

12.0 Annual Inspection of the Mexican Hat, Utah, UMTRCA Title I 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 3, 2012. The disposal cell was in excellent condition. The U.S. Department of Energy (DOE) site lead and three inspectors from the U.S. Nuclear Regulatory Commission (NRC) were part of the annual inspection. The cell condition was unchanged from the previous year. Minor fence repair was performed near the beginning of the north diversion channel. A slight rockslide near perimeter sign P22 loosened fence strands, and a radiation protection sign was missing from perimeter sign P31; these repairs are the only future maintenance required. Vandalism continues, as indicated by new bullet holes in perimeter signs. No additional maintenance needs or cause for a follow-up or contingency inspection was identified.

Numbers in the left margin of this report refer to items summarized in the "Executive Summary" table.

12.2 Inspection 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* (DOE/AL/62350-207, Rev. 2, DOE, June 1997; LTSP) and in procedures established by DOE to comply with the requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27).

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 12.7.1
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 sampling and analysis was performed 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 the required it 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 NRC general license (10 CFR 40.27) in 1997. DOE is the licensee and, in accordance with the requirements for UMRCA 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 3, 2012. J. Gillespie and R. Johnson of the S.M. Stoller Corporation, the Legacy Management Support contractor at the DOE office in Grand Junction, Colorado, conducted the inspection. R. Bush, the DOE Office of Legacy Management site manager, attended the inspection, as did NRC inspectors R.J. Evans, D.B. Spitzberg, and L.M. Gersey.

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 located at the gate is in excellent condition.

12.4.1.2 Fence and Perimeter Signs

A barbed-wire perimeter fence is located between the disposal cell features and the site boundary. Other than erosion of soil down to rock at a couple of locations near the south and southwest diversion channel, the perimeter fence is in excellent 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 observed to be 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.

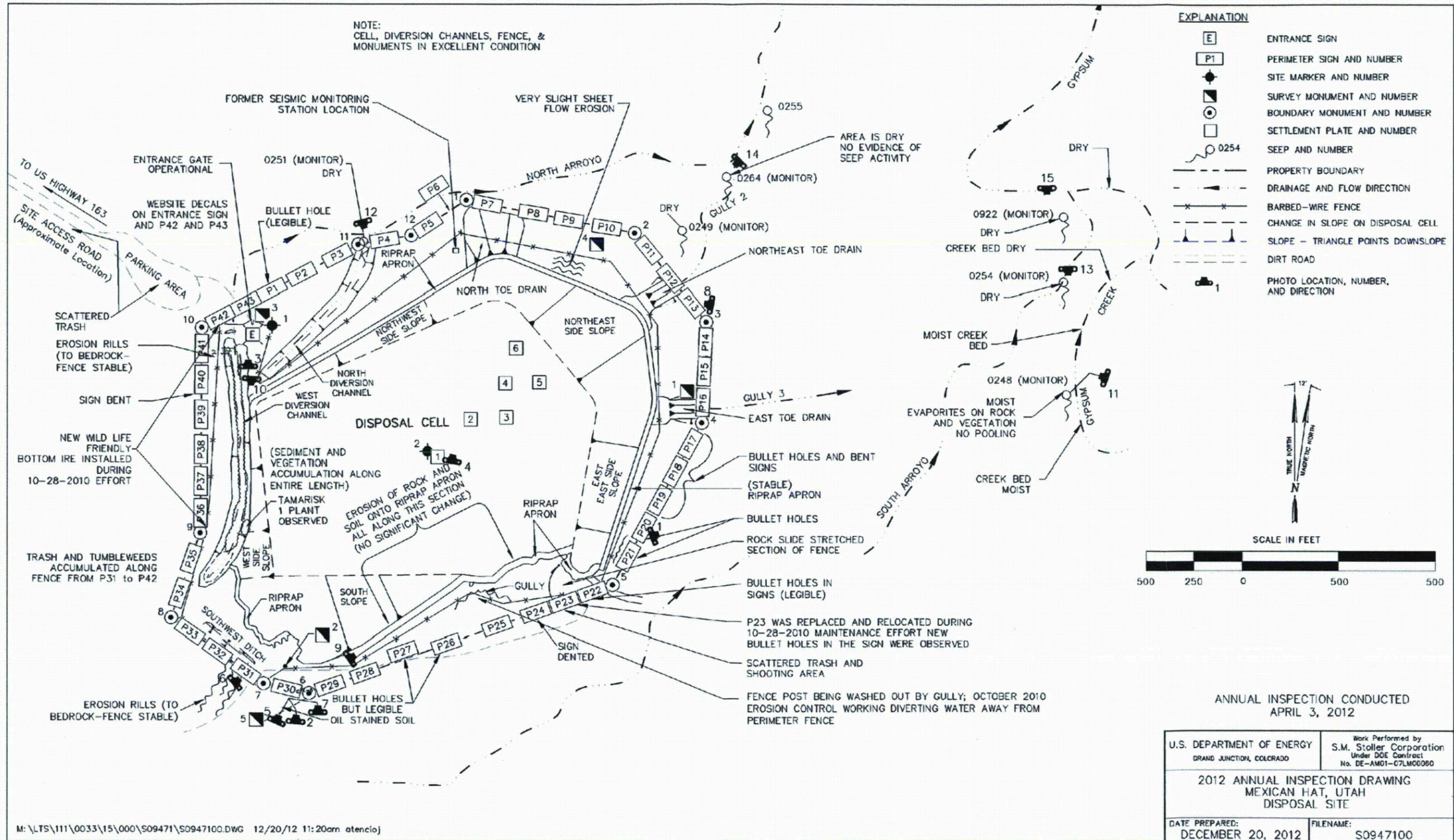


Figure 12-1. 2012 Annual Compliance Drawing for the Mexican Hat Disposal Site

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There are 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-1). Perimeter sign P31 is missing the lower radioactive warning portion of the sign (PL-2). Several signs on the south boundary have new bullet holes, including perimeter sign P23, which was replaced and relocated inside the perimeter fence in October 2010.

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 there is no need for repairs 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.

12.4.3 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). There was 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 observed to be growing on top of the disposal cell.

The disposal cell side slopes, toe drains, aprons, and diversion channels were in excellent condition and functioning as designed (PL-8).

The sloughing of red country rock and soil along the south apron (PL-9) has not increased during the past year. Because the apron in this area is immediately adjacent to the steep rocky cliff face along the southern edge of the disposal cell cover, it is anticipated 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-10). 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 of the site, one tamarisk plant was observed on the site during the inspection in the west diversion channel outside of the cap. Its growth will be monitored and potentially removed during the next scheduled maintenance effort. Tamarisk will continue to be controlled on the site.

12.4.4 Site Perimeter Between the Security Fence and the Site Boundary

Erosional rills and gullies continue forming 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 vehicular access is available. The most noticeable accumulations of trash were 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 required to maintain the integrity of the perimeter fence and to keep trash from entering the fenced area.

Tumbleweeds as well as 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.

12.4.5 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 A missing radiological warning sign (P31) and some minor fence repair near perimeter sign P22 will be required in the future. A warning sign should also be placed at seep 0254.

12.7 Environmental Monitoring

12.7.1 Groundwater Monitoring

- 12B Visible inspection of the monitored seeps is performed in accordance with the approved recommendations presented in the seep monitoring evaluation report (in 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 seep monitoring evaluation report (in the resolution document), annual visual assessments of seep flows were conducted at six designated seep locations. No significant increases in water flow or conditions at the seeps were noted; therefore, no additional 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 within the disposal cell. Warning signs that stipulate to not drink the water remain posted at the seep locations. Seep flows were nonexistent during the 2012 inspection since very little rainfall had occurred so far that year.

All seeps observed during the site inspection are listed in the LTSP, except seep 0264, which replaced seep 0249 in 1995 because of insufficient flow for sampling. Historically, minimal flow is observed only at seep 0248; however, this year the area was only moist, and no pooling or dripping water was observed. The remaining seeps were all dry, with no indication of recent moisture. Some evaporates were observed, but the soil beneath was dry. Gypsum Creek sediments were moist, and there was limited exposed flowing water in the drainage. Table 12-1 provides observations and qualitative descriptions of seep flows, along with a reference to photographic documentation.

Table 12-1. 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-11	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 but no observed flow. Minimal vegetation—primarily tamarisk (very little other riparian vegetation).
0254	South Arroyo	PL-13	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-14	Dry; no flow.
0922	South Arroyo	PL-15	Dry; no change from previous year's inspection.

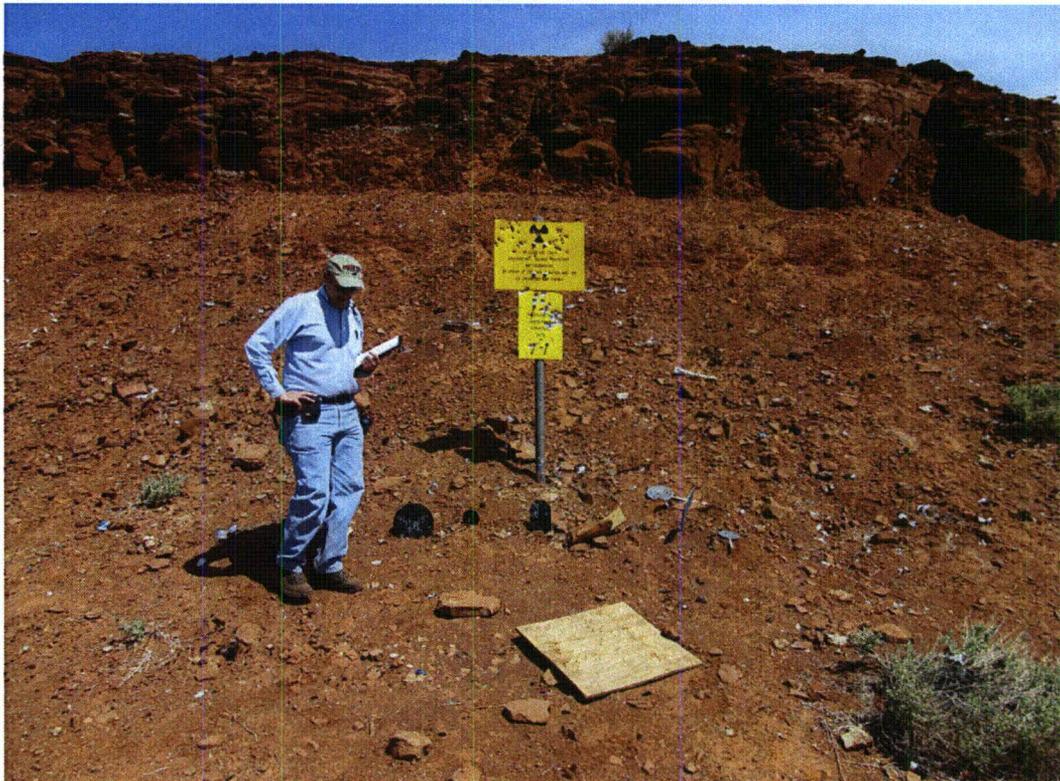
12.8 Corrective Action

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 2012.

12.9 Photographs

Photo Location Number	Azimuth	Photograph Description
PL-1	70	Photo of perimeter sign P20 with bullet damage.
PL-2	5	Missing radiation warning sign at perimeter sign P31.
PL-3	0	Site Marker 1 (SMK-1).
PL-4	10	Site Marker 2 (SMK-2).
PL-5	25	Central portion of the disposal cell.
PL-6	50	Southeast portion of the disposal cell.
PL-7	North	West portion of the disposal cell and the west diversion channel.
PL-8	280	West view of northeast and east slope.
PL-9	55	Southeast edge of the disposal cell.
PL-10	185	West edge of the disposal cell and the west diversion channel.
PL-11	290	Seep 0248 close up of bank (no pooling).
PL-12	165	Seep 0251 in the North Arroyo (dry).
PL-13	180	Seep 0254.
PL-14	225	Seep 0264 in the North Arroyo (dry).
PL-15	180	Seep 0922.



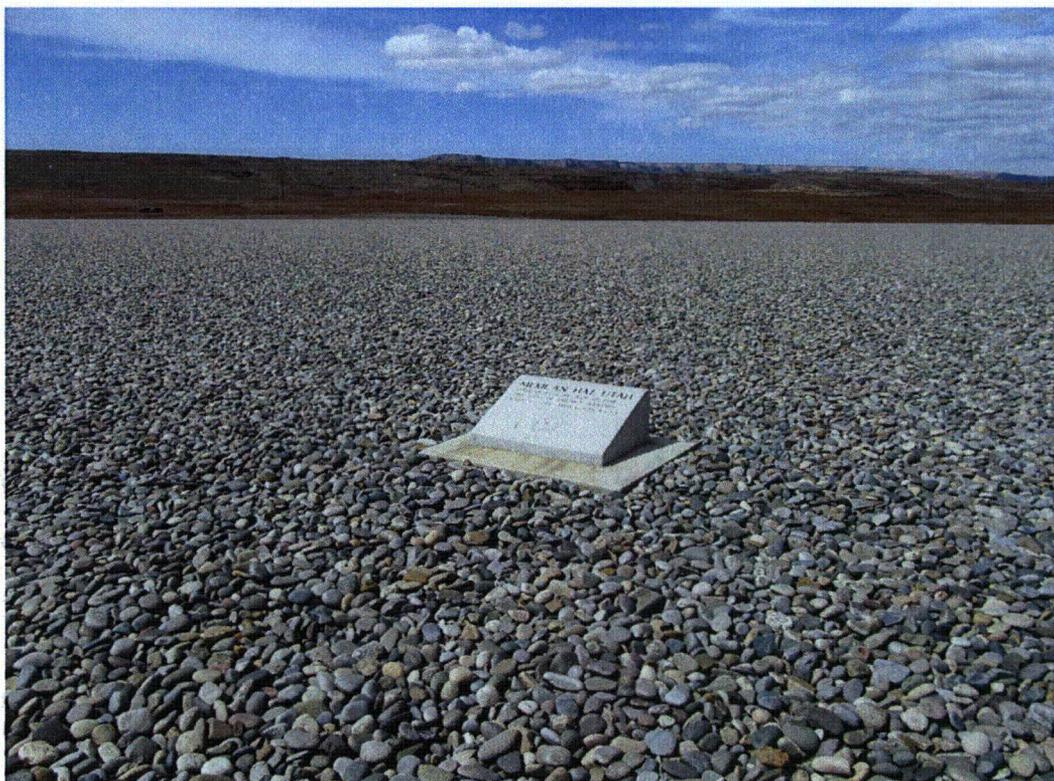
HAT 4/2012. PL-1. Photo of perimeter sign P20 with bullet damage.



