8.0 Gunnison, Colorado, Disposal Site

8.1 Compliance Summary

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) conducted the Gunnison, Colorado, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Disposal Site inspection on August 31, 2023. No cause for a follow-up inspection was identified.

No changes were observed on the disposal cell or in the associated diversion channels. Inspectors identified several minor maintenance items that were addressed following the annual inspection.

The most recent groundwater sampling event occurred in July 2021. The next scheduled monitoring event will occur in 2026. Groundwater monitoring results were below the site-specific uranium action level in the six point of compliance (POC) wells.

8.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the site are specified in the site-specific Long-Term Surveillance Plan (DOE 1997) (LTSP) in accordance with procedures established to comply with the requirements of the U.S. Nuclear Regulatory Commission (NRC) general license at Title 10 *Code of Federal Regulations* Section 40.27 (10 CFR 40.27). Table 8-1 lists these requirements.

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

Requirement	LTSP	This Report	10 CFR 40.27
Annual Inspection and Report	Section 3.0	Section 8.4	(b)(3)
Follow-Up Inspections	Section 3.5	Section 8.5	(b)(4)
Maintenance and Repairs	Section 5.0	Section 8.6	(b)(5)
Groundwater Monitoring	Section 4.0	Section 8.7	(b)(2)
Corrective Action	Section 6.0	Section 8.8	--

8.3 Institutional Controls

The 92-acre site, identified by the property boundary shown in Figure 8-1, is owned by the United States and was accepted under the NRC general license in 1997. DOE is the licensee and, in accordance with the requirements for UMTRCA Title I sites, LM is responsible for the custody and long-term care of the site. Institutional controls (ICs) at the site include federal ownership of the property, administrative controls, and the following physical ICs that are inspected annually: the disposal cell and associated diversion channels, entrance gate, and sign; perimeter fence and signs; site markers; survey and boundary monuments; quality control monuments; and wellhead protectors.

8.4 Inspection Results

The site, 6 miles southeast of Gunnison, Colorado, was inspected on August 31, 2023. The inspection was conducted by J. Lobato and M. Guziak of the Legacy Management Support contractor. M. Hurt (LM site manager), M. Cosby (Colorado Department of Public Health and Environment), and M. Schmidt and S. Casebolt (Gunnison County Public Works) also attended the inspection. The purposes of the inspection were to confirm the integrity of visible features at the site, identify changes in conditions that might affect conformance with the LTSP, and evaluate whether maintenance or follow-up inspection and monitoring are needed.

8.4.1 Site Surveillance Features

Figure 8-1 shows the locations of site features, including site surveillance features and inspection areas, in black and gray font. Some site features that are present but not required to be inspected are shown in italic font. Observations from previous inspections that are currently monitored are shown in blue, and new observations identified during the 2023 annual inspection are shown in red. Inspection results and recommended maintenance activities associated with site surveillance features are described in the following subsections. Photographs to support specific observations are noted in the text and in Figure 8-1 by photograph location (PL) numbers. The photographs and photograph log are presented in Section 8.10.

8.4.1.1 Site Access, Entrance Gate, and Entrance Sign

Access to the site is from Gunnison County Road 42 onto U.S. Bureau of Land Management (BLM) Route 3068, a gravel road maintained by BLM. Entrance to the site is through a locked gate that is part of the perimeter fence. The entrance gate was locked and functional, and the entrance sign was intact and legible. The site has two additional access gates, one on the east fence line and the other on the north fence line, that provide access to several offsite monitoring wells. Although not part of the inspection results, all three barbed-wire gates were replaced with metal gates following the inspection. Gates were locked at the time of the inspection. No maintenance needs were identified.

8.4.1.2 Perimeter Fence and Signs

A three-strand barbed-wire perimeter fence encloses the site, which is set along or within the property boundary. In 2019, fence flagging was added to help protect sage-grouse and antelope from becoming entangled. The perimeter fence was intact.

There are 45 perimeter signs bolted to the perimeter fence posts. Perimeter signs P2, P3, P35, P40, P44, and P45 (PL-1) have bullet damage but remain legible. No other maintenance needs were identified.

8.4.1.3 Site Markers

The site has two granite site markers. Site marker SMK-1 (PL-2) is just inside the entrance gate, and site marker SMK-2 is on the top slope of the disposal cell. The concrete base of site marker SMK-2 has cracks lining up with each of the four monument corners but remains stable. No maintenance needs were identified.

