

8.0 Gunnison, Colorado, Disposal Site

8.1 Compliance Summary

The Gunnison Disposal Site, inspected on May 30 and 31, 2006, was in excellent condition. The disposal cell, its cover, and associated drainage features are performing as designed. Several missing or illegible perimeter signs and the entrance sign were replaced. All former erosion areas continue to be stable. The BLM agreed to terminate the right-of-way permit for the reseeded areas along the former reclaimed Chance Gulch haul road based on successful revegetation (determined to meet BLM Wildlife Mitigation Plan criteria for closure). No cause for a follow-up or contingency inspection was identified.

8.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Gunnison, Colorado, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I disposal site are specified in the *Long-Term Surveillance Plan [LTSP] for the Gunnison, Colorado, Disposal Site* (DOE/AL/62350–222, Rev. 2, U.S. Department of Energy [DOE], Albuquerque Operations Office, April 1997) and in procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). These requirements are listed in Table 8–1.

Table 8–1. License Requirements for the Gunnison, Colorado, Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 3.1	Section 8.3.1
Follow-up or Contingency Inspections	Section 3.5	Section 8.3.2
Routine Maintenance and Repairs	Section 5.0	Section 8.3.3
Ground Water Monitoring	Section 4.1	Section 8.3.4
Corrective Action	Section 6.0	Section 8.3.5

Institutional Controls—The 92-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 disposal site, as defined by DOE Policy 454.1, consist of federal ownership of the property, a site perimeter fence, warning/no trespassing signs placed along the property boundary, and a locked gate at the entrance to the site. Verification of these institutional controls is part of the annual inspection.

8.3 Compliance Review

8.3.1 Annual Inspection and Report

The site, located southeast of Gunnison, Colorado, was inspected on May 30 and 31, 2006. Results of the inspection are described below. Features and photograph locations (PLs) mentioned in this report are shown on Figure 8–1. Numbers in the left margin of this report refer to items summarized in the Executive Summary table.

8.3.1.1 Specific Site Surveillance Features

Access Road, Entrance Gate, Signs, and Fence— Access to the site is off Gunnison County Road 42 onto U.S. Bureau of Land Management (BLM) Road 3068 to the site entrance gate. The road to the site is an all-weather gravel road maintained by the BLM and is in good condition. The entrance gate is a simple barbed-wire gate in the stock fence that surrounds the site. The gate, secured by a padlock and chain to the adjoining post, is in good condition.

8A An entrance sign and 45 perimeter signs are attached to the posts of the perimeter fence. The entrance sign, missing at the time of the inspection, was replaced. Perimeter signs P4 and P37 were also missing, and signs P38 and P44 were illegible due to extensive bullet damage; all were replaced. Several other perimeter signs have bullet damage but are still legible. The remaining signs are in excellent condition.

A 3-strand barbed-wire fence delineates the site perimeter. Two barbed-wire gates—one on the north fence line, the other on the east fence line—provide monitor well access. The top strand of wire was broken at perimeter sign P38 and was repaired; otherwise, the fence and gates are in excellent condition.

Site Markers, Survey Monuments, and Boundary Monuments—The two site markers, three combination survey/boundary monuments, and eight boundary monuments were in excellent condition (PL-1).

Monitor Wells— Sixteen wells comprise the ground water monitoring network at the disposal site. Six of the wells are for monitoring cell performance, two for monitoring background ground water quality, and eight for water level measurements. The wells were secure and in excellent condition (PL-2).

8.3.1.2 Transects

To ensure a thorough and efficient inspection, the site was divided into four areas referred to as transects: (1) the riprap-covered disposal cell; (2) the riprap-covered side slopes, apron, and diversion ditches; (3) the area between the disposal cell and the site boundary; and (4) the outlying area. Transect four included an inspection of several reseeded areas on reclaimed former haul roads.

The area inside each transect was inspected by walking a series of traverses. Within each transect, the inspectors examined specific site surveillance features, drainage structures, vegetation, and other features. Inspectors also looked for evidence of settlement, erosion, or other modifying processes that might affect site integrity or the long-term performance of the site.

