

8.0 Gunnison, Colorado, Disposal Site

8.1 Compliance Summary

The Gunnison, Colorado, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Disposal Site was inspected on June 7, 2011. The disposal cell and all associated surface water diversion and drainage structures were in excellent condition and functioning as designed. Six riprap test areas on the cell apron and diversion ditches were visually inspected; no apparent rock degradation was noted when compared to previous photos. A broken fence strand was repaired. No other maintenance needs or cause for a follow-up or contingency inspection was identified.

8.2 Compliance Requirements

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

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

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 3.0	Section 8.3.1
Follow-Up or Contingency Inspections	Section 3.5	Section 8.3.2
Routine Maintenance and Repairs	Section 5.0	Section 8.3.3
Groundwater Monitoring	Section 4.1	Section 8.3.4
Corrective Action	Section 6.0	Section 8.3.5

Institutional Controls—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 along the property boundary, and locked gates on the site perimeter. The 92-acre site is owned by the United States of America and was accepted under the U.S. Nuclear Regulatory Commission (NRC) general license (10 CFR 40.27) in 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.

Inspectors found no evidence that these institutional controls were ineffective or violated.

8.3 Compliance Review

8.3.1 Annual Inspection and Report

The site, southeast of Gunnison, Colorado, was inspected on June 7, 2011. The results of the inspection are described below. Figure 8–1 shows features and photograph locations (PLs) mentioned in this report. 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 BLM and was in good condition.

The entrance gate is a simple barbed-wire gate in the stock fence that surrounds the site. The entrance gate, located along the south portion of the perimeter fence, was secured by a padlock and chain to the adjoining post and was in good condition. Two other locked barbed-wire gates—one on the north fence line and the other on the east fence line—provide monitoring well access. The gates were locked and in excellent condition.

8A A three-strand, barbed-wire fence delineates the site; most of it is set along the property boundary. A broken strand near perimeter sign P8 was repaired. Otherwise, the fence was in good condition.

The entrance sign, at the south entrance gate, was in good condition. Forty-five perimeter signs are bolted to the perimeter fence posts and were in good condition.

Site Markers and Monuments—Both granite site markers, SMK-1 (just inside the south entrance gate) and SMK-2 (on top of the disposal cell), were in good condition. Combined survey/boundary monuments (SM-1/BM-1, SM-2/BM-2, and SM-3/BM-3) and eight additional boundary monuments (BM-4 through BM-11) also were in excellent condition.

Monitoring Wells—Sixteen wells constitute the groundwater monitoring network at the site. Six of the wells are for monitoring cell performance, two are for monitoring background groundwater quality, and eight are for water-level measurements. The wells were secure and in excellent condition (PL-1).

8.3.1.2 *Transects*

To ensure a thorough and efficient inspection, inspectors divided the site into four areas called “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.

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, and vegetation, along with other features. Inspectors also looked for evidence of settlement, erosion, or other modifying processes that might affect the site’s integrity or long-term performance.

