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 (site) annual site inspection on July 31, 2018 and the five-year groundwater monitoring event in July 2016. 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 needs and addressed most during the inspection.

The most recent groundwater monitoring results were below the site-specific uranium action level in all 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 LM Long-Term Surveillance Plan (LTSP) (DOE 1997) and in procedures LM established to comply with the requirements of the U.S. Nuclear Regulatory Commission 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 general license 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 (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 channel, entrance gate and sign, perimeter fence and signs, site markers, survey and boundary monuments, and wellhead protectors.

8.4 Inspection Results

The site, 6 miles southeast of Gunnison, Colorado, was inspected on July 31, 2018. The inspection was conducted by R. Johnson, J. Lobato, and J. Cario of the Legacy Management

Support contractor. J. Dayvault (LM site manager) and M. Cosby (Colorado Department of Public Health and Environment) 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 determine the need, if any, for maintenance or additional inspection and monitoring. The results of the inspection are reported in the remainder of Section 8.4.

8.4.1 Site Surveillance Features

Figure 8-1 shows the locations of site features in black, including site surveillance features and inspection areas. 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 text, and new observations identified during the 2018 annual inspection are shown in red. Inspection results and recommended maintenance activities associated with site surveillance features are included in the following subsections. Photographs to support specific observations are identified in the text and in Figure 8-1 by photograph location (PL) numbers. The photographs and photograph log are presented in Section 8.9.

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. The road to the site is 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. The entrance sign is bolted to a perimeter fence post next to the entrance gate. The entrance sign has bullet damage but remains legible. No maintenance needs were identified.

8.4.1.2 Perimeter Fence and Signs

A three-strand barbed-wire perimeter fence encloses the site; most of it is set along the property boundary. The perimeter fence was intact except for one location with a broken strand that was repaired during the inspection (PL-1). Two barbed-wire gates—one on the north fence line and the other on the east fence line—provide egress from the site to offsite monitoring wells; both gates were locked.

There are 45 perimeter signs bolted to the perimeter fence posts. Several perimeter signs have bullet damage but remain legible. Perimeter signs P2, P38, and P43 were faded or damaged; replacement signs were installed during the inspection (PL-2). Perimeter signs P4–P13 along the west perimeter fence line are becoming illegible due to fading and should be replaced within the next couple of years. No other maintenance needs were identified.

8.4.1.3 Site Markers

The site has two granite site markers. Site marker SMK-1 is just inside the entrance gate (PL-3), and site marker SMK-2 is on the top slope of the disposal cell. No maintenance needs were identified.

8.4.1.4 Survey and Boundary Monuments

Three combined survey and boundary monuments and eight additional boundary monuments delineate the property boundary (PL-4). No maintenance needs were identified.