Top of Disposal Cell—The top of the disposal cell was in excellent condition (PL-3). There was no evidence of erosion, settling, slumping, or rock degradation. Several isolated patches of grass were observed on the disposal cell cover; however, these shallow-rooted plants do not impact the performance of the cover. Many small indentations were present on the cell cover. The indentations, with dimensions up to 4 inches across and up to 4 inches deep, appear to have been caused by pronghorn antelope. None of the indentations penetrate into the bedding layer under the rock cover and are not a cause for concern.

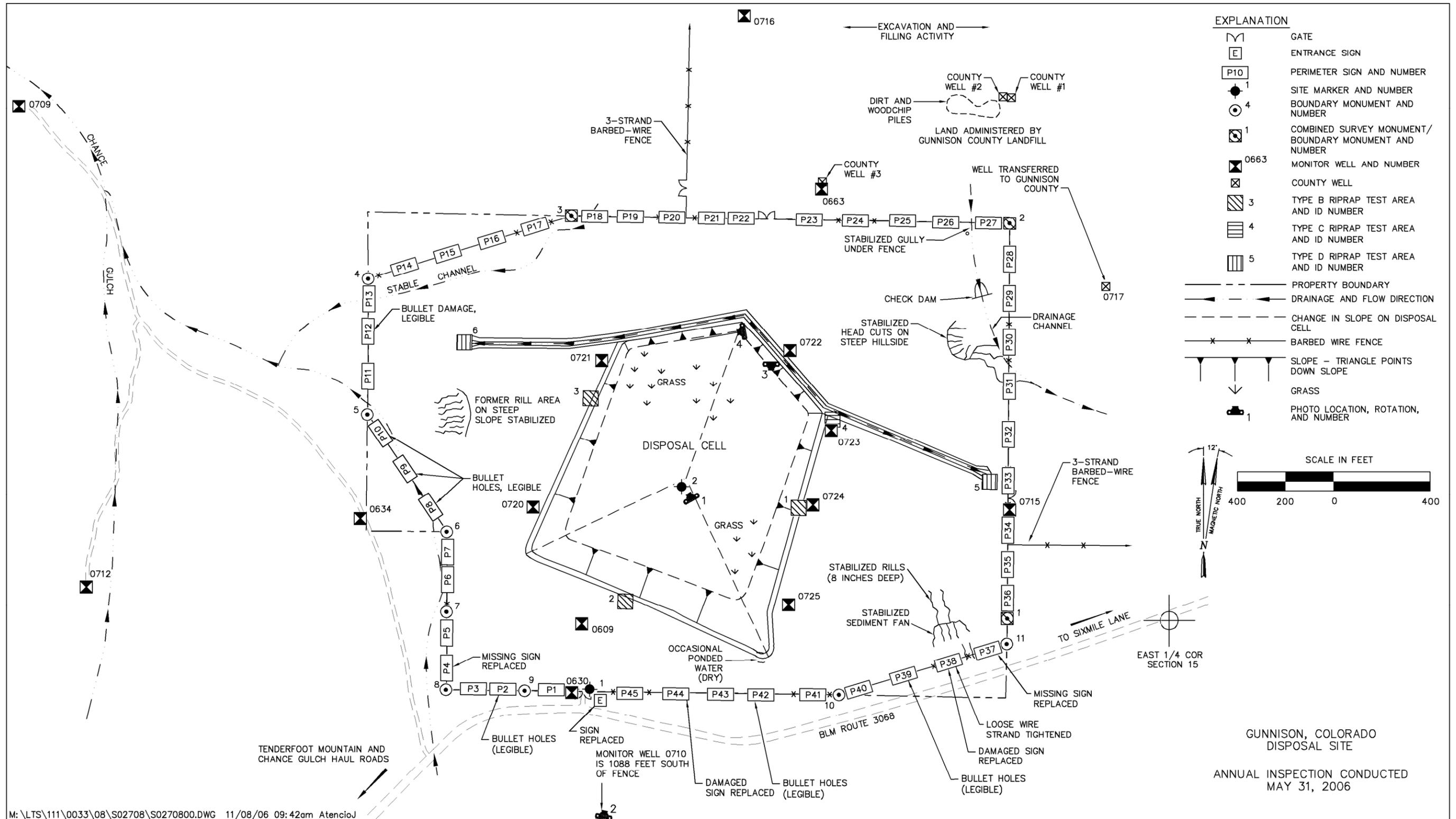


Figure 8-1. 2006 Annual Compliance Drawing for the Gunnison, Colorado, Disposal Site

Side Slopes, Apron, and Diversion Ditches—The riprap-covered side slopes, apron, and diversion ditches were in excellent condition (PL-4). No evidence of slumping, settling, or significant encroachment of vegetation was observed.