HAT 4/2012. PL-2. Missing radiation warning sign at perimeter sign P31.



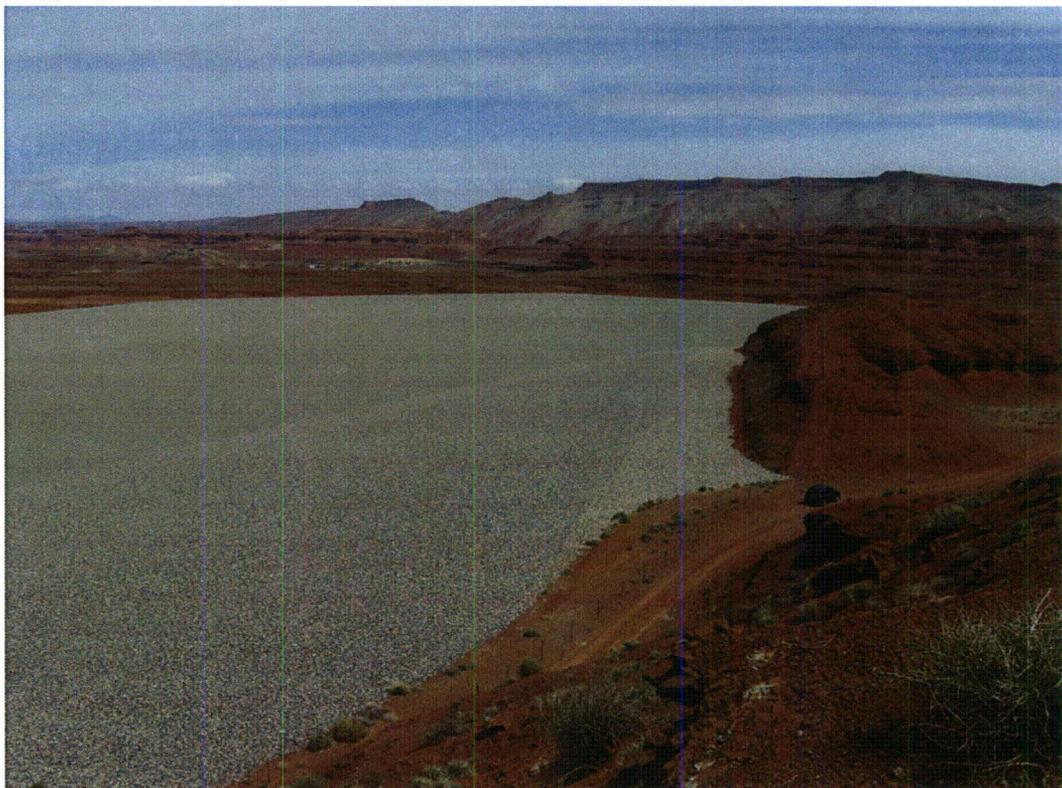
HAT 4/2012. PL-3. Site Marker 1 (SMK-1).



HAT 4/2012. PL-4. Site Marker 2 (SMK-2).



HAT 4/2012. PL-5. Central portion of the disposal cell.



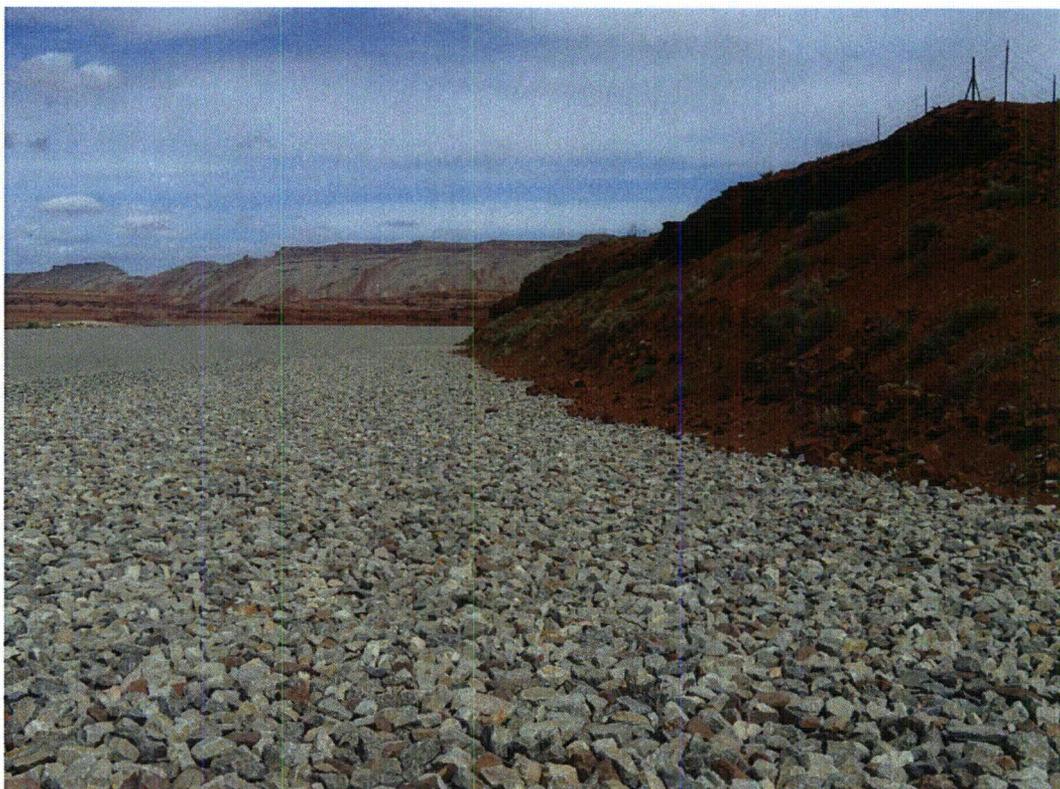
HAT 4/2012. PL-6. Southeast portion of the disposal cell.



HAT 4/2012. PL-7. West portion of the disposal cell and the west diversion channel.



HAT 4/2012. PL-8. West view of northeast and east slope.



HAT 4/2012. PL-9. Southeast edge of the disposal cell.



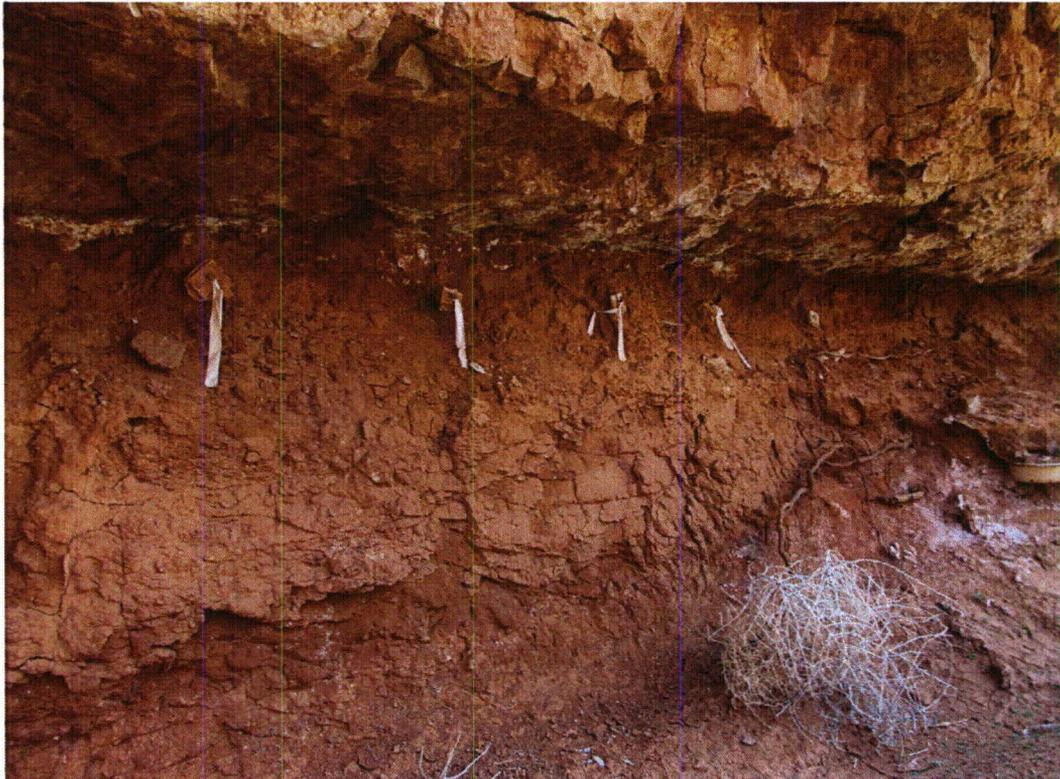
HAT 4/2012. PL-10. West edge of the disposal cell and the west diversion channel.



HAT 4/2012. PL-11. Seep 0248 close up of bank (no pooling).



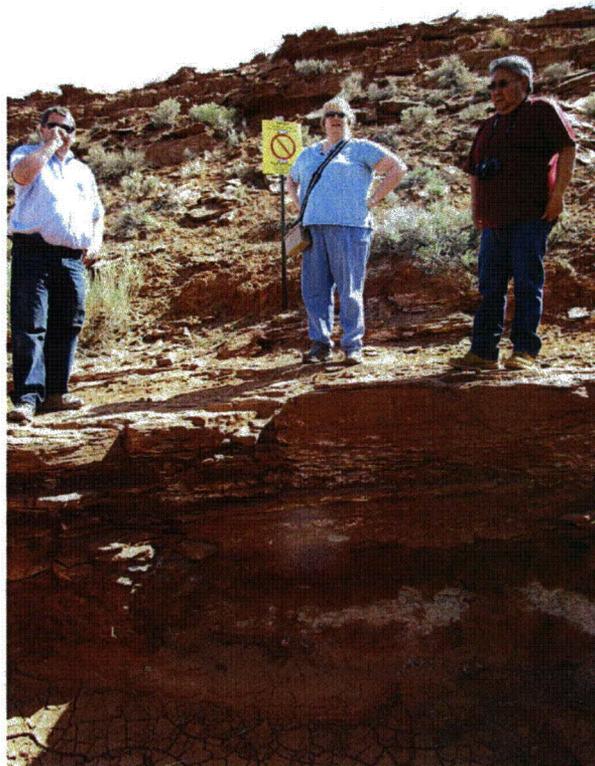
HAT 4/2012. PL-12. Seep 0251 in the North Arroyo (dry).



HAT 4/2012. PL-13. Seep 0254.



HAT 4/2012. PL-14. Seep 0264 in the North Arroyo (dry).



HAT 4/2012. PL-15. Seep 0922.

13.0 Annual Inspection of the Naturita, Colorado, UMTRCA Title I Disposal Site

13.1 Compliance Summary

The Naturita, Colorado, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Disposal Site, inspected on May 15, 2012, is in excellent condition. The only new maintenance needs identified during the inspection were loose and broken fence wires at two locations on the perimeter fence. The wires will be repaired before the next annual inspection. No additional maintenance needs or cause for a follow-up or contingency inspection was identified.

Numbers in the left margin of this report refer to items summarized in the "Executive Summary" table.

13.2 Inspection 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* (DOE/AL/62350B250, Rev. 1, U.S. Department of Energy [DOE], July 1999; LTSP) and in procedures established by DOE 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	Sections 3.1 and 6.2	Section 13.4
Follow-Up or Contingency Inspections	Section 3.4	Section 13.5
Routine Maintenance and Repairs	Section 4.0	Section 13.6
Groundwater Monitoring	Section 2.6.2	Section 13.7.1
Corrective Action	Section 5.0	Section 13.8

13.3 Institutional Controls

The 26.65-acre 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 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: site markers, survey and boundary monuments, warning/no-trespassing signs, a site perimeter fence, and locked gates at the site entrances.

13.4 Inspection Results

The site, approximately 1 mile west-southwest of the former community of Uravan, Colorado, was inspected on May 15, 2012. D. Traub and L. Sheader of the S.M. Stoller Corporation, the Legacy Management Support contractor at the DOE office in Grand Junction, Colorado, conducted the inspection. M. Kautsky, the DOE site manager for Naturita, and M. Cosby of the Colorado Department of Public Health and Environment accompanied the inspectors.

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

The locations of site surveillance features are shown on Figure 13-1. 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 13-1 by photograph location (PL) numbers.

13.4.1.1 Entrance Gates, Entrance Signs, and Access Road

Access to the site is gained by traveling west 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 of the Salt Wash Member, Morrison Formation (PL-1).

