSP) (DOE/AL/62350B250, Revision 1, July 1999) and in procedures that the U.S. Department of Energy (DOE) established to comply with the requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). Table 13-1 lists these requirements.

Table 13-1. License Requirements for the Naturita Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 6.0	Section 13.4
Follow-Up or Contingency Inspections	Section 7.0	Section 13.5
Routine Maintenance and Repairs	Section 8.0	Section 13.6
Groundwater Monitoring	Section 5.2	Section 13.7
Corrective Action	Section 9.0	Section 13.8

13.3 Institutional Controls

The 26.65-acre disposal site 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 1999. 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: a site perimeter fence, warning/no trespassing signs (referred to as perimeter signs) placed along the property boundary, and a locked gate at the entrance to the site access road.

13.4 Inspection Results

D. Traub and L. Sheader of the S.M. Stoller Corporation, the Legacy Management Support contractor for the DOE office in Grand Junction, Colorado, conducted the inspection along with M. Kautsky, of the DOE Office of Legacy Management. R. Evans, senior health physicist with NRC, attended this year's inspection to conduct an observational site visit. M. Cosby of the Colorado Department of Public Health and Environment accompanied the inspectors. J. Nguyen the DOE site manager for the Slick Rock site also attended.

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

13.4.1 Site Surveillance Features

Figure 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 the drawing by photograph location (PL) numbers.

13.4.1.1 Entrance Gate, Entrance Sign, and Access Road

Access to the Naturita disposal site is off State Highway 141 south of Uravan up Hieroglyphic Canyon along Montrose County Road EE22. Road EE22 borders the site on the east.

The entrance gate consists of a locked pair of tubular metal gates that hang on galvanized steel gateposts. Two other metal gates allow access to monitoring wells adjacent to the west side of the cell. The gates are in good condition. The disposal cell access road along the northwest side of the site descends through the shale and sandstone units in the Salt Wash Member of the Morrison Formation (PL-1). As is indicated in photo PL-2, erosion of the access road bed has occurred at the upper gate on the access road. The erosional rill will be filled and drainage rechanneled before the next inspection.

13.4.1.2 Perimeter Fence and Perimeter Signs

Perimeter signs (PL-3) mounted on steel posts are set approximately 5 feet inside the perimeter fence. One perimeter sign (P2) has had three bullet holes for the past several years but remains legible. The other 24 perimeter signs and the entrance sign are in good condition.

A barbed-wire stock fence encloses the site. The fence is in good condition except for several sections with broken and loose strands along the north perimeter and a section just south of the entrance gate. Evidence that elk frequent the area was detected near the broken fences. Fence wire strands were repaired in October 2013.

13.4.1.3 Site Markers

Two granite site markers identify the Naturita disposal site. Site marker SMK-1 (PL-4) is set just inside and left of the entrance gate; site marker SMK-2 is located on the disposal cell in the south-central portion of the top slope. Both markers were undisturbed and in good condition.

13.4.1.4 Survey Monuments and Boundary Monuments

Boundary monuments BM-1 through BM-17 (BM-2/PL-5) mark the property corners. Survey monuments SM-3, SM-4, and SM-11, represent boundary monuments BM-3, BM-4, and BM-11. Both survey and boundary monuments are located with the same precision and serve the same purpose of marking the boundaries for the site. Survey monuments were installed early during site construction for survey control; boundary monuments were installed after