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

The condition of the riprap in six monitoring plots was visually inspected. Each monitoring plot, roughly 1 square meter in area, is in a “critical flow path” location in the apron and diversion channels. Corners of each monitoring plot are marked with orange paint. Overall, the rock is in excellent condition. As outlined in the LTSP, annual photographing and comparing of these monitoring plots occurred through the 2002 inspection, and the monitoring plots will be photographed every 5 years until 2017. The monitoring plots will be photographed again in 2007.

Area Between the Disposal Cell and the Site Boundary—Reclaimed and undisturbed areas occur between the disposal cell and the site perimeter. Areas disturbed during cell construction were regraded and then reclaimed by planting a seed mix. At the time of the 2006 inspection, both the seeded areas and the undisturbed areas were in excellent condition. Reclaimed areas had good coverage of vegetation, mostly grass. Shrub and forb abundance and diversity is much less in reclaimed areas than in undisturbed areas.

During the 2006 inspection, four areas of the site containing erosional features were investigated: rills in the southeast corner, north of perimeter sign P38; gullied areas in the northeast; a drainage channel in the northwest; and rills on a steep west-facing slope on the west side.

- In the southeast erosional area, several 8-inch-deep rills had formed in the steeper portion of the slope, and a fan-like accumulation of eroded sediments had formed just below the rills. The area was found to be in stable condition. Vegetation is well established on the steeper portions of the eroded slopes. No recent erosion was evident.
- In the northeast portion of the property, a series of deep gullies and headcuts had formed at a natural slope break in the terrain. No new erosion was noted, and the gullies continue to stabilize with the successful establishment of sagebrush and various grasses. No evidence of new erosion or sediment transport off site was observed at the drainage channel between perimeter signs P30 and P31.
- In the northwest portion of the property, a drainage channel tributary to Chance Gulch was inspected. This area continues to be stable and in good condition.
- On the west side of the property, rills had been noted on the steep west-facing slope during previous inspections. Surface rock fragments and vegetation have stabilized the slope.

Although these areas currently are stable and none of them encroach on the cell or diversion ditches, the steep topography makes them susceptible to erosion. Monitoring will continue for signs of increased erosion or any other indications of slope instability.

Vandalism at the site continues. Several perimeter signs were removed or severely damaged and were replaced.

Outlying Area—Gunnison County owns the land that adjoins the disposal site boundary to the north and east, and uses the land for a municipal landfill. In 2001, the county installed several fences and monitor wells in these areas. The monitor wells are identified as County Wells 1, 2, and 3 on Figure 8–1. DOE transferred former monitor well MW–0717 to the county in 2001. The county installed unlocked wire gates to allow DOE access to their monitor wells.

Landfill operations have encroached to within approximately 400 feet of the northeast corner of the DOE property boundary. A check dam was constructed on landfill property west of the disposal site, apparently to control sediment transport. Although landfill activities do not appear to pose a threat to the disposal site, DOE will continue to monitor the level of activity occurring near the site property boundaries and site surveillance features (e.g., fences and monitor wells).

This transect also includes inspection of several reseeded areas on the reclaimed former Chance Gulch haul road, which are approximately 2 miles west of the disposal cell.

This road was established during cell construction to access a borrow area. The restored area is within critical habitat of the Gunnison sage grouse. A BLM right-of-way permit and a Wildlife Mitigation Plan establish criteria for successful revegetation for this road. The BLM Wildlife Mitigation Plan requires the establishment of forbs (e.g., alfalfa, buckwheat, vetch, and wild flowers) to improve habitat for sage grouse and pronghorn antelope. DOE has been working to revegetate the road through a period of extended drought to meet BLM restoration criteria and close permits.

Although restoration has been successful along most of the reclaimed road, several isolated areas were reseeded in October 2000 to meet BLM’s vegetation success criteria for species diversity. Additional areas were reseeded and mulched in fall 2004 to promote species diversity.