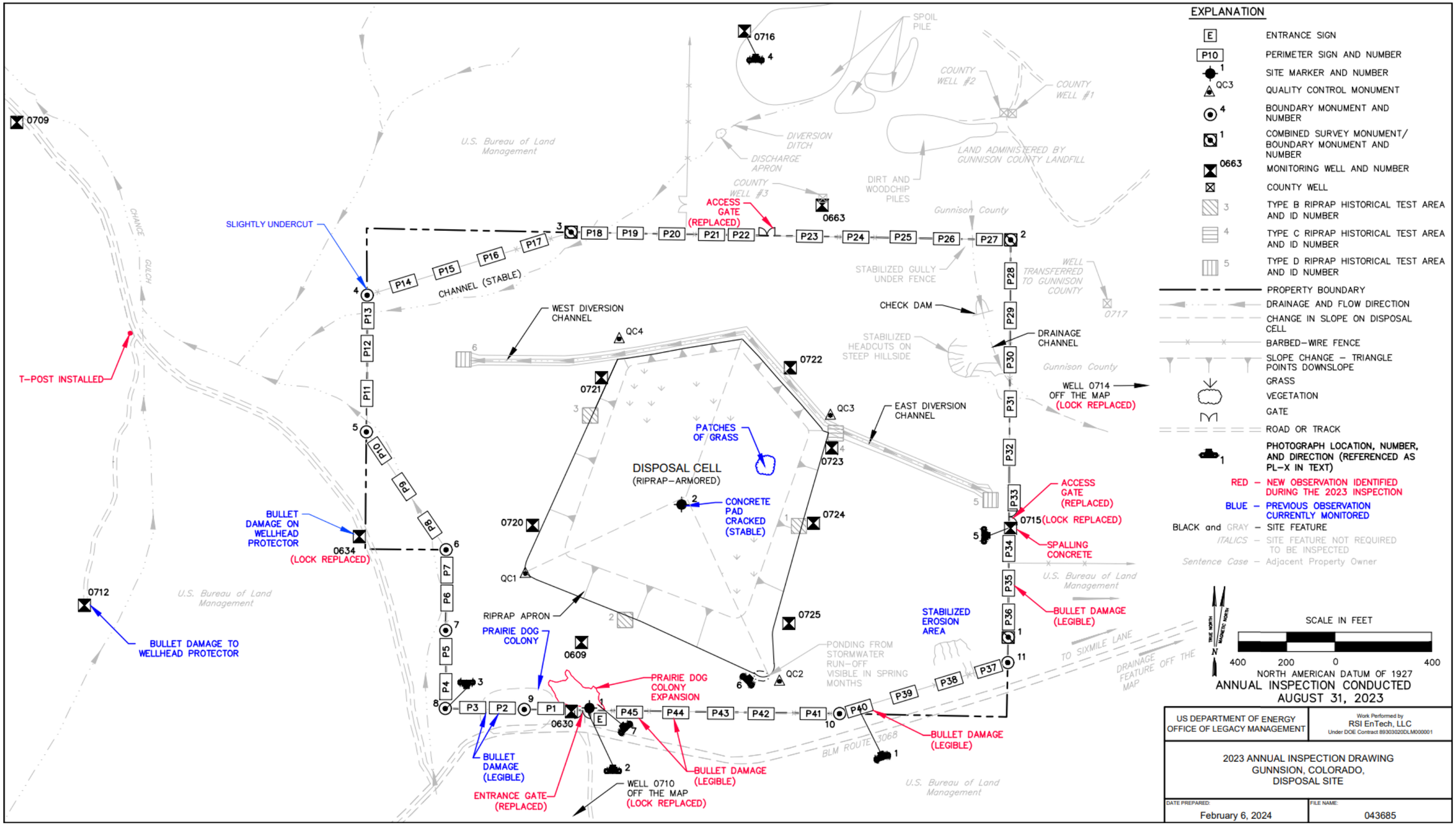

Figure 8-1. 2023 Annual Inspection Drawing for the Gunnison, Colorado, Disposal Site

8.4.1.4 Survey and Boundary Monuments

Three combined survey and boundary monuments and eight additional boundary monuments delineate the property boundary (PL-3). Inspectors noted that boundary monument BM-4 is slightly undercut but remains stable. No maintenance needs were identified.