The entrance sign is in good condition.

13.4.1.2 Perimeter Fence and Perimeter Signs

Perimeter signs, 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 are in good condition.

A barbed-wire stock fence encloses the site. The fence is in good condition except for sections with broken and loose strands north of perimeter sign P1 and broken strands near sign P21 (PL-2). Fence wire strands will be repaired or tightened before the next annual inspection. Cattle grazing should be of little concern because forage within the site or in the immediate area is minimal.

As a safety precaution, pedestrian stiles were installed at three locations around the perimeter of the site near boundary monuments BM-15 and BM-16, and one was installed near perimeter sign 19 (as noted on the site map). These allow inspectors safer access without having to climb over or through barbed-wire fences.

13.4.1.3 Site Markers

Two granite site markers identify the site. Site marker SMK-1 is set just inside and left of the entrance gate; site marker SMK-2 (PL-3) is located on the disposal cell in the south-central portion of the top slope. Both markers were undisturbed and in good condition; however, SMK-1 has a minor chip off the northeast corner of the concrete pad on which it is placed.

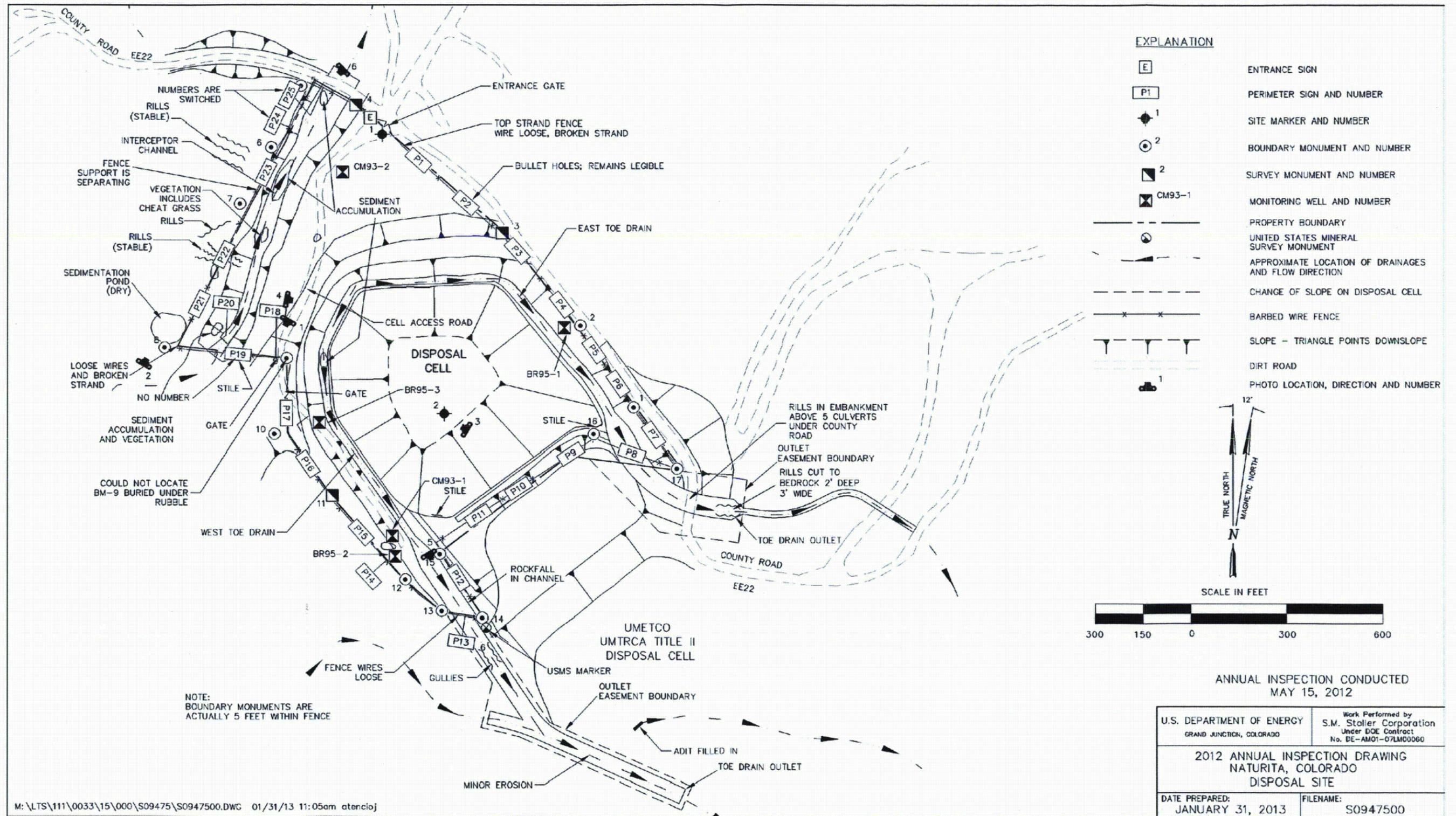


Figure 13-1. 2012 Annual Compliance Drawing for the Naturita Disposal Site

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13.4.1.4 Survey Monuments and Boundary Monuments

Boundary monuments BM-1 through BM-17 (BM-7/PL-7) 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 site's boundaries. Survey monuments were installed early during site construction for survey control; boundary monuments were installed after completion of construction. Boundary monument BM-9 was covered by loose rock at the time of the inspection. It will be uncovered and verified before the next inspection. Other than BM-9, the boundary monuments and the survey monuments are undisturbed and 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 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. All monitoring wells were secure and in good condition.

13.4.2 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 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, boundary monuments, and signs. 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.

13.4.2.1 Disposal Cell, Toe Drains and Toe Drain Outlets, and Interceptor Channel

Rock covers the 2-acre top of the disposal cell and the approximate 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-4) 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. No other degradation or vegetation was evident on the cell.

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-5). 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 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. 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 it is not a threat to cell performance. This area will be watched in future inspections for additional rock movement. During the 2012 inspection, there was still just one boulder in the drain.

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-6). The channel is in excellent condition, however, and the current sediment accumulation and associated vegetation do not impair the function of the channel.

13.4.2.2 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. As noted last year, the most significant disturbance in an outlying area is the Umetco reclamation of a large borrow area northwest of the site. Sediment could erode off this disturbed region if heavy rains occur, and the area will probably be a source of new, possibly noxious, weed growth. During the 2010 inspection, the majority of the noxious weeds noted were immediately adjacent to the northwest boundary. Inspectors at the site will monitor this area with interest for the next few years. Umetco (DOW Chemical) has completed most Uranium Title II remedial action activity and is preparing for the transfer of the site to the 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 Fence strands are broken and loose near perimeter signs P1 and P21. Personnel will repair the strands when they are next in the area.

13.7 Environmental Monitoring

13.7.1 Groundwater Monitoring

- 13B 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 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 (aquitard) 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 uppermost aquifer (Wingate Sandstone). Indicator analytes are arsenic, molybdenum, and uranium. Monitoring wells CM93-1 and CM93-2 in the uppermost aquifer (Wingate Sandstone) were last sampled in May 1997; concentrations of all indicator analytes were at or near detection limits and, thus, well below the respective MCLs.

13.7.1.1 Groundwater Monitoring Results

Results of the 2012 sampling event are consistent with those reported in previous years (1997, 1998, 2000, 2002, 2004, 2006, 2008, and 2010). Although the concentrations of uranium in wells BR95-1 and BR95-2 exceed the MCL of 0.044 milligram per liter (mg/L) (0.12 mg/L and 0.057 mg/L, respectively), comparable concentrations of uranium have been detected in samples collected from these wells since the beginning of the monitoring period and have not changed appreciably (see Figure 13-2 below). Concentrations of uranium in this range are not unexpected at the contact between the Salt Wash Member and the Summerville Formation because uranium mineralization is present in the Salt Wash. An indication of the intrinsic mineralization of this groundwater is the high level of uranium in seep water approximately 0.5 mile north-northwest of the disposal cell—2.0 mg/L in October 2000 and 2.59 mg/L in April 2001 (Umetco results for Seep 1). This seep is cross gradient from the disposal cell and represents natural discharge from the Salt Wash/Summerville contact. Therefore, the concentrations of uranium reported from wells BR95-1 and BR95-2 are considered to be naturally occurring (background) and not site-related.

Concentrations of arsenic and molybdenum are still one to two orders of magnitude below corresponding MCLs, consistent with historical measurements. In 2012, concentrations of arsenic in groundwater in the three shallower monitor wells BR95-1 (0.00038 mg/L), BR95-2 (0.00042 mg/L), and BR95-3 (0.00091 mg/L) are well below the MCL of 0.05 mg/L. The concentrations of molybdenum in 2012—BR95-1 (0.0051 mg/L), BR95-2 (0.0022 mg/L), and BR95-3 (0.012 mg/L)—are less than the MCL of 0.1 mg/L.

13.7.1.2 Groundwater Monitoring Evaluation

In previous annual compliance reports, DOE 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 aquitard that consists 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 one to two orders of magnitude less than respective MCLs). Based on these findings, initially documented in 2006,¹ 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.

¹ On March 14, 2006, DOE submitted the document entitled *Termination of Monitoring for the Naturita Disposal Site* to NRC.

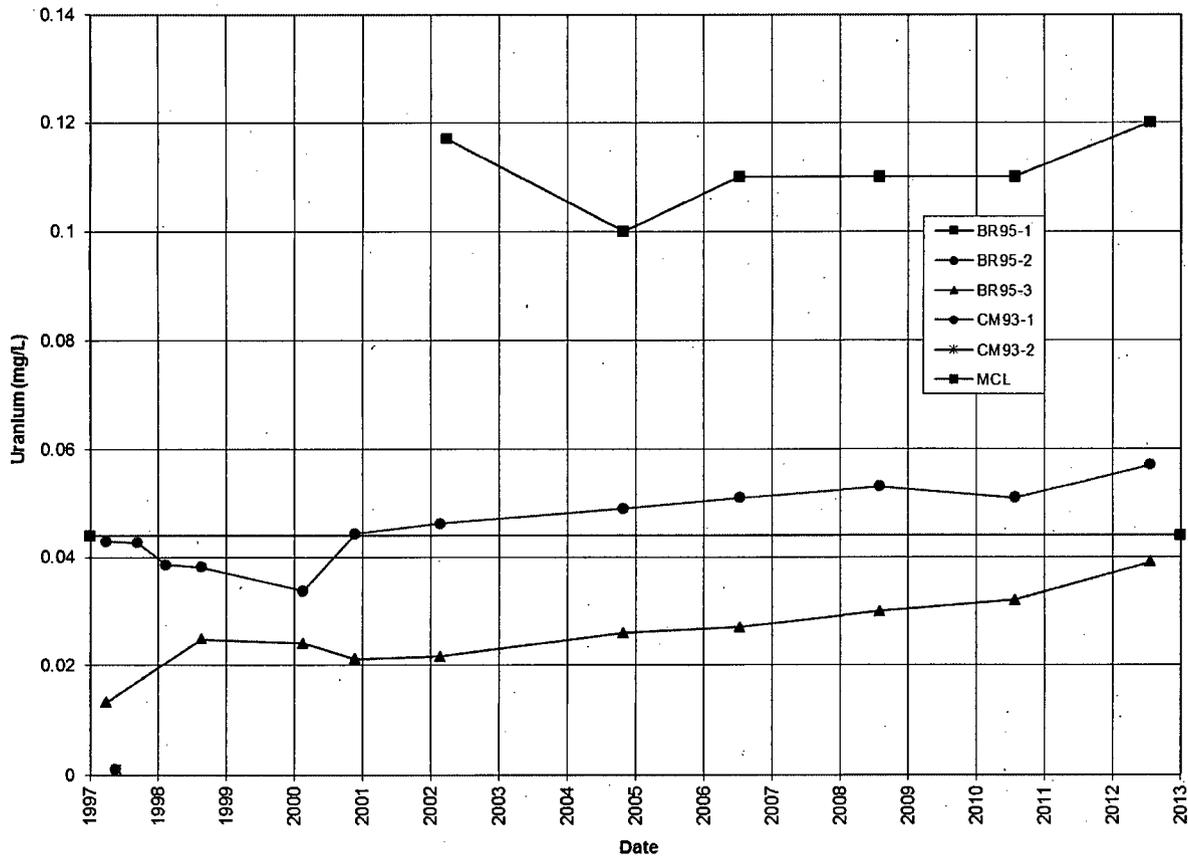


Figure 13-2. Time-Concentration Plots of Uranium in Groundwater at the Naturita Disposal Site

As a best management practice, and given the impending transfer of the adjacent Umetco (Uravan) Title II cell and concomitant need for a spatially comprehensive data set, DOE is postponing any revisions to the existing groundwater monitoring program at the site. DOE will continue to monitor groundwater every 2 years to evaluate cell performance.

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 was required in 2012.

13.9 Photographs

Photo Location Number	Azimuth	Description
PL-1	210	Access road west of cell.
PL-2	210	Broken fence strands near perimeter sign P21.
PL-3	120	Monument on top of cell.
PL-4	270	Top of cell from west.
PL-5	150	Toe drain outlet channel.
PL-6	225	View southwest from county road of interceptor channel area.



NAD 5/2012. PL-1. Access road west of cell.