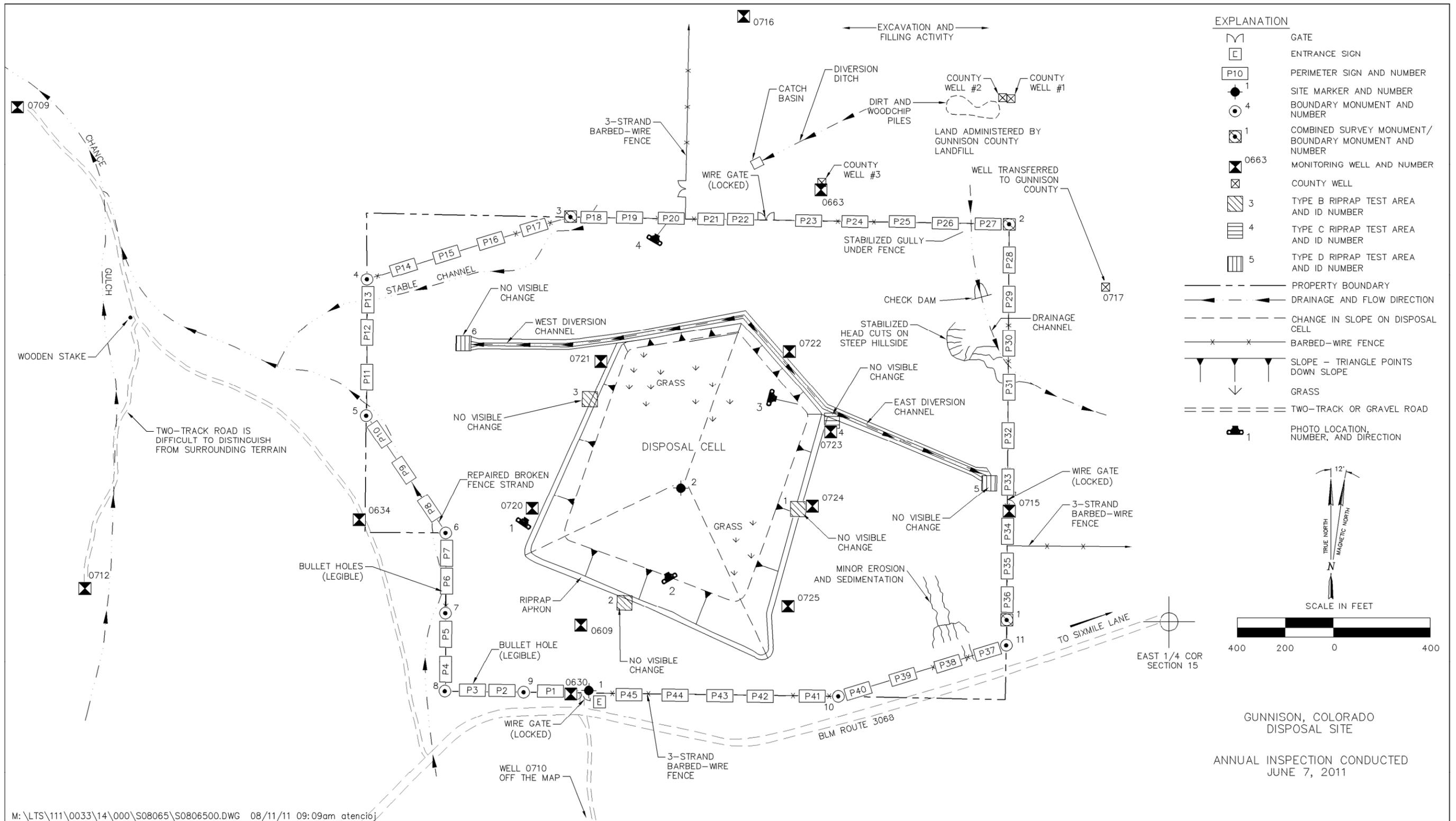


Figure 8-1. 2011 Annual Compliance Drawing for the Gunnison Disposal Site

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Top of the Disposal Cell—The top of the disposal cell was in excellent condition (PL–2). There was no evidence of erosion, settling, slumping, or rock degradation. Several isolated patches of grass are randomly distributed over the disposal cell cover; however, these shallow-rooted plants are not a cause for concern.

Side Slopes, Apron, and Diversion Ditches—The riprap-covered side slopes, apron, and diversion ditches were in good condition (PL–3). No evidence of slumping, settling, rock degradation, or encroachment of vegetation was observed.

The condition of the riprap in six monitoring test areas was visually inspected. The test areas, each roughly 1 square meter in area, are in critical flow path locations in the apron and diversion channels. The corners of each monitoring plot are marked with orange paint; new paint was applied during the inspection. The riprap in all of the test areas was in excellent condition. When the rocks were compared to the photos taken of them in 2007, there was no evidence that individual rocks had split or otherwise been degraded. As outlined in the LTSP, annual photographing and comparing of these test areas was performed through 2002; after that, the LTSP requires the test areas to be photographed every 5 years (through 2017). The next photos will be taken in 2012.

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

Area Between the Disposal Cell and the Site Boundary—There are reclaimed and undisturbed areas between the disposal cell and the site perimeter. Both types of areas are in excellent condition. In general, reclaimed areas have good vegetation coverage, mostly grass. As expected, shrubs and forbs are much less abundant and less diverse in reclaimed areas than they are in undisturbed areas. Overall, however, the vegetation at the site is very healthy.

Several locations in areas of steep topography had been susceptible to erosion in the past. Recent snowmelt runoff caused minor rill erosion and sediment deposition at a location near the southeast corner of the site. All other areas were stable, with no evidence of new erosion.

Outlying Area—Gunnison County owns the land that adjoins the site boundary to the north and east, and uses the land for a municipal landfill. In 2001, the County installed several fences and monitoring wells in these areas. The monitoring wells are identified as County wells 1, 2, and 3 on Figure 8–1. DOE transferred monitoring well 0717 to the County in 2001. Gates installed in the County fence for access to the wells remain unlocked.