8.4.1.5 Aerial Survey Quality Control Monuments

In October 2022, four permanent aerial survey quality control monuments were installed at the site for an aerial survey of the disposal cell. The quality control monument locations are shown in Figure 8-1. No maintenance needs were identified.

8.4.1.6 Monitoring Wells

The site has 16 groundwater monitoring wells. The wellhead protectors were locked and properly labeled. Bullet damage is on the wellhead protector of monitoring wells 0634 and 0712, but the well casings are not impacted and remain functional. Monitoring well 0716 is on landfill property. Gunnison County landfill operators have placed concrete barriers to protect monitoring well 0716 (PL-4) from landfill activities. The concrete around monitoring well 0715 is beginning to spall (PL-5). Four monitoring well locks (monitoring wells 0634, 0710, 0714, and 0715) were replaced before the inspection as part of a programmatic effort. No maintenance needs were identified.

8.4.2 Inspection Areas

In accordance with the LTSP, the site is divided into four inspection areas to ensure a thorough and efficient inspection. The inspection areas are (1) the top of the disposal cell; (2) the disposal cell side slopes, apron, and diversion channels; (3) the area between the disposal cell and the site boundary; and (4) the outlying area. Inspectors examined specific site surveillance features within each area and looked for evidence of erosion, settling, slumping, or other modifying processes that might affect the site's conformance with LTSP requirements.

8.4.2.1 Top of the Disposal Cell

There was no evidence of settling, slumping, erosion, or any other modifying process that might affect the integrity of the top slope of the disposal cell. Several isolated patches of grass have established on the top slope; however, these shallow-rooted plants do not degrade the performance of the radon barrier component of the disposal cell's engineered cover. No maintenance needs were identified.

8.4.2.2 Disposal Cell Side Slopes, Apron, and Diversion Channels

The disposal cell, completed in 1995, occupies 29 acres and is armored with basalt riprap to control erosion. Basalt riprap armors the disposal cell side slopes, the apron that collects and diverts stormwater runoff from the disposal cell, and the two diversion channels that protect the disposal cell from precipitation run-on. There was no evidence of settling, slumping, erosion, or any other modifying process that might affect the integrity of the disposal cell side slopes, apron, or diversion channels. Six historical test areas that were armored with riprap were last inspected during the 2017 annual inspection; in accordance with the LTSP (DOE 1997), monitoring is no longer required because no rock degradation has been observed.

Stormwater runoff from the disposal cell occasionally accumulates in a low-lying area at the southeast corner of the disposal cell apron (PL-6). The riparian-type vegetation that has become established there indicates that the area retains moisture. Water collection in this area does not pose a problem because the disposal cell surfaces are designed to drain to the southeast, and any water that ponds there is below the elevation of tailings placed under the engineered cover. No maintenance needs were identified.

8.4.2.3 Area Between the Disposal Cell and the Site Boundary

Reclaimed and undisturbed areas comprise the area between the disposal cell and the site boundary. In general, the vegetation in the reseeded, reclaimed areas consists of well-established grass; native plants are much less abundant and less diverse in reclaimed areas than they are in undisturbed areas. Former erosion areas are stable and naturally revegetating with native plant species. Inspectors observed several new prairie dog burrows inside the perimeter fence near perimeter signs P1, P2, and P3 (PL-7). Inspectors noted that the prairie dog colony appears to be expanding and will be monitored to ensure that the holes do not damage any DOE assets or become a nuisance. The closest burrow to the southern riprap apron is approximately 280 feet away. No maintenance needs were identified.

8.4.2.4 Outlying Area

In accordance with the LTSP, a drainage feature from the southeast corner of the site and along BLM Route 3068 was checked for indications of seepage from the vadose zone. The feature, which follows the borrow ditch along the road, was dry and showed no signs of seepage.

The 0.25-mile area beyond the site boundary was visually observed for erosion, changes in land use, or other phenomena that might affect the long-term integrity of the site. A prairie dog colony that has been observed along the southwestern boundary of the site has moved inside the perimeter fence, as noted in Section 8.4.2.3. Inspectors will continue to monitor and track the extent of the prairie dog colony in this area.

Gunnison County owns the land adjacent to the site boundary to the north and east and uses the land for a municipal landfill. The nearest landfill operations continue to be approximately 400 feet north of the property boundary. Although landfill activities do not affect the site, inspectors will continue to monitor the level of activity occurring near the site boundary and surveillance features (e.g., fences and monitoring wells). There is a spoil pile near monitoring well 0716 (Figure 8-1) that inspectors will continue to monitor. No maintenance needs were identified.