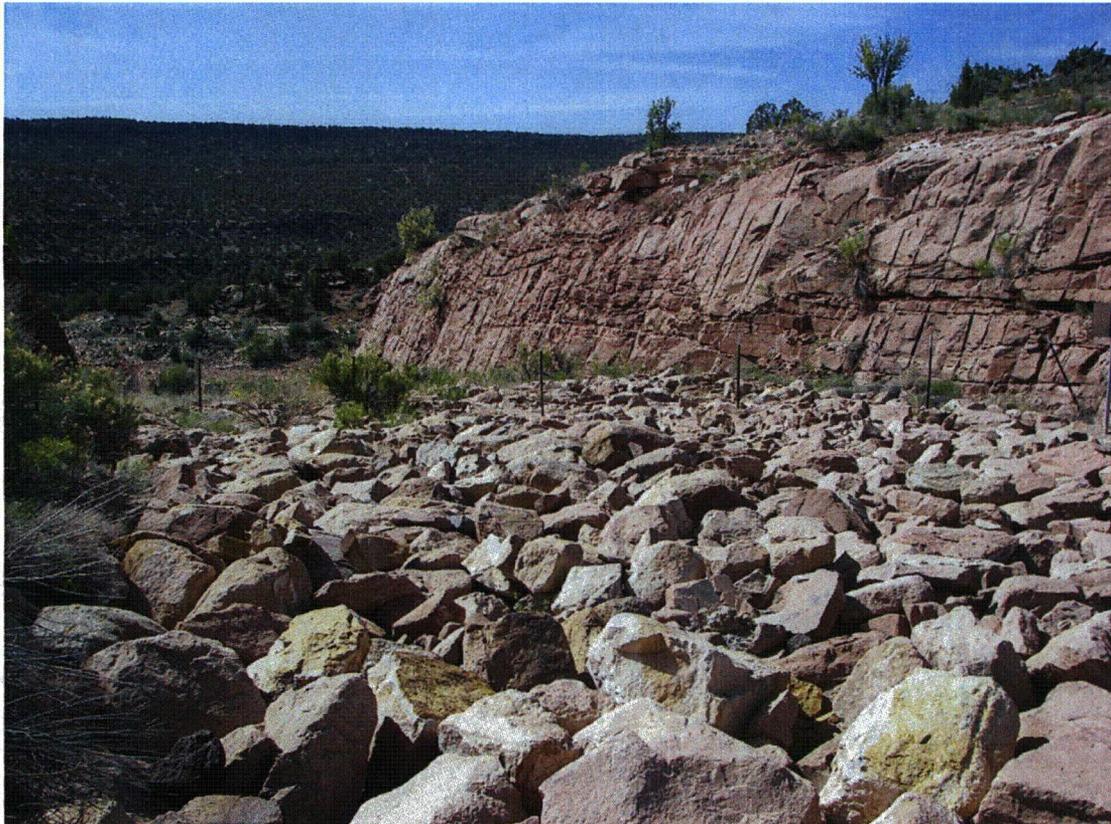
NAD 5/2012. PL-2. Broken fence strands near perimeter sign P21.



NAD 5/2012. PL-3. Monument on top of cell.



NAD 5/2012. PL-4. Top of cell from west.



NAD 5/2012. PL-5. Toe drain outlet channel.



NAD 5/2012. PL-6. View southwest from county road of interceptor channel area.

14.0 Annual Inspection for the Rifle, Colorado, UMTRCA Title I Disposal Site

14.1 Compliance Summary

The Rifle, Colorado, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Disposal Site was inspected on June 27, 2012. The disposal cell and all associated surface water diversion and drainage structures were in good condition and functioning as designed. River-derived rock covering the disposal cell and toe ditch is in excellent condition although isolated cobbles and boulders show incipient weathering. Minor erosional rills observed in previous years show no new erosion. They do not immediately threaten the cell and will be monitored during future inspections. Vegetation on the cell is minimal, consisting of small patches of weeds, mostly prickly lettuce (*Lactuca serriola*), and two small piñon pine (*Pinus edulis*) saplings are growing on the side slope of the cell. A single tamarisk shrub (*Tamarix ramosissima*) was noted in the rock-covered drainage along the southeast side of the site and will be removed at some time in the future. Vegetation around the disposal site is closely grazed, and much of it is brown. This is due to a shortage of moisture this year and heavy grazing by cattle.

Pore water continues to be removed from the disposal cell to maintain the water level below the action level (6,016 feet). This water is removed from one standpipe, MW-03, in the toe of the cell and sent to the evaporation pond. Standpipe MW-02, which was pumped in previous years, contains little water and is no longer being pumped. The two old pumps in MW-03 were replaced with a new pump in 2012. The barbed-wire perimeter fence that limits access to the site was damaged at the time of the inspection. The BLM grazing permittee for this area will be identified. No additional maintenance needs or cause for a follow-up or contingency inspection was identified.

Numbers in the left margin of this report refer to items summarized in the "Executive Summary" table.

14.2 Inspection Requirements

Requirements for the long-term surveillance and maintenance of the site are specified in the *Long-Term Surveillance Plan for the Estes Gulch Disposal Site near Rifle, Colorado* (DOE/AL/62350-235, Rev. 1, U.S. Department of Energy [DOE], November 1997; LTSP) and in procedures established by DOE to comply with the requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). Table 14-1 lists these requirements.

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

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 3.0	Section 14.4
Follow-Up or Contingency Inspections	Section 3.4	Section 14.5
Routine Maintenance and Repairs	Section 4.0	Section 14.6
Groundwater Monitoring	Section 2.6 and Appendix	Section 14.7.1
Corrective Action	Section 5.0	Section 14.8

14.3 Institutional Controls

The 205-acre site is owned by the United States of America and was accepted under U.S. Nuclear Regulatory Commission general license (10 CFR 40.27) in 1998. 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.

14.4 Inspection Results

The site, located 5 miles north of Rifle, Colorado, was inspected on June 27, 2012. R. Dayvault and L. Sheader of the S.M. Stoller Corporation, the Legacy Management Support contractor at the DOE office in Grand Junction, Colorado, conducted the inspection. R. Bush, the DOE Office of Legacy Management site manager, M. Cosby, Colorado Department of Public Health and Environment, and M. Begay, a DOE intern, 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.

14.4.1 Site Surveillance Features

The locations of site surveillance features are shown on Figure 14–1. 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 14–1 by photograph location (PL) numbers.

14.4.1.1 Entrance Gates, Entrance Signs, and Access Road

The site is accessed by driving northwest of Rifle for 5 miles on State Highway 13 and turning northeast on an improved gravel road. A perpetual right-of-way across U.S. Bureau of Land Management (BLM) property provides access to the site. Two locked gates are installed on the access road—a lower gate closer to State Highway 13 and, farther up the hill, a second tubular metal gate at the site perimeter, which limits access to the site proper. The access road, entrance gates, and entrance sign were in good condition.

14.4.1.2 Perimeter Fence and Perimeter Signs

The barbed-wire perimeter fence that limits access to the site was damaged at the time of the inspection. The fence extends to the edge of steep-sided arroyos that bound the site on the east and west and act as a deterrent for easy access to the site. The barbed-wire personnel gate at the southeast corner of the site was open, a section of perimeter fence had been cut and folded back between perimeter signs P0 and P1, and some bent fence posts and broken or loose wires were found in many places along the fence. Cattle had heavily grazed inside the site boundary and around the perimeter of the cell. A comparison between vegetation inside the fence enclosing the evaporation pond (where no grazing had been done) and outside the fence shows the extent of grazing (PL–1). Other signs of deer and elk grazing in the revegetated areas adjacent to and inside the disposal cell site boundary were identified. Such grazing has occurred historically.

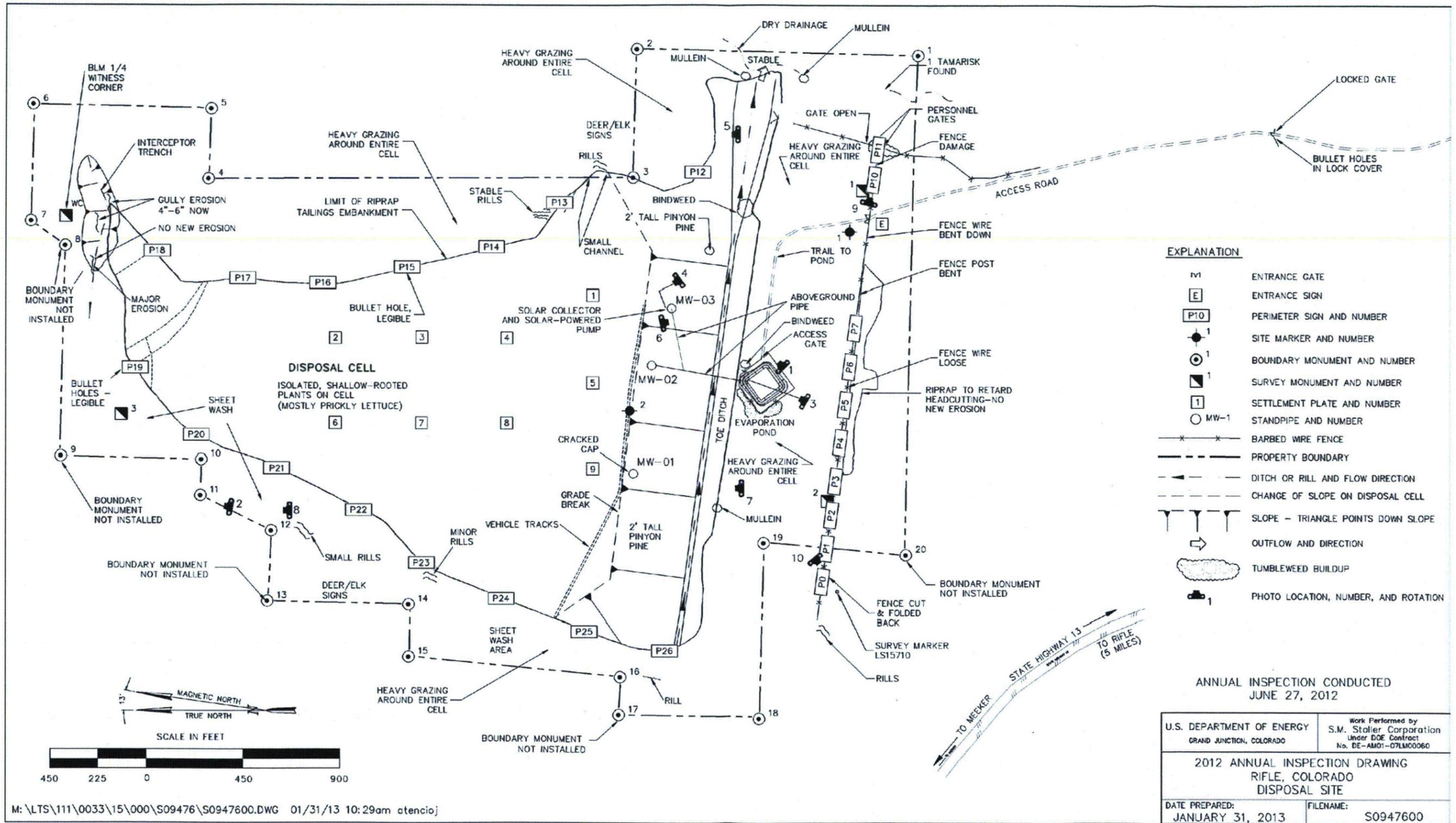


Figure 14-1. 2012 Annual Compliance Drawing for the Rifle Disposal Site

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All perimeter signs are legible although a few have bullet holes; they will continue to be monitored for signs of further vandalism. Two personnel gates, located at the southeast corner of the inner fence, were open but partly blocked by tumbleweeds even though they were removed the previous fall. Tumbleweed buildup against fences is a constant problem and will continue to be monitored.

14.4.1.3 Site Markers

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

14.4.1.4 Survey Monuments and Boundary Monuments

There are three survey monuments and 15 boundary monuments at the site. Boundary monuments are set at corners along an irregular site boundary. According to the LTSP, 20 corner monuments were set along the site boundary; however, previous field investigations indicated that only 15 monuments were actually set because of the rough terrain. Consequently, boundary monument locations BM-8, BM-9, BM-13, BM-17, and BM-20 were only marked with wooden laths and are not included as part of the annual inspection. Several of the survey and boundary monuments at the site are difficult to locate because deadfall and underbrush obscure them, or rough terrain makes them inaccessible. All survey and boundary monuments inspected were in good condition (PL-2).

14.4.1.5 Standpipes

Three standpipes (MW-01, MW-02, and MW-03) are located on the south side slope of the disposal cell and were in good condition. These standpipes were installed during cell construction to monitor water levels in the toe of the cell. Dataloggers with remote data transfer systems (i.e., telemetry) powered by solar panels were installed in MW-02 and MW-03 to measure water-level fluctuations. Standpipe MW-03 is equipped with a solar-powered pump so that water may be removed and discharged to a lined evaporation pond directly south of the cell (PL-2). Water was flowing into the evaporation pond as shown in PL-3. The small-diameter, plastic, surficial water line from MW-03 to the pond was in good condition, as were the two solar panels that power the pump.

14.4.1.6 Evaporation Pond

An evaporation pond was constructed adjacent to the cell in 2001 to receive water pumped from standpipes MW-02 and MW-03 (PL-4). A datalogger, also with a remote data transfer system, measures water-level fluctuations in the evaporation pond. The evaporation pond continues to function as designed because water in the pond is evaporating as fast as, or faster than, influent arrives. A meteorological station was also installed alongside the pond several years ago and is functioning normally. This year, the water level was low in the pond due to enhanced evaporation from unusually high temperatures and the abundance of sunny days. The lined pond, surrounding security fence, and locked gate were in excellent condition.

14.4.2 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 top of the disposal cell and interceptor trench, (2) the toe ditch and toe ditch outlet, (3) onsite reclaimed areas, and (4) the outlying area.