On May 30, 2006, the inspectors met with BLM staff to inspect the restored areas. Overall, the revegetated areas contained an acceptable percentage of desirable, seeded species. Some of the areas, however, also contained small infestations of cheatgrass, a noxious weed that BLM is trying to eradicate in this area. Consequently, at BLM’s request, local personnel were subcontracted to remove cheatgrass plants (June) and apply herbicide (September) to newly germinating cheatgrass plants. Following these actions, BLM re-inspected the area and agreed to terminate DOE’s right-of-way permit (fall 2006).

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8.3.2 Follow-up or Contingency Inspections

DOE will conduct follow-up 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 are substantially changed.

No follow-up or contingency inspections were required in 2006.

8.3.3 Routine Maintenance and Repairs

In 2006, DOE replaced the entrance sign and several perimeter signs.

8.3.4 Ground Water Monitoring

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DOE monitors ground water at the Gunnison disposal site to demonstrate compliance with U.S. Environmental Protection Agency ground water protection standards in 40 CFR 192.03 and to demonstrate that the disposal cell is performing as designed. The monitoring network consists of 16 wells, including six point-of-compliance wells to determine cell performance, two background wells, and eight wells for water level measurements (Table 8–2). Ground water was sampled and water levels were measured annually from 1998 through 2001. After the 2001 sampling event, the sampling frequency changed to a five-year basis, and sampling and water-level measurements were collected in 2006.

The indicator analyte for cell performance at the Gunnison site is uranium. This analyte was selected on the basis of its presence in tailings pore fluid, its relatively high mobility in ground water, and its low concentration in upgradient (background) ground water. The target concentration of uranium is 0.013 mg/L. The basis for this value is the maximum observed concentration of uranium in background samples determined prior to long-term surveillance and maintenance. The maximum concentration level, or MCL, established for uranium by EPA is higher at 0.044 mg/L.

Table 8–2. Active Monitor Wells at the Gunnison, Colorado, Disposal Site

Compliance and Background Wells	Water Level Wells
MW–0720 (compliance)	MW–0630
MW–0721 (compliance)	MW–0634
MW–0722 (compliance)	MW–0663
MW–0723 (compliance)	MW–0709
MW–0724 (compliance)	MW–0710
MW–0725 (compliance)	MW–0712
MW–0609 (background)	MW–0714
MW–0716 (background)	MW–0715

Ground Water Quality Monitoring—Ground water at the Gunnison disposal site was sampled in May 2006. The concentration of uranium in samples collected at background wells MW-0609 and MW-0716 was 0.0012 mg/L and 0.0017 mg/L, respectively. The concentration of uranium in samples collected from point-of-compliance wells ranged between 0.00073 mg/L and 0.005 mg/L, which is consistent with historical results as shown in the time versus concentration graphs (Figure 8–2). Uranium results from the point of compliance wells were one to two orders of magnitude below the action level of 0.013 mg/L.

Samples also were analyzed for major anions (chloride and sulfate) and cations (calcium, magnesium, potassium, and sodium), metals (iron and manganese), and total dissolved solids as indicators of general water quality. These results were consistent with historical results

indicating no significant change in general water chemistry. The consistent general water-quality, along with the low uranium concentrations, indicate the disposal cell continues to perform as an efficient containment system.