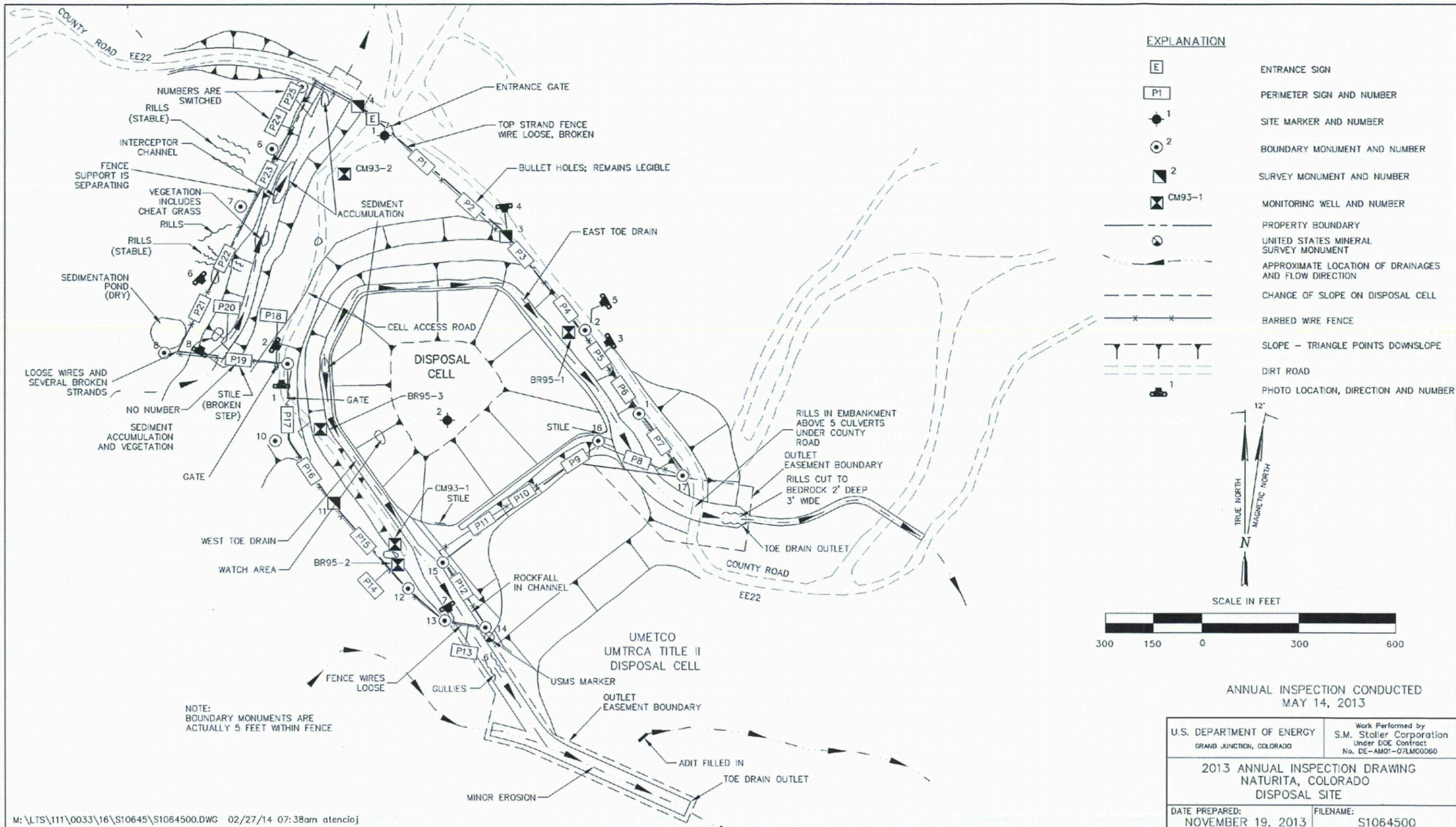


Figure 13-1. 2013 Annual Inspection Drawing for the Naturita Disposal Site

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completion of construction. The boundary monuments and the survey monuments are undisturbed and in good condition. Boundary monument BM-9, which was not located during the 2012 inspection, was found under brush during this inspection and is in good condition.

13.4.1.5 Monitoring Wells

Monitoring wells BR95-1, BR95-2, and BR95-3 were completed at the contact of the Salt Wash Member of the Morrison Formation and the Summerville Formation, which forms an aquitard above the Wingate Sandstone. Wells CM93-1 and CM93-2 were completed in the Wingate Sandstone, which is the uppermost aquifer at the site. Well CM93-2 was missing the lock; otherwise, all monitoring wells were in good condition. The lock was replaced in October 2013.

