1.0 Bluewater, New Mexico, Disposal Site

1.1 Compliance Summary

The Bluewater, New Mexico, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title II Disposal Site was inspected on March 7 and March 8, 2023. Minor depressions on the side slopes of the main tailings disposal cell continue to be observed. Depressions continue to be observed on the north portion of the top slope of the main tailings disposal cell. A new potential depression was identified on the southeastern top slope of the main tailings disposal cell. Inspectors identified several routine maintenance needs but found no cause for a follow-up or contingency inspection.

Groundwater was sampled in November 2022 and May 2023. Analytical results from the two sampling events indicate that alternate concentration limits (ACLs) were not exceeded. However, groundwater in both the alluvial and bedrock aquifer onsite monitoring wells has uranium concentrations exceeding the U.S. Environmental Protection Agency (EPA) drinking water standard. Results from the fall 2023 sampling event, conducted the week of November 13, 2023, will be documented in the 2024 Annual Inspection and Monitoring Report.

1.2 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 40.28 (10 CFR 40.28). Table 1-1 lists these requirements.

Table 1-1. License Requirements for the Bluewater, New Mexico, Disposal Site

Requirement	LTSP	This Report	10 CFR 40.28
Annual Inspection and Report	Sections 3.3 and 3.4	Section 1.4	(b)(3)
Follow-Up Inspections	Section 3.5	Section 1.5	(b)(4)
Routine Maintenance and Emergency Measures	Section 3.6	Section 1.6	(b)(5)
Environmental Monitoring	Section 3.7	Section 1.7	(b)(3)

1.3 Institutional Controls

The 3300-acre site, identified by the property boundary shown in Figure 1-1 and Figure 1-2, is owned by the United States and was accepted under the NRC general license in 1997. The U.S. Department of Energy (DOE) is the licensee and, in accordance with the requirements for UMTRCA Title II sites, the Office of Legacy Management (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: disposal cells, disposal areas, dumps, entrance gate and sign, perimeter fence and signs, a site marker, boundary monuments, and monitoring wellhead protectors. In addition to LM ICs, the New Mexico Office of the State Engineer implemented a well prohibition in the alluvial aquifer downgradient of the site in May 2018 (Romero 2018).

1.4 Inspection Results

The site, approximately 9 miles northwest of Grants, New Mexico, was inspected March 7 and 8, 2023. The inspection was conducted by J. Cario, J. Graham, C. Murphy, and T. Santonastaso of the Legacy Management Support (LMS) contractor. B. Frazier, N. Olin, M. Young (LM) and A. Rheubottom (New Mexico Environment Department [NMED]) attended the inspection on both days. The purpose of the inspection was 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.

1.4.1 Site Surveillance Features

Figure 1-1 and Figure 1-2 show 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 1-1 and Figure 1-2 by photograph location (PL) numbers. The photographs and photograph log are presented in Section 1.9.

1.4.1.1 Site Access, Entrance Gate, and Interior Roads

Access to the site is directly from gravel-surfaced Cibola County Road 63 (also known as Anaconda Road); no private property is crossed to gain site access. The entrance gate is a tubular steel, double-swing gate secured by a chain and locks belonging to LM and the various utility companies that have rights-of-way across the site. The site access road is surfaced with crushed basalt and extends northward along a narrow strip of LM property for approximately 1700 feet (ft) from the entrance gate to the main site access road gate. Two culverts allow drainage of surface runoff under the road.

Interior roads used to access LM assets consist of a dirt track covered at places with crushed basalt. The roads are susceptible to erosion and are repaired when they become impassable. Erosion on the road northwest of the main tailings disposal cell continues to be an issue (PL-1). In 2017, riprap was added to repair a gully intersecting this section of the road. Additional erosion was noted along the road parallel to the northern perimeter of the site. Thirteen road repair areas were identified around the site perimeter road. LM is planning to repair the roads in spring 2024 through the interagency agreement with the U.S. Army Corps of Engineers (USACE). Minor areas of erosion on the site road along the west side of the site were identified during the 2023 inspection. These minor areas were top dressed with gravel to prevent further erosion during routine maintenance work in 2023. No other maintenance needs were identified.