Within each area, inspectors examined specific site surveillance features, 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.

14.4.2.1 Disposal Cell and Interceptor Trench

Rock armor, derived from river cobbles and boulders, covering the 71-acre disposal cell generally remains in excellent condition overall. An example of the cobbles with a local inhabitant is shown in PL-5. No evidence of subsidence, differential settling, or slumping was found. Surveys conducted to detect any movement of the cover rock in three dimensions was discontinued in 2011 after 5 years of surveys revealed no issues.

During the 2010 inspection, it was noted that a few cobbles or boulders showed signs of frost action and had begun to crack. Degradation of a few cobbles and boulders was also noted during the 2011 and 2012 inspections and will continue to be monitored. This is not considered a major concern because most of the rock on the cell consists of very tough igneous and metamorphic river cobbles and boulders that should last for the expected life of the cell. However, if increased rock degradation becomes apparent, one or more study plots will be established.

As observed in 2011, only small, isolated patches of annual weeds or annual grasses were found on the cell top, and these were mostly brown; no deep-rooted plants or noxious weeds were observed in these areas.

A revegetated interceptor trench was constructed at the top of the disposal cell to protect the cell from storm-water and snowmelt run-on. The trench diverts water to the arroyo west of the site. Significant erosion occurred during a major rain event in 2005, and repairs to the lower section of the interceptor trench were undertaken later that year. In November 2005, rocks were moved into the eroded channel (directly above the drop-off into a major drainage), and the erosion was stabilized. No new erosion was observed during this inspection for any part of the diversion trench.

14.4.2.2 Toe Ditch and Toe Ditch Outlet

A toe ditch runs along the downslope (south) edge of the disposal cell and is armored with the same rock that protects the disposal cell. The toe ditch diverts surface runoff from the disposal cell offsite to the east. As observed during previous inspections, small shrubs and trees and minor weeds are still growing around the perimeter of the rock-covered cell. For example, two small piñon trees are growing on the lower part of the cell near the toe drain ditch but are not large enough to be of concern. Minor rabbitbrush, bindweed, and mullein were found in areas around the perimeter of the toe ditch and outlet. This vegetation will be monitored and controlled as necessary in the future.

Tumbleweeds have often collected in the southeastern end of the toe ditch. Because tumbleweeds were removed from this area in November 2010, little accumulation was evident during the 2012 inspection. This area will continue to be monitored next year to determine the need for removal.

Minor erosion, anticipated in the design, is still evident in the channel at the outlet below the toe ditch. Bedrock is now exposed in this area. Rock previously placed in the outlet to stabilize the erosion continues to drop into the eroded area (self-armoring). Comparisons with a photograph taken during the 2003 inspection indicate that no new erosion has occurred during the past several years. This was still the case in 2012, and no new erosion was found. Several tamarisk were observed downstream of the toe drain during the 2012 inspection. A single tamarisk was noted in the rock-covered portion of the drainage this year and will be removed at some time in the future.

14.4.2.3 Onsite Reclaimed Areas

Disturbed areas around the edges and south of the disposal cell were reseeded in 1996 and, overall, have been successfully reclaimed. The vegetation is composed primarily of desirable grasses and shrubs.

During the past several years, inspectors had found no evidence of cattle or sheep grazing within the site boundaries, only evidence of deer and elk grazing. This changed dramatically in 2012. This year, vegetation has been heavily grazed. On average, grasses have been grazed down to only 1 or 2 inches sitewide. Photo PL-6 shows the general barren nature of the reclaimed area south of the disposal cell. Photos PL-7 and PL-8 show the degree of vegetation damage by cattle, including browsing of rabbitbrush and cactus. Fence damage is associated with the cattle grazing. Photo PL-9 shows damage to the barbed-wire fence, and photo PL-10 shows a barbed-wire fence that was cut and folded back. It is unclear if this action was to allow cattle onto or off of the site.

Three arroyos are present in the reclaimed area south of the disposal cell. A rock apron was placed between the stock fence and the headcuts in these arroyos to prevent headward migration toward the disposal cell. As erosion has migrated into the rock apron, the rock has self-armored the arroyos and effectively stabilized them from further erosion. This process, which has been ongoing for a number of years, continued very little in 2012. This area will continue to be monitored.

Rills noted during previous inspections in the vicinity of perimeter sign P13 were still stable in 2012. The runoff collected by the rills flows along the interface between the riprap and the adjacent reclaimed soil area. The runoff has scoured a small channel that currently averages about 1 foot wide and less than 1 foot deep, exposing some of the gravel bedding material. A comparison with photographs taken the last several years at this location indicates that the channel has not changed. While this feature is not threatening the integrity of the disposal cell at this time, continued observation during subsequent site inspections is warranted.

During the 2010 inspection, a new rill was noted along the southwest side of the property, extending from about perimeter sign P1 and then down a hill. This feature is not currently affecting the integrity of the cell, and no new erosion was evident in 2012. This area will continue to be examined during future inspections.

14.4.2.4 Outlying Area

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

All BLM Right-of-Way Reservation permit areas, including the 16-acre parcel south of the disposal cell, were returned to BLM in 2012. DOE had been obligated to revegetate these areas that were originally withdrawn from BLM during construction of the disposal cell. No further actions by DOE are required for these areas.

14.5 Follow-Up or Contingency Inspections

DOE will conduct follow-up or contingency inspections if (1) a condition is identified during the annual inspection or other site visit that requires a return to the site to evaluate the condition, or (2) DOE is notified by a citizen or outside agency that conditions at the site or in the vicinity of the site are substantially changed.

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

14.6 Maintenance and Repairs

- 14A Fence repairs will be performed before the next inspection. The BLM grazing permittee for this area will be identified. Discussions will be conducted with this party to determine if a grazing agreement should be established.
- 14B As discussed in Section 14.7.2, two old pumps were removed from MW-03, and a new pump was installed.

14.7 Environmental Monitoring

14.7.1 Groundwater Monitoring

Monitoring of groundwater quality is not required at this site because groundwater in the uppermost aquifer is of limited use and the disposal cell is geologically isolated from the first usable aquifer by approximately 3,800 feet of low-permeability siltstones, shales, and sandstones. The nine monitoring wells that had been at the site were decommissioned in 2002.

14.7.2 Disposal Cell Pore-Water-Level Monitoring

- 14C In accordance with the LTSP, DOE continues to monitor pore water levels from transient drainage in the disposal cell at standpipes MW-02 and MW-03, installed at the downgradient end of the cell on the south side slope. An action level elevation of 6,016 feet was established in the LTSP for pumping the pore water from the cell to a lined evaporation pond. This monitoring is performed to ensure that water does not rise above a geotextile liner that was installed in the toe of the cell at an elevation of 6,020 feet.

Pumping from standpipes MW-02 and MW-03 was initiated when water levels reached an action level of 6,016 feet above sea level in 2001. In December 2003, a solar-powered pump (similar to the one in MW-02) was installed in MW-03, and a plastic aboveground water line was plumbed into the existing water line to increase the amount of water being removed from the disposal cell. Pumping from both standpipes continued until September 2006, when it was determined that MW-02 could not sustain prolonged pumping due to consistent lack of sufficient recharge. Although pumping at MW-02 was discontinued at that time, the datalogger remains, and water-level monitoring at this standpipe continues. After cessation of pumping at MW-02, the pump in MW-03 was lowered about 9 feet to near the bottom of the well so that it could pump for longer periods and produce more water. The pump from MW-02 was removed and installed in MW-03 in August 2008.

Pumps were turned on in May 2012 but did not actuate. The two old pumps in MW-03 were removed, and a new submersible pump was installed. It has been operating normally since being started. At the time of the 2012 inspection, MW-03 was pumping at about 2 to 3 gallons per minute, which is generally consistent with active pumping rates recorded the last several years (see PL-3).

Datalogger information for the 2012 reporting period indicates that pore water levels in both standpipes were consistently below the 6,016-foot action level (Figure 14-2). As observed historically, levels were highest during late fall and winter, when pumping is discontinued (in 2012, maximum water levels in MW-02 and MW-03 were 6,014.4 feet and 6,015.0 feet, respectively). Water levels then declined to between 6,013 feet and 6,014 feet in the summer during pumping. For the 2012 pumping season, pumping started on May 30, 2012, and ceased on October 2, 2012. According to the LTSP requirement, pumping will continue until the water levels in the standpipes stabilize at an elevation of 6,014 feet or lower.

14.8 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.

The LTSP establishes that corrective action will be taken if the water level in the disposal cell reaches 6,016 feet in elevation. In 2001, when the action level of 6,016 feet was reached, corrective action was initiated with the installation of the cell dewatering system and associated evaporation pond. This continued corrective action has maintained the water level at an acceptable elevation (below the action level) and prevents water from overtopping the disposal cell liner. Dewatering of the cell will continue.

No additional corrective action was required in 2012.