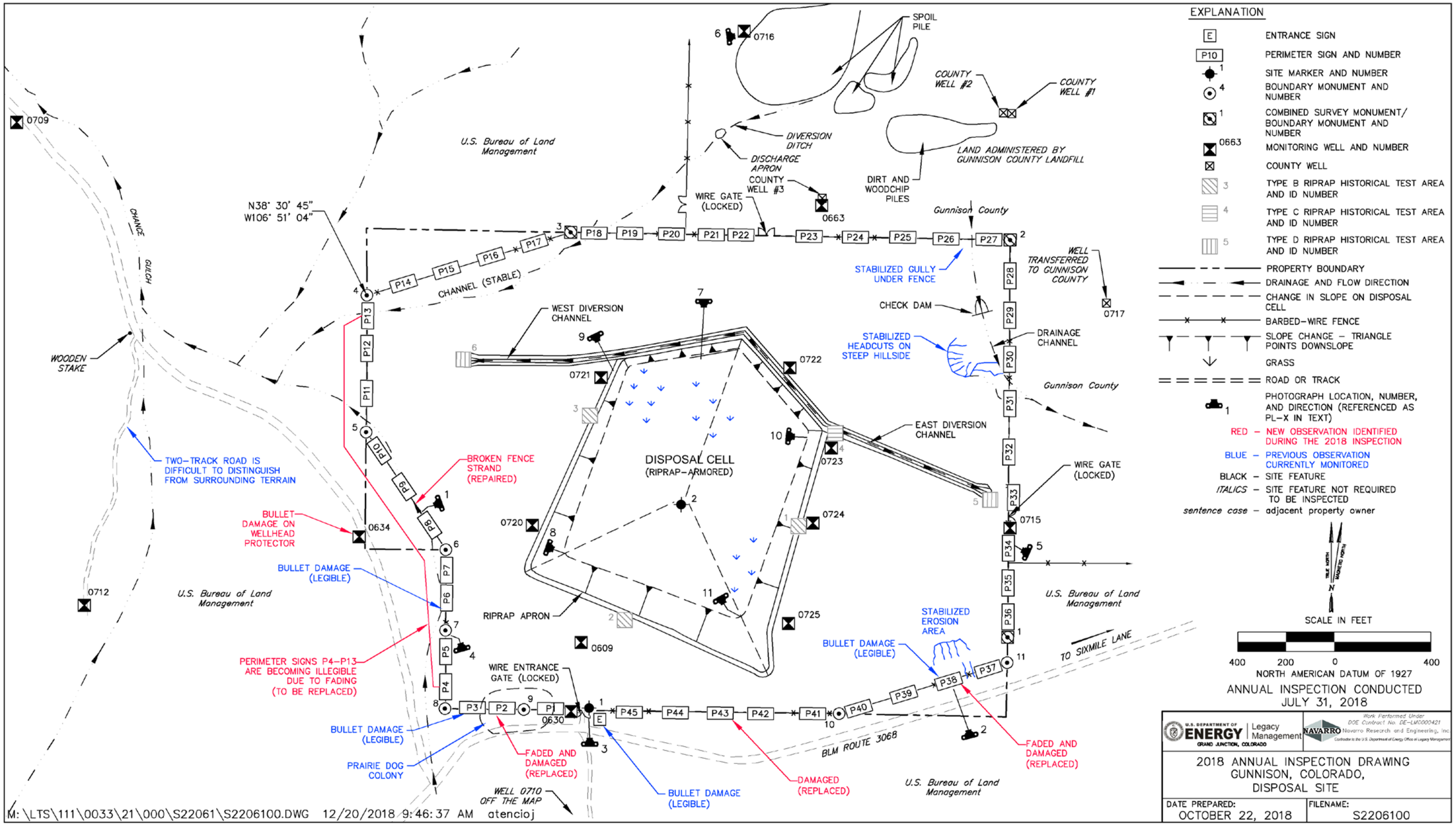

Figure 8-1. 2018 Annual Inspection Drawing for the Gunnison, Colorado, Disposal Site

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8.4.1.5 Monitoring Wells

The site has 16 groundwater monitoring wells. The wellhead protectors were locked and properly labeled (PL-5). The wellhead protector for monitoring well 0634 had bullet damage but was secure. Gunnison County landfill operators have placed concrete barriers to protect monitoring well 0716, which is on landfill property, from landfill activities (PL-6). The edge of an adjacent spoil pile, although close to the concrete barriers, does not impair access to monitoring well 0716. 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

The disposal cell, completed in 1995, occupies 29 acres and is armored with basalt riprap to control erosion. 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 (PL-7). 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 side slopes (PL-8), an apron to collect and divert precipitation runoff from the disposal cell (PL-9), and two diversion channels to protect the disposal cell from precipitation run-on (PL-10) are all armored with basalt riprap. 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 rock-monitoring test areas were last inspected during the 2017 annual inspection; monitoring is no longer required in accordance with the LTSP because no rock degradation had been observed.