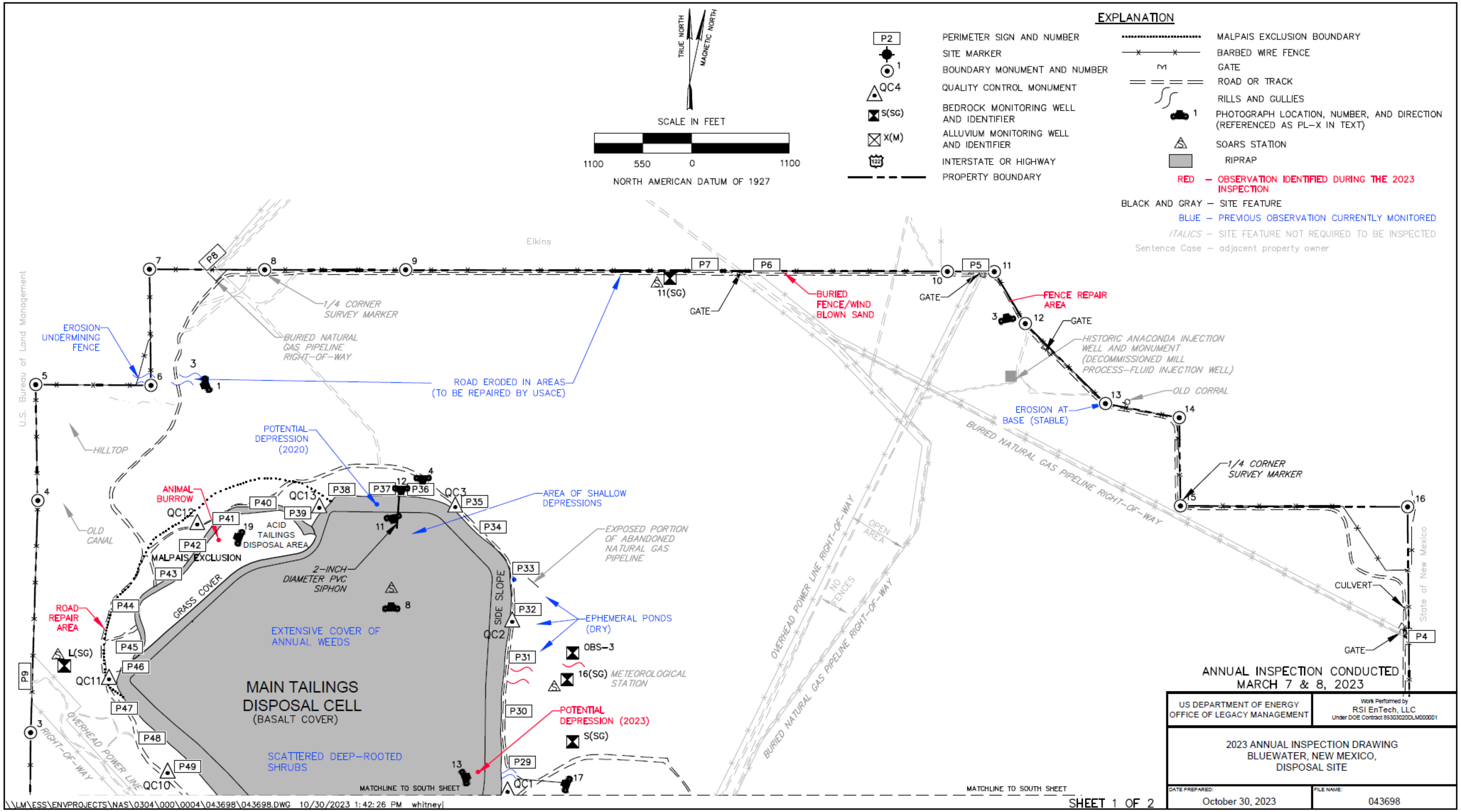


Figure 1-1. 2023 Annual Inspection Drawing for the Bluewater, New Mexico, Disposal Site (Northern Area)