Landfill operations have encroached to within approximately 400 feet of the northeast corner of the DOE property boundary (PL–4). A diversion ditch and catchment basin were constructed on landfill property north of the site. These features were constructed to control runoff and sediment transport onto landfill property. Although landfill activities do not appear to threaten the site, future inspections will continue to monitor the level of activity occurring near the DOE property boundaries and site-surveillance features (e.g., fences, monitoring wells).

8.3.2 Follow-Up or Contingency Inspections

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

No follow-up or contingency inspections were required in 2011.

8.3.3 Routine Maintenance and Repairs

A broken fence strand was repaired.

8.3.4 Groundwater Monitoring

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

In accordance with the LTSP, groundwater was sampled and water levels were measured annually from 1998 through 2001. Following the 2001 sampling event, the monitoring frequency changed to once every 5 years, and sampling and water-level measurements were collected in 2011.

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

Table 8–2. Active Monitoring Wells at the Gunnison Disposal Site

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

Groundwater Quality Monitoring—Groundwater at the site was sampled in May 2011. The concentrations of uranium in samples collected at background wells 0609 and 0716 were

0.0038 mg/L and 0.0022 mg/L, respectively. The concentrations of uranium in samples collected from POC wells ranged between 0.001 mg/L and 0.005 mg/L, which is consistent with historical results, as shown in the time-versus-concentration graph (Figure 8–2). Uranium results from the POC wells were an order 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, indicates that the disposal cell continues to perform as an efficient containment system.

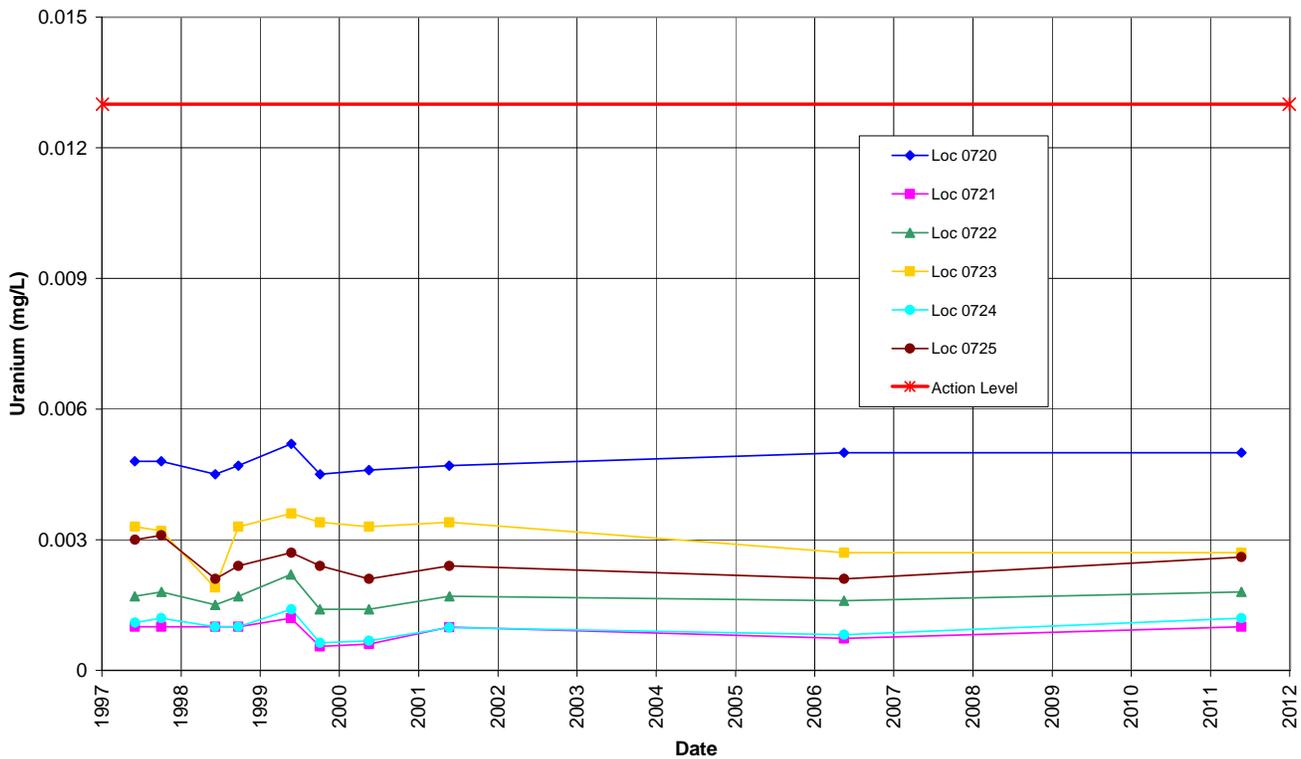


Figure 8–2. Time-Concentration Plots of Uranium in Groundwater at the Gunnison, Colorado, Disposal Site