13.4.2 Inspection Areas

To ensure a thorough and efficient inspection, the site was divided into four areas (referred to as “transects” in the LTSP): (1) the riprap-covered top slope and side slopes of the disposal cell; (2) the riprap-covered toe drains and toe drain outlets; (3) the riprap-covered interceptor channel; and (4) the outlying area.

Within each area, inspectors examined specific site surveillance features, such as monitoring wells, survey and boundary monuments, signs, and site markers. Inspectors also examined each area for evidence of erosion, settling, slumping, or other disturbance that might affect site integrity or the long-term performance of the site.

13.4.2.1 Top Slope and Side Slopes

Rock covers the 2-acre top of the disposal cell and the approximately 8 acres of side slopes. The rock is rounded, with larger rock on the side slopes than on the top. The rock-covered surfaces are in excellent condition (PL-6) and show no signs of disturbance except on the southwest side of the top surface. This is an area that had a standpipe removed several years ago, and the slightly irregular surface is the result of this activity. A small area on the southwest side of the disposal cell was noted as being slightly higher than the surrounding cell sides. This area, which may be a feature left from final rock placement, will be observed in future inspections to verify that it is not changing. No other degradation or vegetation was evident on the cell.

13.4.2.2 Toe Drains and Toe Drain Outlets

Two riprap-filled toe drains collect water from the cell side slopes and divert it to the southeast. The toe drain on the west and southwest sides of the cell exits through a channel quarried through the wall of the Burbank Pit, into Hieroglyphic Canyon, and finally to the San Miguel River (PL-7). Some sediment has accumulated in the upper end of the west toe drain, allowing scattered plants to grow. Farther down this drain, beyond the lined portion, water is beginning to erode the softer bedrock. A knickpoint has formed at the intersection of shale and overlying sandstone units within the Salt Wash Member of the Morrison Formation. This occurrence is not a threat to the performance of the cell. Several years ago, a boulder rolled off the slope from County Road EE22 along the eastern side of the site into the drain near perimeter sign P4, but is not a threat to cell performance. This area will be watched in future inspections for additional rock movement. During the 2013 inspection, there was still just one boulder in the drain.

13.4.2.3 Interceptor Channel

A riprap-armored interceptor channel, upgradient and northwest of the disposal cell, diverts storm water and snowmelt run-on to the northeast under County Road EE22. Some erosion has occurred outside the property uphill from perimeter sign P23 and between perimeter signs P22 and P23, resulting in deposition of sediment in the channel (PL-8). The channel is in excellent condition, however, and the current sediment accumulation and associated vegetation do not impair the function of the channel.

13.4.2.4 Outlying Area

The site boundary and the area within 0.25 mile of the site boundary have been highly disturbed by mining, quarrying, reclamation, and road building. Numerous weeds, none noxious, have been observed on the Title II cell just to the southeast of the Title I cell.

As noted last year, the most significant disturbance in an outlying area is the Umetco reclamation of a large borrow area northwest of the DOE disposal site. Sediment could erode off this disturbed region during heavy rains, and the area will probably be a source of new, possibly noxious, weed growth. During previous inspections, the majority of the noxious weeds noted were immediately adjacent to the northwest boundary. Inspectors at the DOE disposal site will monitor this area for the next few years. Umetco (DOW Chemical) has completed most Uravan Title II remedial action and is preparing for the transfer of the site to DOE's Office of Legacy Management.

13.5 Follow-Up or Contingency Inspections

DOE will conduct follow-up inspections if (1) an annual inspection or other site visit reveals a condition that must be reevaluated during a return to the site, or (2) a citizen or outside agency notifies DOE that conditions at the site are substantially changed.

No need for a follow-up or contingency inspection was identified during the inspection.

13.6 Maintenance and Repairs

- 13A** Broken and loose fence strands near the entrance gate and along the northern perimeter were repaired in October.
- 13B** Erosion repair is needed; the gravel roadbed of the access road has washed out in a small gully near the upper double gates on the cell access road.