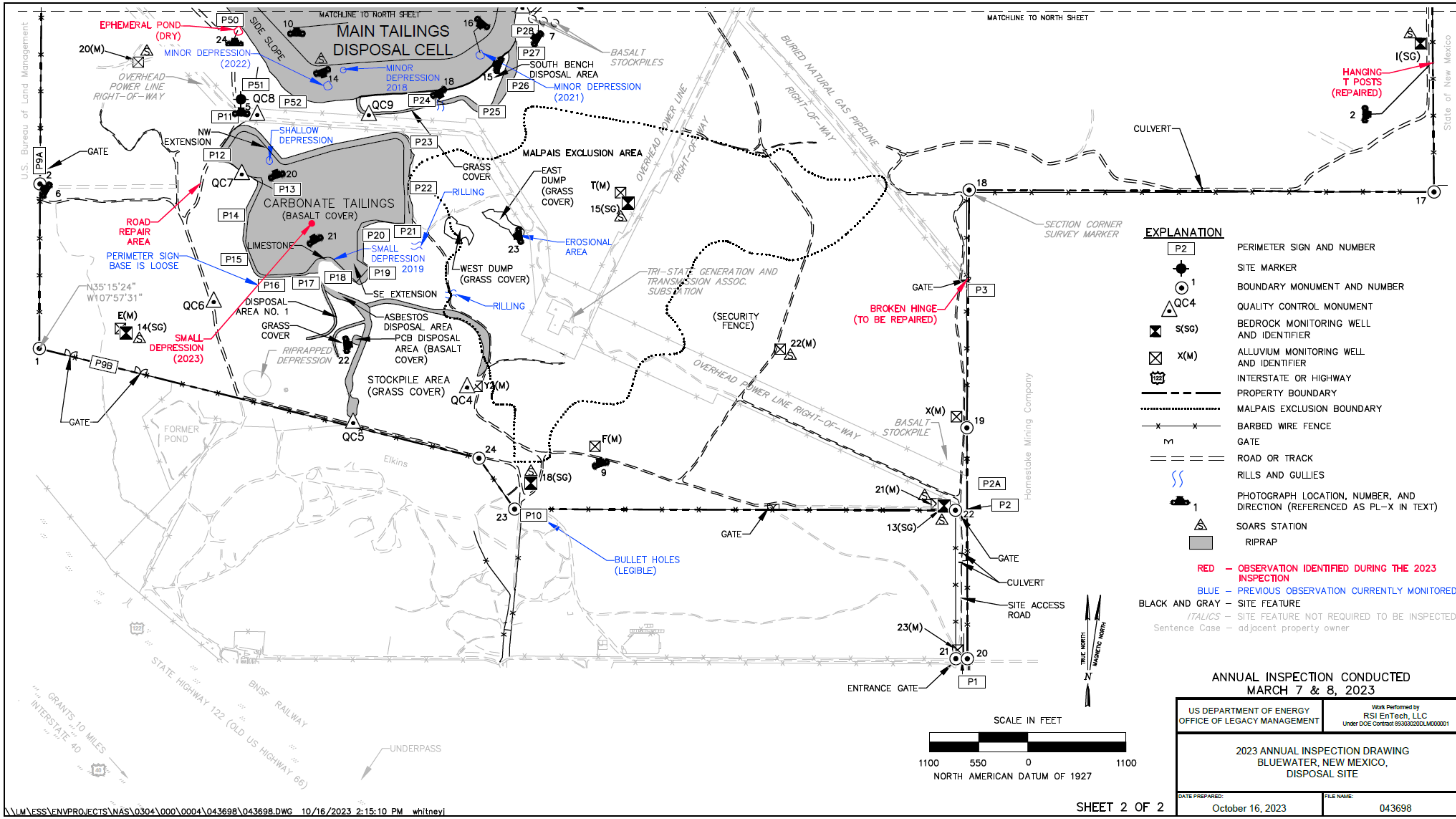


Figure 1-2. 2023 Annual Inspection Drawing for the Bluewater, New Mexico, Disposal Site (Southern Area)

1.4.1.2 Perimeter Fence and Signs

A four-strand barbed-wire fence encloses the site to facilitate land management by LM, which retains a local subcontractor to periodically check the site perimeter fence and remove trespassing cattle. Numerous sections of the fence are in remote areas of the site and cannot be observed from site access roads. Inspectors identified hanging or loose T-posts along the eastern fence near monitoring well I(SG) and boundary monument BM-12 (PL-2, PL-3), and windblown sediment was observed burying the lower strands of wire near perimeter sign P6. All were repaired post inspection during the week of April 10, 2023. A broken hinge was observed on a right-of-way gate near perimeter sign P3. Maintenance staff contacted employees from the Tri-State utility company while onsite. Tri-State said they intended to repair the gate. Inspectors observed the gullies, identified in the 2019 inspection, parallel to the perimeter fence northwest of the main tailings disposal cell. No significant changes were observed. LM will continue to monitor this area for damage to the perimeter fence.