Precipitation runoff from the disposal cell occasionally ponds in a low-lying area at the southeast corner of the disposal cell; standing water was not present at the time of the inspection (PL-11). 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 continue to be stable and are naturally revegetating with native plant species. 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 area beyond the site boundary for a distance of 0.25 mile was visually observed for erosion, changes in land use, or other phenomena that might affect the long-term integrity of the site. Gunnison County owns the land that adjoins 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 site. Although landfill activities do not impact 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). With regard to groundwater flow, the landfill operations are upgradient from the disposal cell. The proximity of the spoil pile to monitoring well 0716 (see Figure 8-1) is the only current concern for activities that could impact a site asset. Inspectors will continue to monitor this area.

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

A broken fence strand was repaired, and faded or damaged perimeter signs P2, P38, and P43 were replaced during the inspection. Perimeter signs P4–P13 along the west fence line are becoming illegible due to fading and should be replaced within the next couple of years. No other maintenance needs were identified.

8.7 Groundwater Monitoring

In accordance with the LTSP, LM conducts groundwater monitoring every 5 years to demonstrate the site-specific uranium action level has not been exceeded. Groundwater was sampled and groundwater levels were measured annually from 1998 through 2001. Following the 2001 sampling event, the monitoring frequency changed to once every 5 years. The most recent sampling event occurred in July 2016.

The groundwater monitoring network consists of 16 monitoring wells, including six POC wells, two monitoring wells to monitor background groundwater quality, and eight wells to monitor groundwater levels (Table 8-2 and Figure 8-2). The indicator analyte for disposal cell performance is uranium, which was selected because of its presence in tailings pore fluid, its relatively high mobility in groundwater, and its low concentration in upgradient (background) groundwater. 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 determined 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). Samples are also collected 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.

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

All groundwater monitoring results for the site are reported and published on the LM Geospatial Environmental Mapping System website (http://gems.lm.doe.gov/#site=GUD). The *2016 Annual Site Inspection and Monitoring Report for Uranium Mill Tailings Radiation Control Act Title I Disposal Sites* (DOE 2016) shows the most recent monitoring results. The report shows uranium concentration was below the action level (0.013 mg/L) in all POC wells and indicates continued groundwater compliance at the Gunnison disposal site.

8.8 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 192.04. No need for corrective action was identified.