8.5 Follow-Up or Contingency Inspections

LM 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) LM is notified by a citizen or outside agency that conditions at the site are substantially changed. No need for a follow-up inspection was identified.

8.6 Maintenance and Repairs

Monitoring well locks were replaced at four locations (monitoring wells 0634, 0710, 0714, and 0715) before the inspection. The wood stake marking the two-track road leading to monitoring well 0712 was missing and has been replaced with a metal T-post. The barbed-wire entrance gates were replaced with metal gates following the inspection. No other maintenance needs were identified.

8.7 Environmental Monitoring

8.7.1 Groundwater Monitoring

In accordance with the LTSP (DOE 1997), LM conducts groundwater monitoring every 5 years to demonstrate that the site-specific uranium action level has not been exceeded. Groundwater was sampled and groundwater levels were measured annually from 1998 to 2001. Following the 2001 sampling event, the monitoring frequency changed to once every 5 years. The most recent sampling event occurred in July 2021. Groundwater monitoring results for the site are reported and published on the LM Geospatial Environmental Mapping System (GEMS) website https://gems.lm.doe.gov/#site=GUD. The next sampling event is planned for 2026.

The groundwater monitoring network consists of 16 monitoring wells. This total includes six POC wells, two monitoring wells to monitor background groundwater quality, and eight wells to monitor groundwater levels.

The indicator analyte for disposal cell performance is uranium, which was selected because of its presence in tailings pore fluid, relatively high mobility in groundwater, and low concentration in background groundwater samples, as stated in Section 2.5 in the LTSP (DOE 1997).

The site-specific screening monitoring action level (action level) concentration for uranium is 0.013 milligram per liter (mg/L). The basis for this action level is the maximum observed concentration of uranium in background samples before long-term surveillance and maintenance activities began. The U.S. Environmental Protection Agency established a maximum concentration limit for uranium of 0.044 mg/L in groundwater (40 CFR 192 Subpart A Table 1). Water levels are measured at each monitoring well during groundwater monitoring events. A rising water level trend in monitoring wells 0663, 0715, 0716, and 0721 through 0725 was noted in the 2021 monitoring report results. In 2022, DOE initiated a new project to investigate the rising water level. Data for the rising water level project have been collected, and DOE is reviewing the results.

The concentrations of uranium in samples collected and analyzed from the POC wells in 2021 ranged from 0.001 mg/L to 0.005 mg/L. In 2021, uranium concentrations were consistent with historical results in five of the POC wells; however, they slightly exceeded the historical maximum in POC well 0721. Uranium results from the POC wells in 2021 were below the action level of 0.013 mg/L.

Figure 8-2 presents the locations of the groundwater monitoring network and Table 8-2 lists the site's groundwater monitoring network.