Fifty-five perimeter signs (warning and no-trespassing signs) are mounted on steel posts along the site boundary and around the main and carbonate tailings disposal cells (PL-4). Perimeter sign P10 has bullet hole damage but is legible. Perimeter sign P16 has a loose base but remains functional. No other maintenance needs were identified.

1.4.1.3 Site Marker

The site has one granite site marker between the southwest corner of the main tailings disposal cell and the northwest corner of the carbonate tailings disposal cell (PL-5). No maintenance needs were identified.

1.4.1.4 Boundary Monuments

Twenty-four boundary monuments define the site boundary (PL-6). These monuments are typically inside the perimeter fence and several feet inside the true corner or boundary line. Some monuments become covered by drifting sand, and metal T-posts have been driven at those locations to help locate them. Other boundary monuments are in remote sections of the site and cannot be observed from site access roads. All boundary monuments were inspected during the 2023 inspection except for boundary monument BM-7. Boundary monument BM-7 will be observed during the next inspection. Some erosion was observed at the base of boundary monument BM-13, but it is stable. No maintenance needs were identified.

1.4.1.5 Aerial Survey Quality Control Monuments

Thirteen aerial survey quality control monuments were installed in 2019, and an aerial survey was conducted by USACE in 2021. The aerial survey quality control monuments were inspected during the 2023 annual inspection (PL-7). No maintenance needs were identified.

1.4.1.6 Monitoring Wells

The site groundwater monitoring network consisted of nine monitoring wells when the site was transferred to LM in 1997. Two additional wells were installed in summer 2011, and eight more wells were installed in summer 2012 in response to elevated uranium concentrations in the two aquifers (alluvial and bedrock) at the site. The onsite groundwater monitoring network now consists of 19 monitoring wells; 10 are completed in the bedrock aquifer and 9 in the alluvial aquifer. Eleven wells (3 alluvial and 8 bedrock) have telemetry towers, known as System Operation and Analysis at Remote Sites (SOARS) stations to transmit groundwater level and weather data to the LM Field Support Center at Grand Junction, Colorado. The monitoring wells and SOARS stations are identified in Figure 1-2. The wellhead protectors and SOARS stations were observed to be undamaged and locked (PL-8). Animal burrows identified during the 2021 inspection near monitoring well F(M) showed signs of abandonment and filling in with sediment during the 2023 inspection (PL-9). They are not threatening the well integrity and will no longer be monitored. No maintenance needs were identified.

1.4.2 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. The inspection areas are (1) the main tailings disposal cell, including the acid tailings and south bench disposal areas; (2) the carbonate tailings disposal cell, including the asbestos disposal area, the polychlorinated biphenyl (PCB) disposal area, and associated disposal areas and dumps; (3) the region between the disposal structures and the site perimeter; and (4) the site perimeter and outlying area. Inspectors examined the specific site surveillance features within each area and looked for evidence of erosion, settling, slumping, or other modifying processes that might affect conformance with LTSP requirements.

1.4.2.1 Main Tailings Disposal Cell, Acid Tailings, and South Bench Disposal Areas

The 354-acre contiguous main tailings disposal cell, acid tailings, and south bench disposal areas constitute one large disposal area. The top slope of the main tailings disposal cell is covered with basalt riprap and was designed to shed runoff water over the north edge of the top slope. The top slope grade is 3% to 4% at the south end and decreases to less than 0.5% at the north end. The top slopes of the acid tailings and south bench disposal areas are nearly flat and covered by grass. Basalt riprap protects the side slopes of the disposal areas.

Plant encroachment (by annual weeds, perennial grasses, forbs, and scattered perennial shrubs) continues on the main tailings disposal cell top and side slopes (PL-10). Siberian elm saplings on the top slope are periodically treated with herbicide to prevent the establishment of trees that could damage the main tailings disposal cell cover materials. No live elms were observed during the inspection.

Several depressions are evident on the north end of the top slope of the main tailings disposal cell and along the east and northwest edges of the top slope. This portion of the top slope overlies predominantly clay-rich tailings referred to as slimes. Although the former licensee attempted to dewater the slimes to consolidate them, that portion of the top slope continued to settle after the site transitioned to LM. Annual inspections indicated that the depressions have enlarged in area and depth over time. LM, therefore, conducted high-resolution topographic mapping using the light detection and ranging (lidar) method in 2012 and 2016 to determine if settlement continued and to gauge its magnitude (DOE 2017). The 2016 lidar results, when compared to the 2012 lidar results and the original topographic map developed in 1997, demonstrated that settlement measures up to 4 feet in places. The rate of settlement since 2012 (an average of 0.72 inch per year between 2012 and 2016) is much less than the rate before 2012 (an average of 1.8 inches per year between 1997 and 2012). Another lidar survey was conducted by USACE in April 2021. The data from this survey were received in February 2023. The data from this survey will be compared to previous surveys to calculate the rate of settlement.