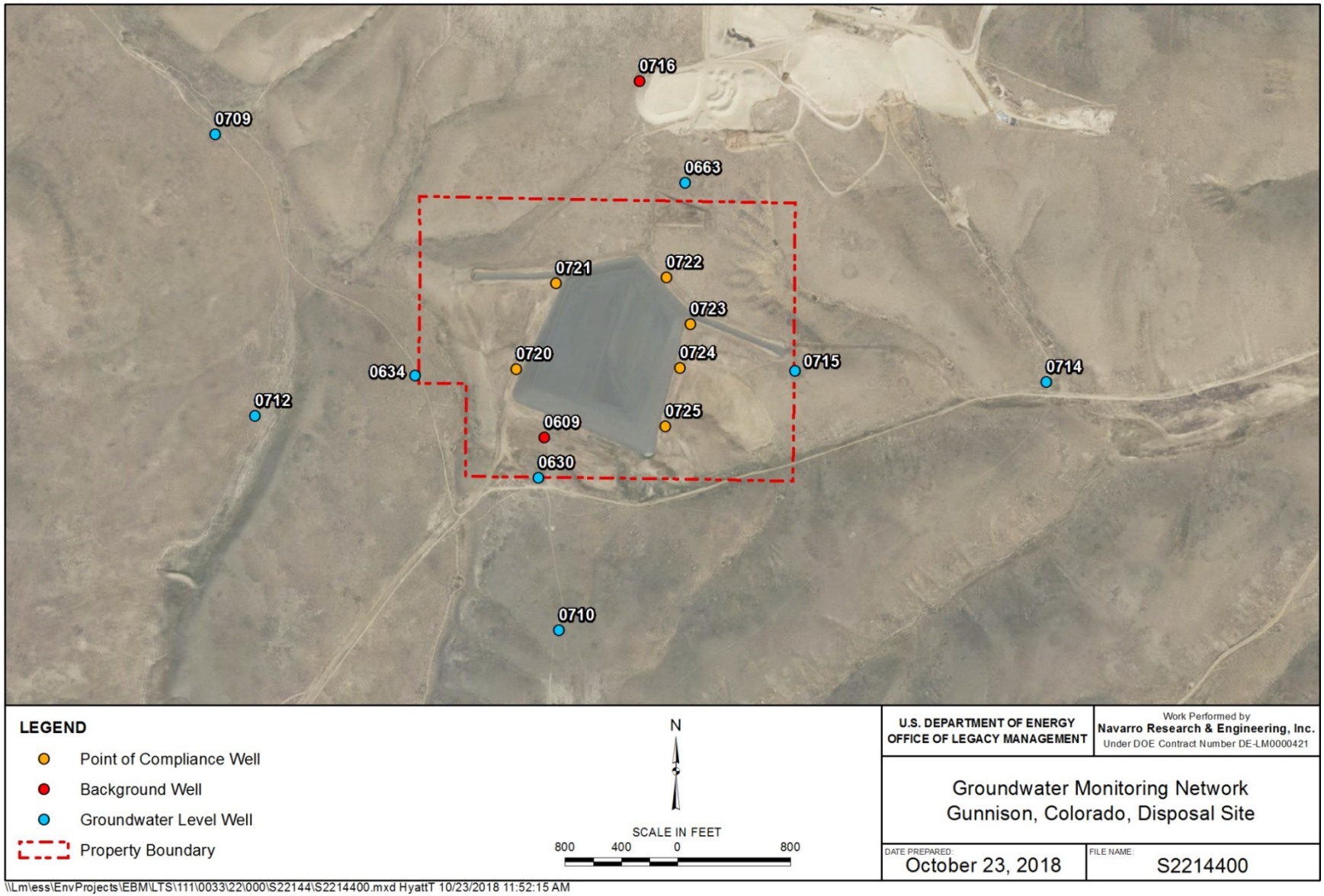

Figure 8-2. Groundwater Monitoring Network at the Gunnison, Colorado, Disposal Site

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 192.03. U.S. Environmental Protection Agency, "Monitoring," *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.

DOE (U.S. Department of Energy), 2016. *2016 Annual Site Inspection and Monitoring Report for Uranium Mill Tailings Radiation Control Act Title I Disposal Sites*, LMS/S15036, Office of Legacy Management, March.

8.10 Photographs

Photograph Location Number	Azimuth	Photograph Description
PL-1	250	Broken Fence Strand near Perimeter Sign P8 (Repaired During Inspection)
PL-2	345	Faded and Damaged Perimeter Sign P38 (Replaced During Inspection)
PL-3	0	Site Marker SMK-1
PL-4	345	Boundary Monument BM-7
PL-5	295	Monitoring Well 0715
PL-6	85	Monitoring Well 0716 and County Landfill Spoil Pile
PL-7	180	Top Slope of Disposal Cell
PL-8	110	Southwest Side Slope of Disposal Cell
PL-9	155	Northwest Side Slope of Disposal Cell and Apron
PL-10	95	East Diversion Channel and Monitoring Well 0723
PL-11	150	Southeast Corner of Disposal Cell

PL-1. Broken Fence Strand near Perimeter Sign P8 (Repaired During Inspection)

PL-2. Faded and Damaged Perimeter Sign P38 (Replaced During Inspection)

PL-3. Site Marker SMK-1

PL-4. Boundary Monument BM-7

PL-5. Monitoring Well 0715

PL-6. Monitoring Well 0716 and County Landfill Spoil Pile

PL-7. Top Slope of Disposal Cell

PL-8. Southwest Side Slope of Disposal Cell

PL-9. Northwest Side Slope of Disposal Cell and Apron

PL-10. East Diversion Channel and Monitoring Well 0723

PL-11. Southeast Corner of Disposal Cell

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