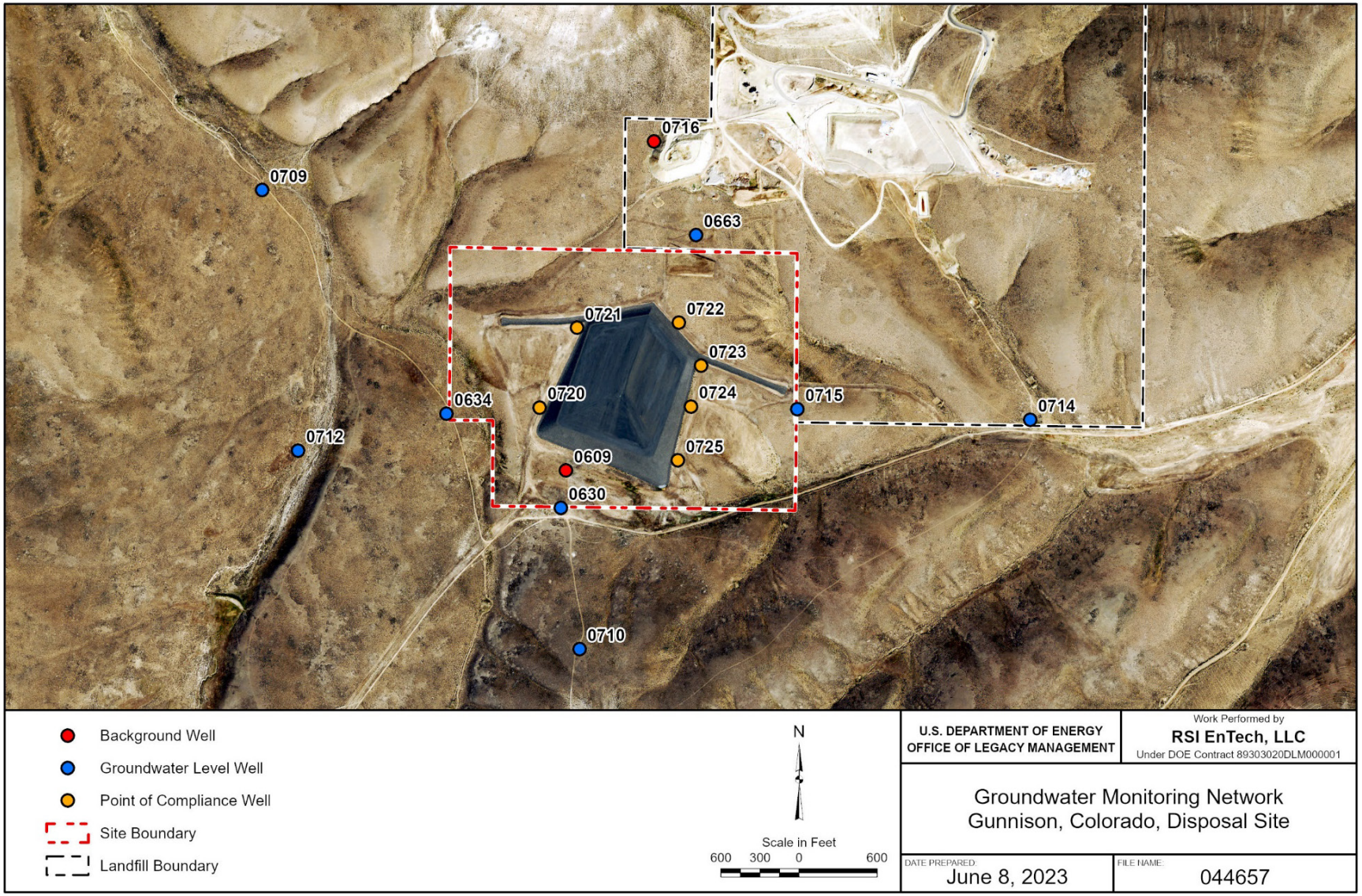

Figure 8-2. Groundwater Monitoring Network at the Gunnison, Colorado, Disposal Site

Table 8-2. Groundwater Monitoring Network for the Gunnison, Colorado, Disposal Site

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

8.8 Corrective Action

Corrective actions may be warranted to address hazardous conditions that create a potential health and safety problem or conditions that may affect the integrity of the disposal cell or compliance with 40 CFR 192.04. No need for corrective action was identified as part of this inspection.

8.9 References

10 CFR 40.27. U.S. Nuclear Regulatory Commission, "General License for Custody and Long-Term Care of Residual Radioactive Material Disposal Sites," *Code of Federal Regulations*.

40 CFR 192 Subpart A Table 1. U.S. Environmental Protection Agency, "Maximum Concentration of Constituents for Groundwater Protection," *Code of Federal Regulations.*

40 CFR 192.04. U.S. Environmental Protection Agency, "Corrective Action," *Code of Federal Regulations*.

DOE (U.S. Department of Energy), 1997. *Long-Term Surveillance Plan for the Gunnison, Colorado, Disposal Site*, DOE/AL/62350-222, Rev. 2, April.

8.10 Photographs

Photograph Location Number	Azimuth	Photograph Description
PL-1	340	Perimeter Sign P40 with Bullet Holes
PL-2	0	Site Marker SMK-1
PL-3	180	Boundary Monument BM-8
PL-4	0	Monitoring Well 0716 with Concrete Barriers
PL-5	90	Monitoring Well 0715 with Concrete Spalling at Base
PL-6	45	Evidence of Water Accumulation on Southeast Toe of Disposal Cell
PL-7	315	Prairie Dog Colony Area

PL-1. Perimeter Sign P40 with Bullet Holes

PL-2. Site Marker SMK-1

PL-3. Boundary Monument BM-8

PL-4. Monitoring Well 0716 with Concrete Barriers

PL-5. Monitoring Well 0715 with Concrete Spalling at Base

PL-6. Evidence of Water Accumulation on Southeast Toe of Disposal Cell

PL-7. Prairie Dog Colony Area