Ponds often develop in the depressions from stormwater and occasionally coalesce into one large pond after a series of storm events. The area of depressions is monitored continuously using a remotely operated webcam to detect the presence of ponded water. No ponding was observed on the main tailings disposal cell during the inspection. No algae were present during the inspection even though algae have been noted in previous reports.

A 2-inch-diameter siphon was installed in fall 2015 to dewater as much of the ponded water as possible (PL-11). The siphon is manually started when the webcam indicates that a large pond has developed. The intent is to avoid potential erosion of the main tailings disposal cell cover materials if the pond surface reaches an elevation high enough to spill over the north side slope. Water would start to spill over at the lowest point along the north edge of the top slope, which could initiate erosion in that area. LM entered into an interagency agreement with USACE in October 2019 to design a repair to the depressions and ensure continued positive drainage from the main tailings disposal cell. In October 2023, USACE completed a geotechnical investigation on the top slope of the disposal cell to collect data on the condition of the cell cover and underlying material; results pending. NRC will be involved in reviewing designs as they are developed and will concur upon the final design before construction.

The siphon is usually operated at least once a year, depending on precipitation, and it successfully removes nearly all the water; any remaining water tends to evaporate. When operated, the siphon discharges water at a rate of approximately 100 gallons per minute at the toe of the north side slope where runoff water was intended to discharge (PL-12). The discharged water ponds over a large area north of the main tailings disposal cell and eventually either evaporates or infiltrates into the soil. The discharged water does not flow off the site. Due to lack of significant precipitation during the 2023 monsoon season (1.93 inches measured by onsite rain gauge), the siphon did not require operation this year.

The side slopes and toe of the main tailings disposal cell were inspected for signs of erosion or sediment deposition. An area of potential depression was identified during the 2023 inspection on the southeastern portion of the top slope that is approximately 8 ft long and 3 ft wide (PL-13). A potential depression feature on the western side of the south side slope was first observed during the 2022 inspection. This was observed again in 2023 and measured approximately 15 ft long and 30 ft wide (PL-14). An area of minor depression was observed on the south side slope during the 2018 annual inspection. It was not identified during the 2021 inspection, observed again during the 2022 inspection, and not observed during the 2023 inspection. This feature is very minor and will be removed from tracking if there are no observed changes in 2024. Another area of minor depression observed in 2021 on the eastern side of the south side slope was not observed during the 2022 inspection. During 2023, inspectors believe they located this minor depression once again. Inspectors concluded there may have been a field documentation error in the location of this feature in 2021. Waypoint polygon data were collected on this feature to confirm its location. This depression was observed to be approximately 20 ft long, 10 ft wide, and 10 to 12 inches deep (PL-15, PL-16). An area of potential depression was observed on the north side slope during the 2020 annual inspection. Inspectors observed the area during the 2023 inspection, but no apparent changes were noted. The side slopes will continue to be observed for depressions. All identified depressions will continue to be monitored and will be evaluated using lidar.

During the 2019 annual inspection, minor rills with a maximum depth of 6 inches were observed at the base of the east side slope and minor rills with a maximum depth of 8 inches were observed at the base of the south bench of the main tailings disposal. The rills did not appear to increase in depth or extent (PL-17, PL-18). During the 2020 annual inspection, a linear desiccation crack was observed along the base of the east side slope. During the 2023 inspection, inspectors observed that the linear crack had filled in with sediment; this item will be removed from the inspection drawing and not monitored in the next inspection. LM will continue to monitor the rills for potential impact to the main tailings disposal cell and south bench area. Animal burrows identified on the top of the south bench disposal area in 2022 appear to have been abandoned and filled with sediment. These burrows will not be monitored in the next inspection. New animal burrows were observed on the top slope of the acid tailings disposal area (PL-19). No sediment deposits were present along the toe. No maintenance needs for the side slopes, acid tailings, or south bench disposal areas were identified.