Groundwater-Level Monitoring—Water levels from the entire monitoring network were measured in May 2011. Data from water-level measurements show only minor fluctuations in groundwater 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 groundwater conditions at the site.

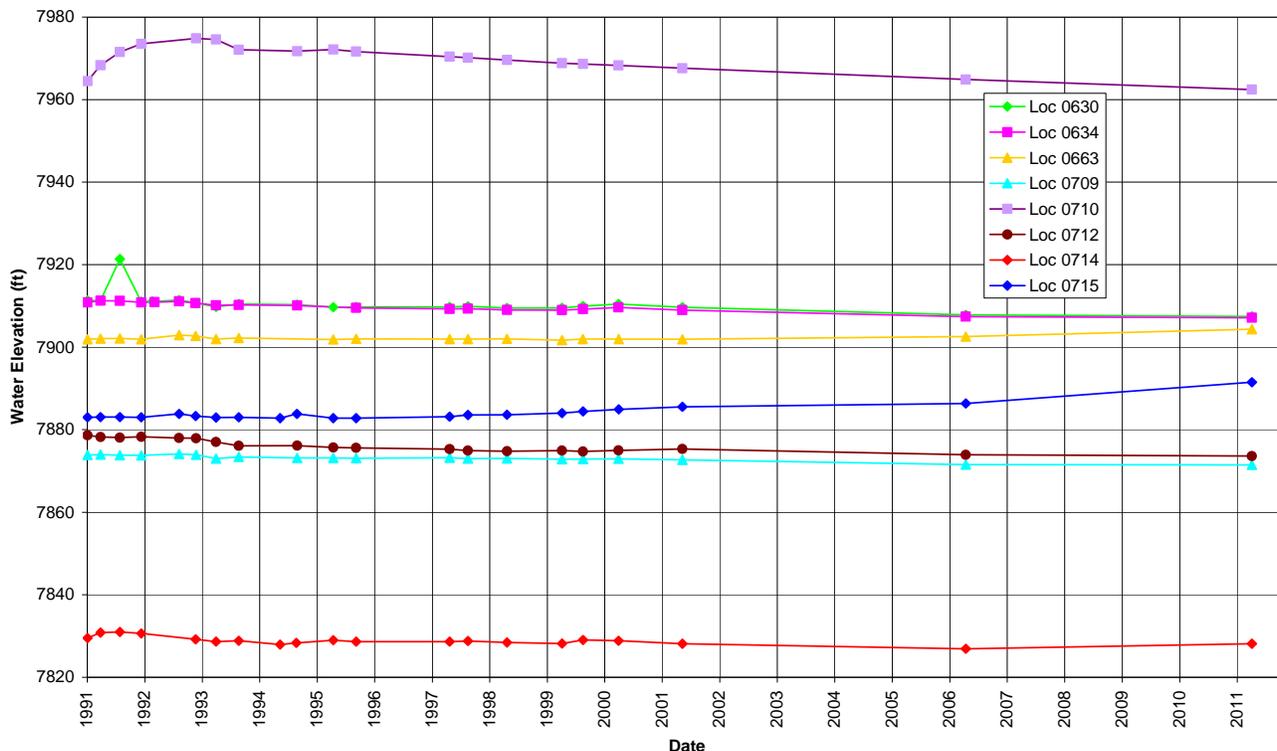


Figure 8-3. Water-Level Measurements at Active Monitoring Wells at the Gunnison, Colorado, Disposal Site

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 2011.

8.3.6 Photographs

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

Photo Location Number	Azimuth	Description
PL-1	35	Monitoring well 0720.
PL-2	330	West portion of the disposal cell top.
PL-3	210	East diversion channel.
PL-4	30	County landfill activities northeast of the site.



GUN 6/2011. PL-1. Monitoring well 0720.



GUN 6/2011. PL-2. West portion of the disposal cell top.



GUN 6/2011. PL-3. East diversion channel.



GUN 6/2011. PL-4. County landfill activities northeast of the site.