The padlock on monitoring well CM93-2 was replaced in October.

13.7 Environmental Monitoring

13.7.1 Groundwater Monitoring

- 13C** Groundwater monitoring was not conducted in 2013. Groundwater monitoring was last performed in July 2012 and will be conducted again in 2014.

Groundwater Monitoring Strategy—In accordance with the LTSP (beginning in 2000), DOE has monitored groundwater at the site every 2 years as a best management practice to demonstrate the initial performance of the disposal cell; the last sampling event was in July 2012. The compliance strategy is to not exceed maximum concentration limits (MCLs) established in Table 1 to Subpart A of 40 CFR 192 or background levels in a point-of-compliance (POC) well (CM93-2) in the uppermost aquifer (Wingate Sandstone) downgradient of the disposal cell. The Wingate Sandstone lies approximately 600 feet beneath the disposal cell and is hydrologically isolated from the surface by unsaturated sandstone of the Salt Wash Member of the Morrison Formation and relatively impermeable shale layers (aquitar) of the Summerville Formation.

Groundwater monitoring is performed in three shallower monitoring wells (BR95-1, BR95-2, and BR95-3), completed at the contact between the Salt Wash Member and the Summerville Formation, to provide early warning of possible migration of contaminants. If contamination suspected to be related to the disposal cell is observed at this horizon, DOE will sample two deeper wells (CM93-1 and CM93-2) screened in the Wingate Sandstone. Indicator analytes are arsenic, molybdenum, and uranium. Wells CM93-1 and CM93-2 were last sampled in May 1997, with concentrations of all indicator analytes at or near detection limits and well below the respective MCLs.

Groundwater Monitoring Evaluation—In the last several annual compliance reports, DOE has reported the following four major findings based on the historical groundwater monitoring results. First, the uppermost aquifer is hydrologically isolated from the surface by an aquitar consisting of unsaturated sandstone and relatively impermeable shale layers. Second, historical monitoring has demonstrated that contamination does not occur within the uppermost aquifer. Third, naturally occurring uranium mineralization affects water quality within the surface formation on which the disposal cell is constructed. And finally, concentrations of indicator compounds have remained essentially static since the onset of sampling (arsenic and molybdenum concentrations remain 1 to 2 orders of magnitude less than their respective MCLs).

Based on these findings, DOE concluded that continued sampling and analysis of the BR-series wells would provide little useful data for evaluating cell performance and that, in accordance with the LTSP, the groundwater monitoring program at the site could be terminated. On October 31, 2013, DOE sent a letter to NRC providing details on DOE's decision to cease groundwater monitoring at the Naturita disposal cell (Notification to Terminate Groundwater Monitoring at the Naturita, Colorado, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Site).

13.8 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

No corrective action needs were identified during the inspection.

13.9 Photographs

Photo Location Number	Azimuth	Description
PL-1	30	Access road west of cell.
PL-2	210	Erosion on access road near upper gate.
PL-3	240	Perimeter sign P5. Signs are numbered for location reference.
PL-4	175	Monument near site entrance gate.
PL-5	240	Boundary monument number BM-2, typical boundary monument.
PL-6	135	View of disposal cell from west-northwest.
PL-7	150	View of drainage channel looking southeast.
PL-8	30	View of interceptor channel looking east-northeast.



NAD 5/2013. PL-1. Access road west of cell.



NAD 5/2013. PL-2. Erosion on access road near upper gate.



NAD 5/2013. PL-3. Perimeter sign P5. Signs are numbered for location reference.



NAD 5/2013. PL-4. Monument near site entrance gate.



NAD 5/2013. PL-5. Boundary monument number BM-2, typical boundary monument.



NAD 5/2013. PL-6. View of disposal cell from west-northwest.



NAD 5/2013. PL-7. View of drainage channel looking southeast.



NAD 5/2013. PL-8. View of interceptor channel looking east-northeast.