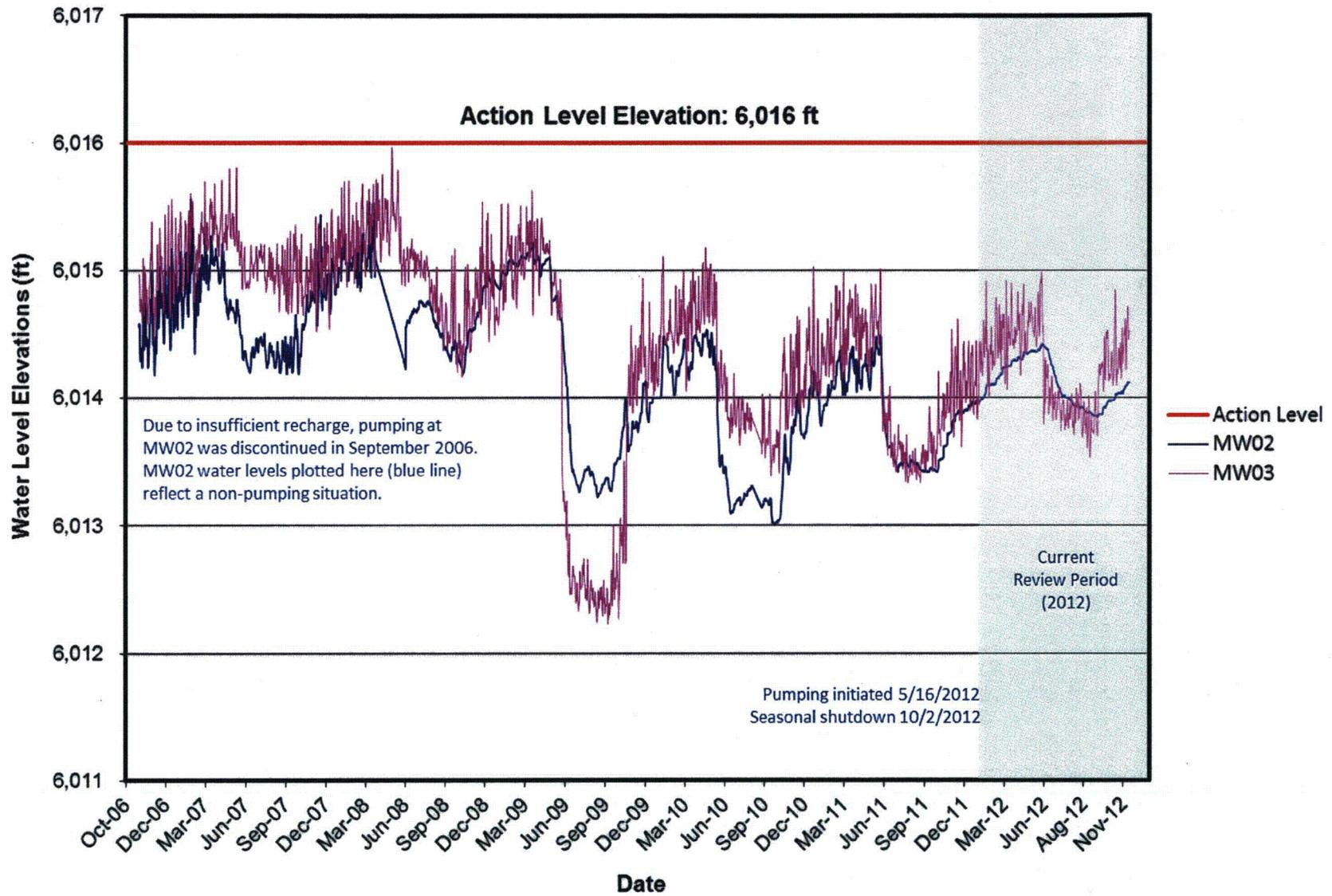


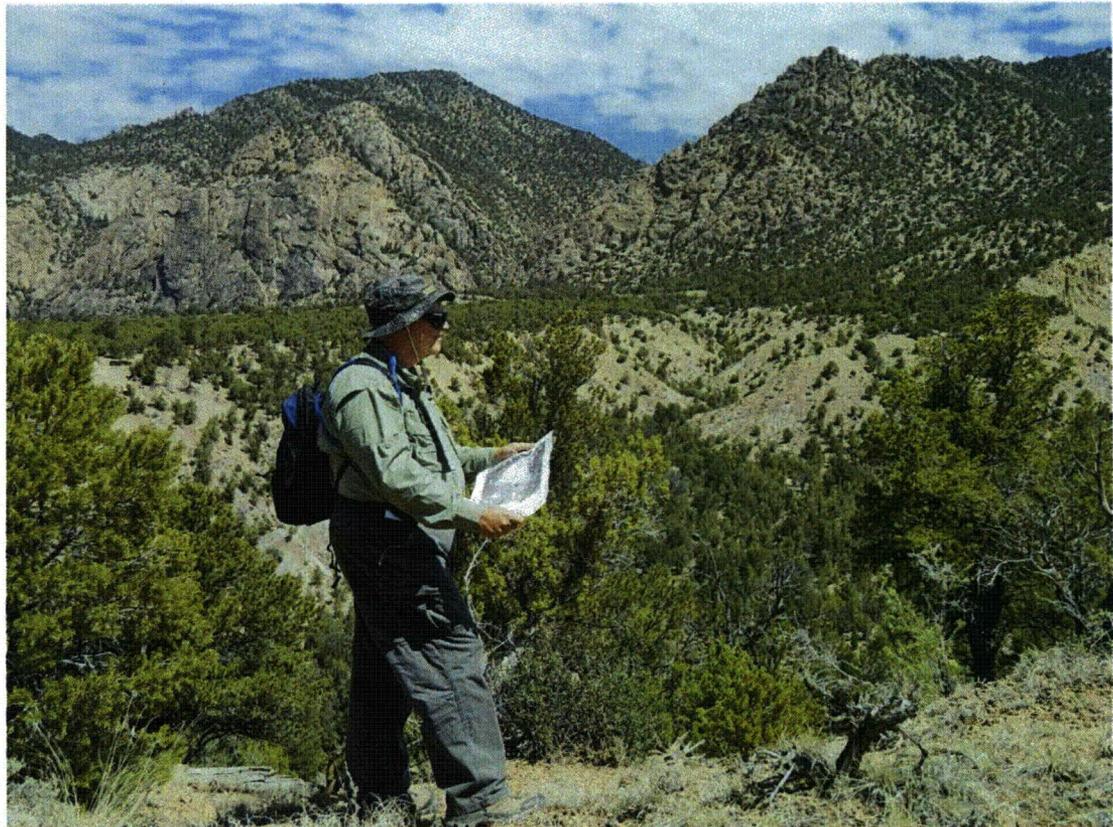
Figure 14-2. Disposal Cell Pore Water Levels in Standpipes MW-02 and MW-03 at the Rifle Disposal Site

14.9 Photographs

Photograph Location Number	Azimuth	Description
PL-1	45	Contrast of cattle grazing inside and outside evaporation pond fence.
PL-2	10	R. Bush inspecting west side of cell area; looking for site boundary monument.
PL-3	30	Water entering evaporation pond.
PL-4	325	M. Begay inspecting MW-03 flow meter inside cooler. Solar panel in foreground, evaporation pond in background.
PL-5	NA	Collared lizard on riprap at bottom of cell.
PL-6	170	Looking south from MW-03 at toe of cell and sparse vegetation inside site boundary. Inspectors on left.
PL-7	NA	Rabbitbrush browsed by cattle.
PL-8	NA	Small spiny star cactus browsed by cattle.
PL-9	105	Section of damaged perimeter fence near perimeter sign P10.
PL-10	230	Fence cut and folded back near perimeter sign P1.



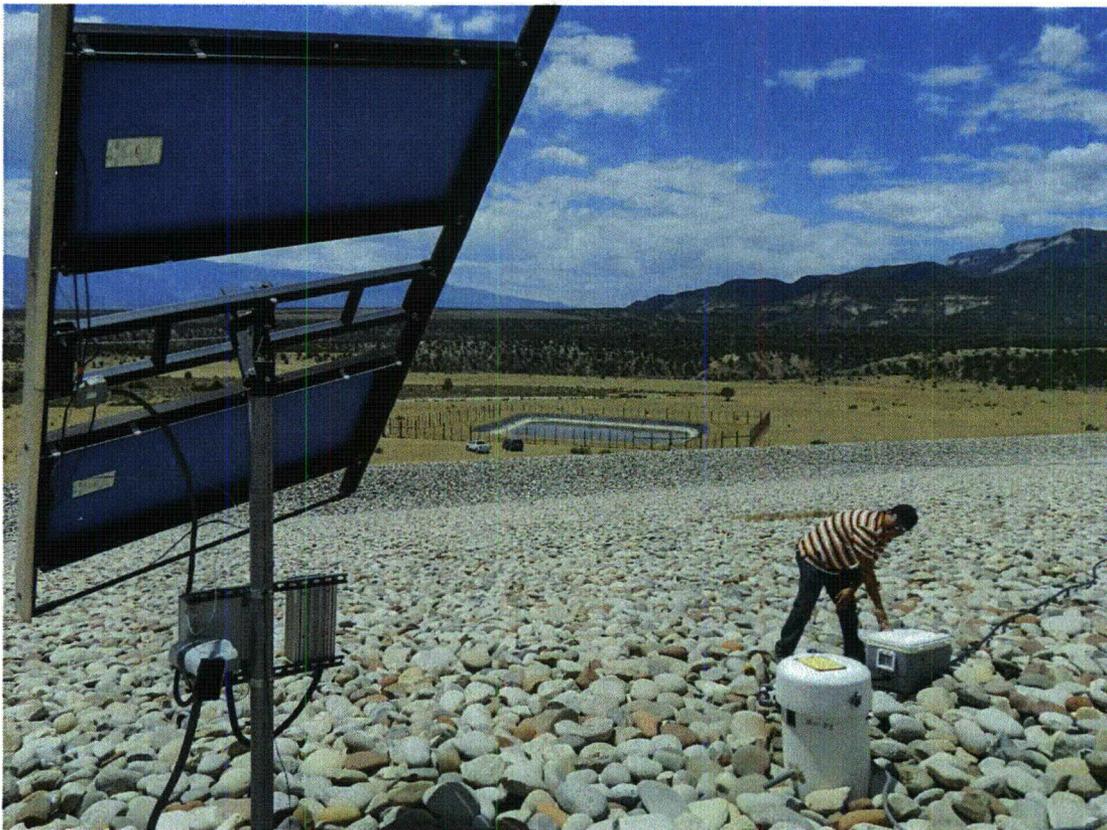
RFL 6/2012. PL-1. Contrast of cattle grazing inside and outside evaporation pond fence.



RFL 6/2012. PL-2. Inspecting west side of cell area; looking for site boundary monument.



RFL 6/2012. PL-3. Water entering evaporation pond.



RFL 6/2012. PL-4. Inspecting MW-03 flow meter inside cooler. Solar panel in foreground, evaporation pond in background.



RFL 6/2012. PL-5. Collared lizard on riprap at bottom of cell.



RFL 6/2012. PL-6. Looking south from MW-03 at toe of cell and sparse vegetation inside site boundary. Inspectors on left.



RFL 6/2012. PL-7. Rabbitbrush browsed by cattle.



RFL 6/2012. PL-8. Small spiny star cactus browsed by cattle.



RFL 6/2012. PL-9. Section of damaged perimeter fence near perimeter sign P10.



RFL 6/2012. PL-10. Fence cut and folded back near perimeter sign P1.

15.0 Annual Inspection of the Salt Lake City, Utah, UMTRCA Title I Disposal Site

15.1 Compliance Summary

The Salt Lake City, Utah, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Disposal Site, inspected on May 9, 2012, is in good condition. During the 2010 annual inspection, 8 square-meter monitoring stations were constructed for the purpose of monitoring the small percentage of rock cover that is degrading. Observations of the rock quality monitoring stations performed during this inspection indicated very little change from the previous year. No change was observed in the three slight depressions found on the disposal cell top; visual monitoring for settlement will continue. No waste debris or indication of windblown or spillover contamination from EnergySolutions' adjacent radioactive waste disposal operations was noted. Radiological survey measurements performed during the 2012 inspection indicated that no windblown contamination was present. Corner boundary markers remain in good condition and protected with PVC pipe by EnergySolutions. EnergySolutions removed greasewood (*Sarcobatus vermiculatus*) adjacent to the southern drainage in 2011 as well as any windblown debris from inside the disposal cell boundary. Other minor maintenance issues, such as the removal of greasewood from around site marker SMK-1 and tumbleweeds from the inside perimeter, were also performed as requested in 2011. No maintenance needs or cause for a follow-up or contingency inspection was identified.

Numbers in the left margin of this report refer to items summarized in the "Executive Summary" table.

15.2 Inspection Requirements

The inspection was conducted in accordance with the *Long-Term Surveillance Plan for the South Clive Disposal Site, Clive, Utah* (DOE/AL/62350-228, Rev. 2, U.S. Department of Energy [DOE], September 1997; LTSP) and procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27. Table 15-1 lists these requirements.

Table 15-1. License Requirements for the Salt Lake City Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 3.0	Section 15.4
Follow-Up or Contingency Inspections	Section 3.4	Section 15.5
Routine Maintenance and Repairs	Section 5.0	Section 15.6
Groundwater Monitoring	Section 4.0	Section 15.7.1
Corrective Action	Section 6.0	Section 15.8

15.3 Institutional Controls

The 100-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 1997. DOE is the licensee and, in accordance with the requirements for UMTRCA Title I sites, is responsible for the custody and long-term care of the site. Institutional controls at the site include federal ownership of the property and the following features that are inspected annually: site markers, boundary monuments, warning/no-trespassing signs, a site perimeter fence, and locked gates at the site entrances.

15.4 Inspection Results

The site, 85 miles west of Salt Lake City, Utah, was inspected on May 9, 2012. J. Gillespie and K. Turley of the S.M. Stoller Corporation, the Legacy Management Support contractor at the DOE office in Grand Junction, Colorado, conducted the inspection. J. Nguyen, the DOE Office of Legacy Management site manager, and R. Topham and C. Bishop, of the Utah Department of Environmental Quality, attended. EnergySolutions provided an escort, B. Kirkwood, accompanied by the chief engineer, D. Booth, and the compliance/permitting manager, S. McCandless.

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

15.4.1 Site Surveillance Features

The locations of site surveillance features are shown on Figure 15-1. 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 15-1 by photograph location (PL) numbers.

15.4.1.1 Entrance Gates, Entrance Signs, and Access Road

Access to the site is attained by following paved and graded roads to the EnergySolutions facility in Clive, Utah. The DOE disposal site is completely surrounded by EnergySolutions' active radioactive waste disposal operations. A perpetual right-of-way easement is in place that ensures DOE, and its representatives, continued access across EnergySolutions' property to the site. All personnel entering the EnergySolutions facility must sign in at the security building near the northwest corner of the site.

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

Access to the DOE disposal cell is via a route across EnergySolutions' property to the southwest corner of the site (site access was rerouted from the northwest corner in 2002 to accommodate EnergySolutions' waste disposal activities). Four locked gates provide access to the DOE disposal cell; one in the southwest corner of the chain-link perimeter fence that EnergySolutions maintains around the entire DOE property and three in the interior security fence DOE maintains around the disposal cell (two in the northwest corner and one in the southwest corner). The EnergySolutions escort admits inspectors through their perimeter gate in the southwest corner. DOE provides EnergySolutions access to the entire disposal site to perform, as needed, periodic maintenance activities through a signed access agreement and license. EnergySolutions is to notify DOE anytime access to the site is needed.

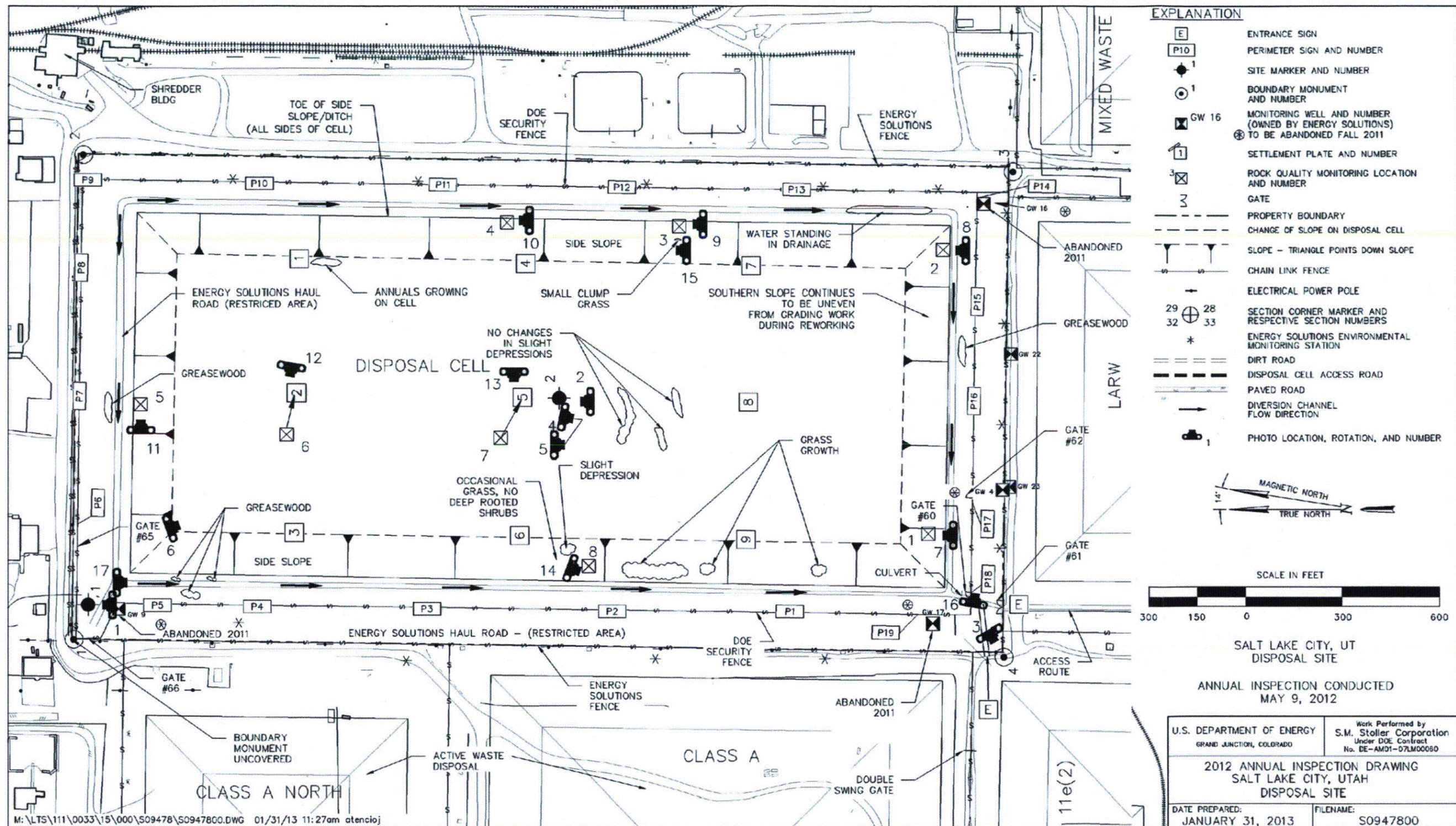


Figure 15-1. 2012 Annual Compliance Drawing for the Salt Lake City Disposal Site

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15.4.1.2 Perimeter Fence and Perimeter Signs

The exterior EnergySolutions fence was in good condition.