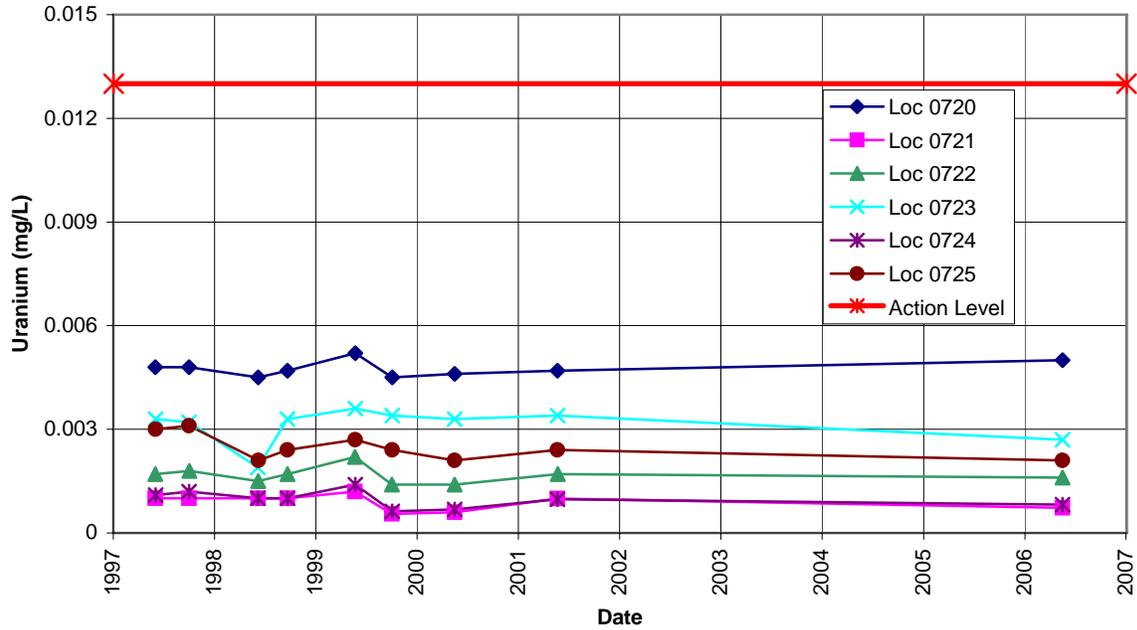


Figure 8–2. Time-Concentration Plots of Uranium in Ground Water at the Gunnison, Colorado, Disposal Site

Ground Water Level Monitoring—Water levels from the entire monitoring network were measured in June 2006. Data from water-level measurements show only minor fluctuations in ground water elevations since completion of the disposal cell in 1995; hydrographs from selected wells across the site illustrate this consistency in water levels (Figure 8–3). Water level measurements indicate essentially steady-state ground water conditions at the site.

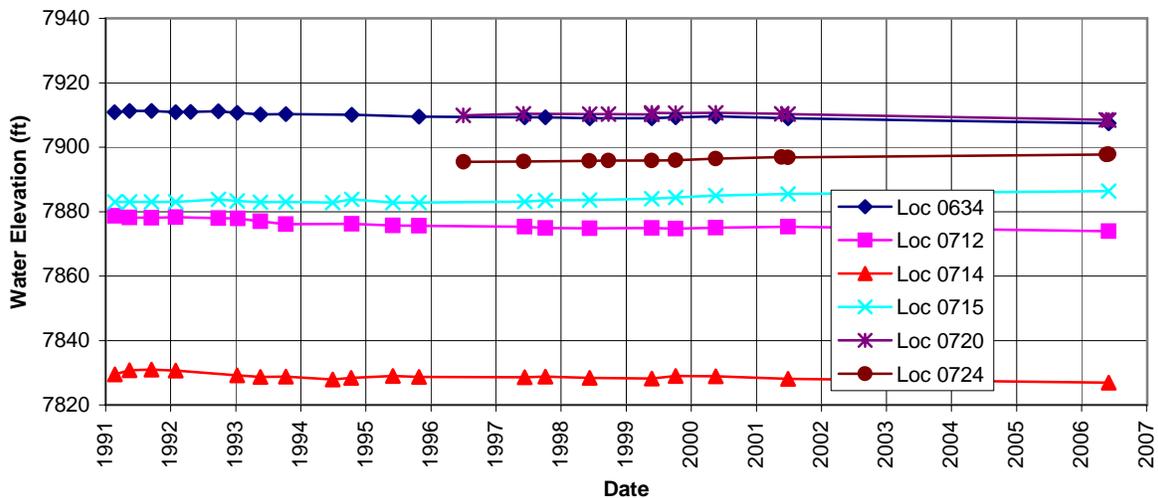


Figure 8-3. Water Level Measurements at Active Monitor Wells at the Gunnison, Colorado, Disposal Site

8.3.5 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 2006.

Photographs

Table 8-3. Photographs Taken at the Gunnison, Colorado, Disposal Site

Photograph Location Number	Azimuth	Description of Photograph
PL-1	330	Site marker SMK-2.
PL-2	10	Disposal cell viewed from monitor well MW-0710.
PL-3	180	View south across of the disposal cell top.
PL-4	260	View west of the north side slope, apron, and diversion ditch.



GUN 5/2006. PL-1. Site marker SMK-2.



GUN 5/2006. PL-2. Disposal cell viewed from monitor well MW-0710.



GUN 5/2006. PL-3. View south across of the disposal cell top.



GUN 5/2006. PL-4. View west of the north side slope, apron, and diversion ditch.

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