The DOE interior fence, site entrance sign, and all perimeter warning signs were present and in good condition. Decal number designations (1 through 18) have been placed on the outward-facing side of all perimeter signs to correspond with the numbered designations on the site map.

15.4.1.3 Site Markers

Both of the granite site markers were in excellent condition (PL-1 and PL-2). Site marker SMK-1 is etched from windblown sand and dirt, but it is legible. EnergySolutions had removed vegetation to clear the area surrounding SMK-1.

15.4.1.4 Survey Monuments and Boundary Monuments

All four boundary monuments were observed to be in good condition. The EnergySolutions protective casings at all four of the locations (PL-3) appeared to be working well for protection from surrounding earth moving activities.

15.4.1.5 Monitoring Wells

Supplemental standards based on limited use (40 CFR 192.21[g]) were applied to the groundwater in the uppermost aquifer underlying the site. The groundwater under the site was determined to be of limited use because of excessive total dissolved solids concentrations (greater than 10,000 parts per million) that naturally occur in the uppermost aquifer. Consequently, in accordance with the LTSP, no groundwater monitoring is required at the site.

Four groundwater monitoring wells that belong to EnergySolutions are located on DOE property. All four wells were properly abandoned in 2011. Abandonment reports are on file at the Utah Department of Environmental Quality and with the Office of Legacy Management.

15.4.2 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 (including the riprap-covered top and side slopes, diversion channels, and outflow channel), (2) the terrace area north and northeast of the disposal cell, and (3) the outlying area.

Within each area, the inspectors examined specific site surveillance features, drainage structures, vegetation, rock quality monitoring plots, 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.

15.4.2.1 Disposal Cell, Diversion Channels, and Outflow Channel

Inspectors walked the perimeter road that surrounds the base of the disposal cell and traversed the top and side slopes of the disposal cell. The crest (PL-4) of each side slope was inspected in order to provide a vantage point to view the planes of both the side slopes and the top of the

disposal cell (PL-5). The riprap was in good condition, and no evidence of erosion or slumping of the side slopes was observed. Several slight depressions in the riprap have been observed during previous inspections along the slopes of the cell, and they appear to have been created by the heavy equipment tracks during installation of the riprap (PL-6). These depressions continue to be monitored to ensure settlement is not occurring.

15A

A minor portion of the riprap, approximately 1 percent (the percentage determined using eight square-meter grids installed during the 2010 inspection), showed signs of weathering (PL-7 through PL-14). The rock type was consistent, and the weathering effects were all similar. The material weathering does not pose a problem at this time, due to the estimated low percentage observed, but the eight square-meter grids have been permanently located as illustrated on the figure and will continue to be monitored during future inspections.

No deep-rooted plants were found growing on the top or side slopes of the cell. However, vegetation was observed on the cell (PL-15), in areas where finer-grain material is filling voids, but does not pose a threat at this time.

Nine settlement plates are located on the cell top; several were inspected and found to be in good condition. Surveying of the settlement plates was conducted for several years following cell construction, but it is no longer required.

The inspectors examined the area between the toe of the disposal cell and the security fence. No evidence of slumping, settling, or significant vegetation encroachment was seen.

The perimeter road was in good condition. All surface water diversion channels were operating and in good condition during the 2012 inspection. Some standing water from recent precipitation was ponded in channels on the east and south sides (PL-16).

Minor plant encroachment has occurred within the diversion channels, with a few scattered greasewood plants observed growing along the top edge of these channels (PL-17). This vegetation does not interfere with the performance of the channels, but its size has increased since the last inspection. EnergySolutions has removed the larger vegetation.

15.4.2.2 Outlying Area

The site perimeter transect extends from the security fence to 0.25 mile beyond the site boundary. This transect includes the EnergySolutions perimeter fence, the enclosed area between the two fences, the outflow channel, and monitoring wells. All features were in good condition.

A variety of features and ongoing waste disposal activities managed by EnergySolutions surround the site. The most obvious waste disposal activities are occurring directly west of the site, where a Class A (low-level radioactive waste) disposal cell is being capped. On the northeast and east sides of the site, incoming wastes are unloaded from railcars and transferred to haul trucks; decontamination facilities are also present. Directly to the south is a completed low-level radioactive waste disposal cell, to the southwest is an 11e(2) waste disposal cell, and to the southeast is an operating mixed-waste treatment and disposal facility. Administration, security, and maintenance buildings lie directly to the north-northwest. A shredding facility, rotary dump, and railroad spur delivery loop are located to the northwest.

All areas surrounding DOE's property are restricted due to radiological hazards resulting from these waste disposal activities conducted by EnergySolutions. However, EnergySolutions ensures perpetual access to the site. Personnel radiological protection procedures are enforced as previously discussed.

15.4.2.3 Cursory Scanning for Spillover and Windblown Radioactive Surface Contamination

Radiological surveys for spillover and windblown radioactive contamination are generally performed onsite every other year during the inspection due to concerns regarding the ongoing radioactive waste disposal activities being conducted by EnergySolutions adjacent to the site. Survey measurements include taking dose rate measurements at random locations across the site, and the collection of smears are subsequently analyzed for removable alpha/beta contamination. In addition, EnergySolutions maintains several surface soil radiological monitoring and sampling stations, and performs routine scanning onsite, just inside the DOE property boundary.

A radiological survey was performed in 2010 as part of the inspection by an EnergySolutions Rad Tech and again during the 2012 inspection. Results of both surveys are included as part of this 2012 annual inspection report, as an attachment. All radiological survey measurements were below the DOE *Radcon Manual* limits. A prior radiological survey in 2007 also resulted in measurements below DOE *Radcon Manual* limits, which indicates that spillover and windblown radiological contamination does not currently appear to be an issue onsite. EnergySolutions performs periodic walkthroughs of the site to remove any windblown debris. No radiological waste items were found on the site in 2012.

15.5 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.

15.6 Maintenance and Repairs

No maintenance needs were identified during the inspection.

15.7 Environmental Monitoring

15.7.1 Groundwater Monitoring

In accordance with 40 CFR 192.21(g), groundwater at the site qualifies for narrative supplemental standards. Groundwater was determined to be of limited use due to naturally occurring concentrations of total dissolved solids in the uppermost aquifer, which exceed 10,000 milligrams per liter. Consequently, the LTSP does not require groundwater monitoring at the site.

15.8 Corrective Action

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

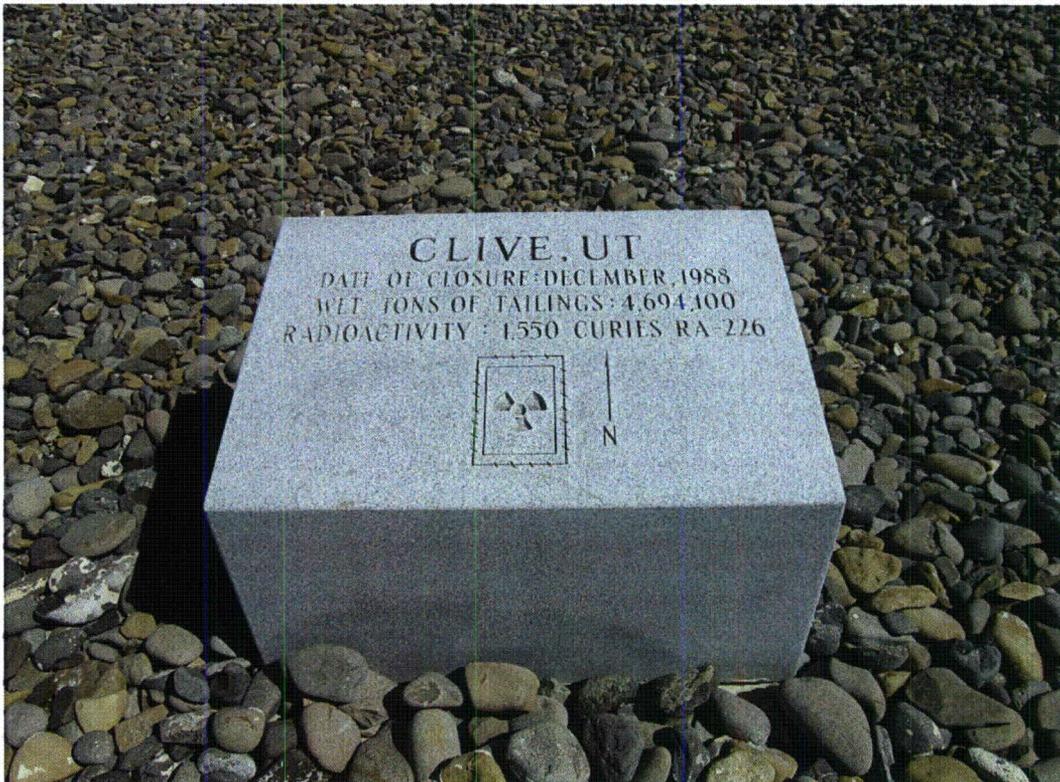
No corrective action was required in 2012.

15.9 Photographs

Photo Location Number	Azimuth	Description
PL-1	0	Site marker SMK-1's pitted surface.
PL-2	0	Site marker SMK-2.
PL-3	240	Boundary corner number 4.
PL-4	190	View of western slope of cell.
PL-5	180	View across the top of cell.
PL-6	160	View southeast across top of the cell.
PL-7	0	Rock Degradation Plot No. 1.
PL-8	0	Rock Degradation Plot No. 2.
PL-9	0	Rock Degradation Plot No. 3 (eastern slope).
PL-10	0	Rock Degradation Plot No. 4.
PL-11	90	Rock Degradation Plot No. 5.
PL-12	280	Rock Degradation Plot No. 6.
PL-13	270	Rock Degradation Plot No. 7.
PL-14	200	Rock Degradation Plot No. 8.
PL-15	0	Clump of grass in finer-grain materials.
PL-16	100	Standing water in drain south side of perimeter road.
PL-17	180	View along drainage west of perimeter road with greasewood.



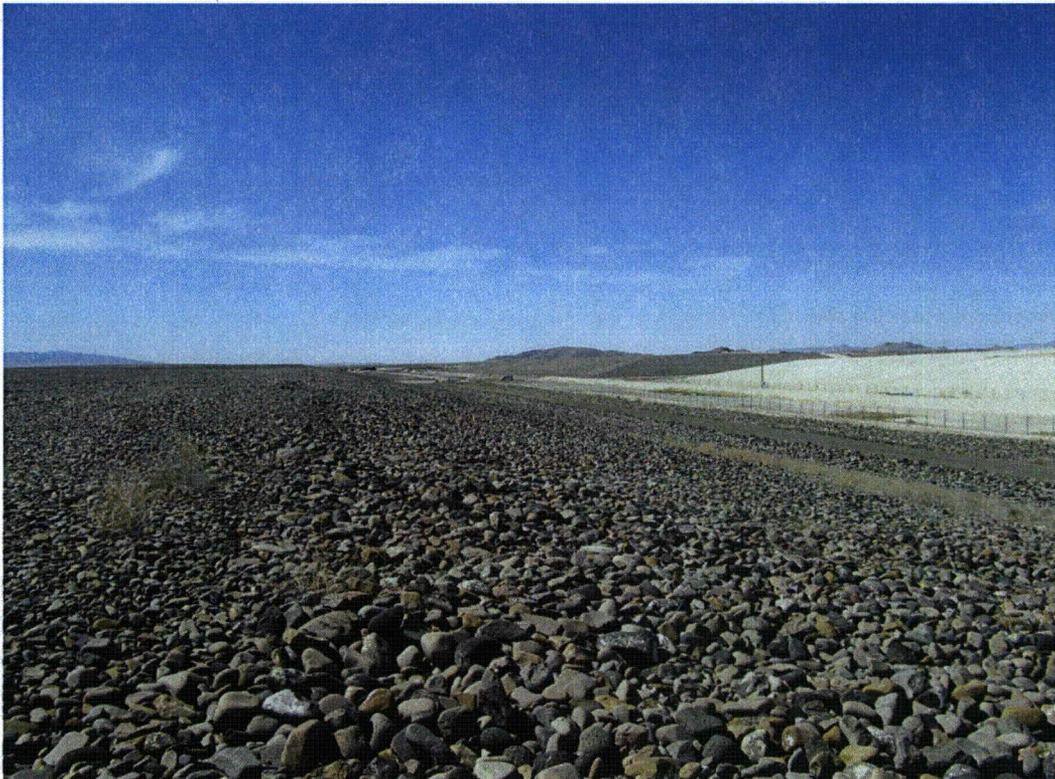
SLD 5/2012. PL-1. Site marker SMK-1's pitted surface.



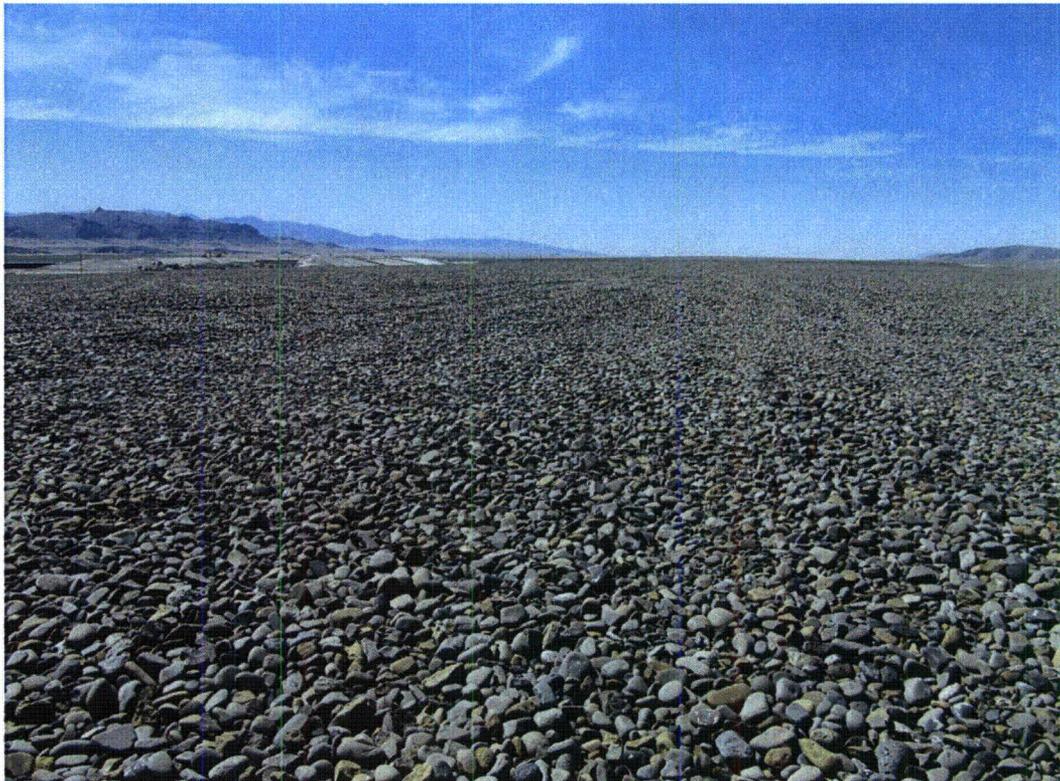
SLD 5/2012. PL-2. Site marker SMK-2.



SLD 5/2012. PL-3. Boundary corner number 4.



SLD 5/2012. PL-4. View of western slope of cell.



SLD 5/2012. PL-5. View across the top of cell.



SLD 5/2012. PL-6. View southeast across top of the cell.



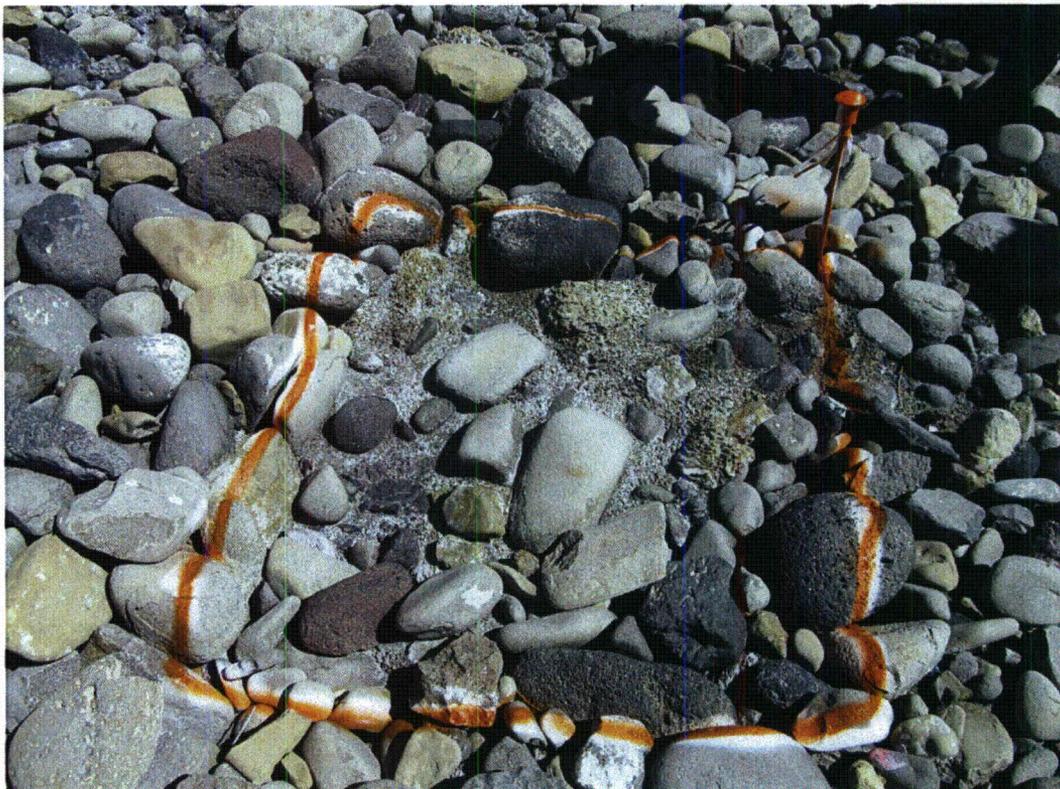
SLD 5/2012. PL-7. Rock Degradation Plot No. 1.



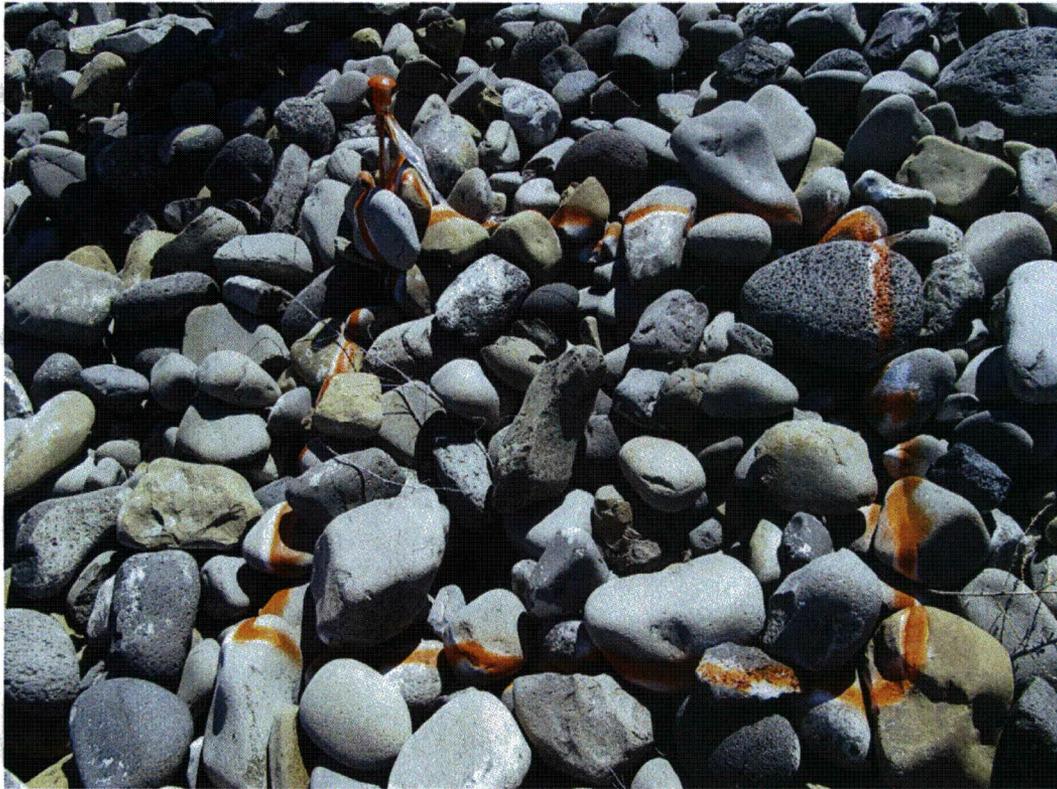
SLD 5/2012. PL-8. Rock Degradation Plot No. 2.



SLD 5/2012. PL-9. Rock Degradation Plot No. 3 (eastern slope).



SLD 5/2012. PL-10. Rock Degradation Plot No. 4.



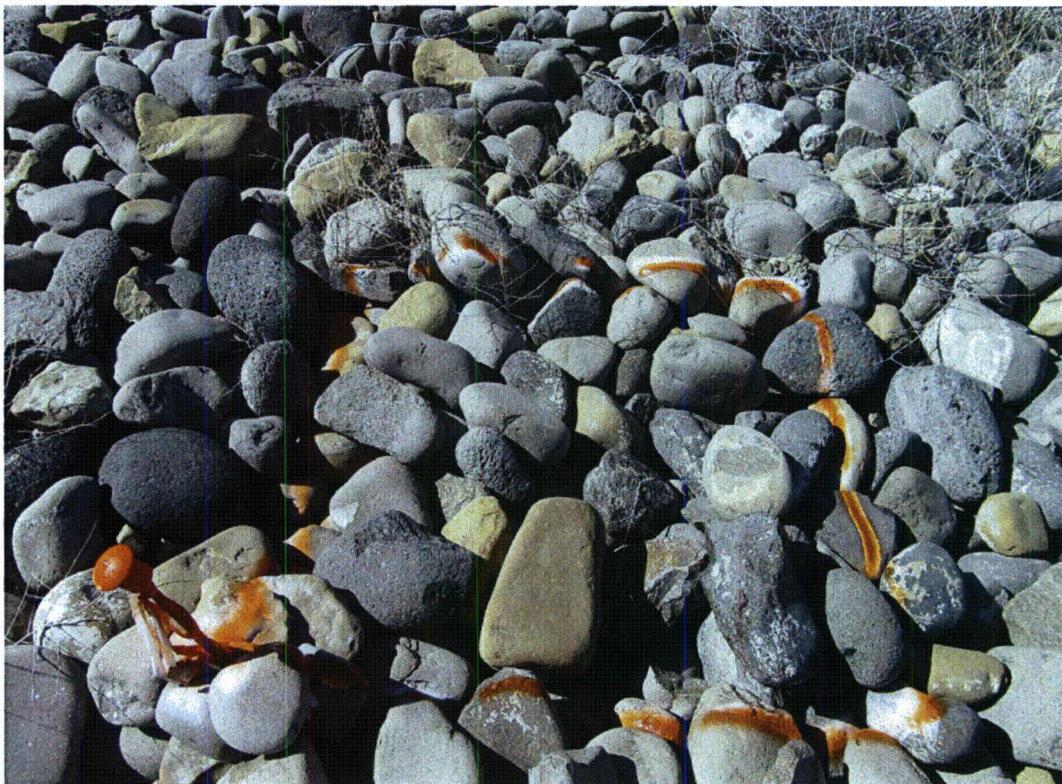
SLD 5/2012. PL-11. Rock Degradation Plot No. 5.



SLD 5/2012. PL-12. Rock Degradation Plot No. 6.



SLD 5/2012. PL-13. Rock Degradation Plot No. 7.



SLD 5/2012. PL-14. Rock Degradation Plot No. 8.



SLD 5/2012. PL-15. Clump of grass in finer-grain materials.



SLD 5/2012. PL-16. Standing water in drain south side of perimeter road.



SLD 5/2012. PL-17. View along drainage west of perimeter road with greasewood.

FY2012

ENERGYSOLUTIONS

Radiological Survey Form

CL-R5-PR-112 FI
Rev. 0

Survey Information		Instrument Information			
Date:	5-9-12	Model	Serial Number	Cal Due	Background
Survey number:	412-828	2360	202444	5-9-12	alpha beta
Bates number:	N/A	Orion	1525	7-12-12 7-17-12	1.0 229.2
Location:	V. To CEW			6-14-12	110 1100
Item:	Ground				
Reason:	Inspection				

N ↑

COPY

Location	dpm/100cm ²	
	alpha	beta
1 Ground	0	81
2 Ground	13	204
3	16	198
4	13	143
5	6	220
6	23	206
7	43	338
8	33	291
9	6	171
10 Ground	30	173
11		
12		
13		
14		
15		
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17		
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19		
20		
21		
22		
23		
24		
25		

Remarks: Highest contact dose rate: 0.014 mrem/hr. All swipe are large area swipes (20") swipes divide by (3) due to large area swipes

Surveyed by (Print):	Leo G. Blanco	Sign:	<i>Leo G. Blanco</i>	Date:	5-9-12
Surveyed by (Print):	N/A	Sign:	N/A	Date:	N/A
Reviewed by (Print):	S Long	Sign:	<i>S Long</i>	Date:	5/9/12

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