1.4.2.2 Carbonate Tailings Disposal Cell, Other Disposal Areas, and Dumps

The 54-acre carbonate tailings disposal cell is south of the main tailings disposal cell. Basalt riprap covers the top and side slopes of the carbonate tailings disposal cell. The top generally slopes gently eastward. The carbonate tailings disposal cell includes extensions to the northwest and southeast. A shallow depression exists on the northwest extension, and stormwater runoff occasionally ponds at this location; the depression was dry during the 2023 inspection (PL-20). This depression does not appear to be enlarging but will continue to be visually inspected and evaluated using periodic lidar survey results. A minor depression was observed on the south-central top slope of the carbonate cell (PL-21). Annual weeds, perennial grasses, and scattered woody shrubs were on the carbonate tailings disposal cell and its extensions. Siberian elm saplings are periodically treated with herbicide. No saplings were observed during the inspection. No additional maintenance needs were identified.

The 2-acre asbestos disposal area is a bowl-like feature just south of the carbonate tailings disposal cell. The north, west, and south side slopes of this feature are covered by limestone riprap; the bottom of the bowl (the asbestos cell cover) is covered with grass. The depressions repaired in May 2018 were observed, and no changes were apparent. As no changes have been identified in the past four inspections, the repaired depression area was removed from the inspection map. A depression on the north side slope, first identified during the 2019 annual inspection, had no observed changes in 2023. LM will continue to observe the depression and make repairs as necessary. No immediate maintenance needs were identified.

An 11-acre grass-covered disposal area is south of the asbestos disposal area. A small riprap-covered PCB cell (less than 1 acre) is within the disposal area (PL-22). Two grass-covered dumps, totaling approximately 2 acres, are east of the carbonate tailings disposal cell. Inspectors observed a minor erosional area along the basalt along the southern interface of the east dump; it was first identified during the 2019 annual inspection (PL-23). This feature appears to have become larger since the 2022 inspection. The erosional area was measured at approximately 11.3 ft long, 5.1 ft wide, and 4 ft deep. Wooden stakes were placed at the edges of the feature to monitor future growth. Radon gas concentration and radiation dose rate surveys were completed near the erosional area by an LMS radiological control technician. The measurements collected near the erosional area were consistent with background levels. LM will continue to observe the erosional area. No immediate maintenance needs were identified.

1.4.2.3 Area Between the Disposal Cells and the Site Perimeter

Other areas inside the site were inspected by driving the site perimeter road and other roads and tracks. Much of the southern and western portions of the site are inaccessible by vehicle because they are covered by basalt flows.

Small ephemeral ponds often form in an area along the east side of the main tailings disposal cell and in other low spots following storms. The areas of ponding are far enough from the main tailings disposal cell that they do not have any impact. The ponded areas were dry during the inspection.

A new ephemeral pond area was observed near the southwest side slope of the main tailings disposal cell near perimeter sign P50 (PL-24). The ephemeral pond was dry when observed. This pond is not currently a concern but will be observed at least 1 additional year.

Scattered tamarisk shrubs and other plants listed as noxious weeds by the State of New Mexico are onsite. Noxious weeds were treated with herbicide following the inspection.

Additional rilling and animal burrows are present in the area between the disposal cell and site perimeter but do not threaten any site features.

The decommissioned mill process-fluid injection well near the northeast corner of the site features a monument consisting of a steel well casing set in concrete. Information pertaining to the well is welded onto the monument. No other maintenance needs were identified.

Several utility companies have rights-of-way that cross the site. These rights-of-way are bordered by stock fences with locked gates where the rights-of-way cross the site boundary. Roads along the rights-of-way typically are covered with crushed basalt to provide the utility companies with all-weather access. LM is not responsible for maintaining the right-of-way roads or fences. An electric power substation, enclosed by a security fence, is near the center of the site. Utility company personnel visit the substation frequently. LM is not responsible for maintaining the substation or its security fence and access road.

1.4.2.4 Site Perimeter and Outlying Areas

Surrounding land is used for livestock grazing and wildlife habitat. The area beyond the site boundary for 0.25 mile was visually observed for erosion, development, changes in land use, or other phenomena that might affect conformance with LTSP requirements. No such changes were observed.

1.5 Follow-Up 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 during the inspection.

1.6 Routine Maintenance and Emergency Measures

Inspectors documented the following minor maintenance needs that were addressed following the inspection:

- Repair the loose T-post near monitoring well I(SG) and boundary monument BM-12
- Treat the noxious weeds
- Minor interior road repair was completed by LMS contractor staff in both April and August 2023

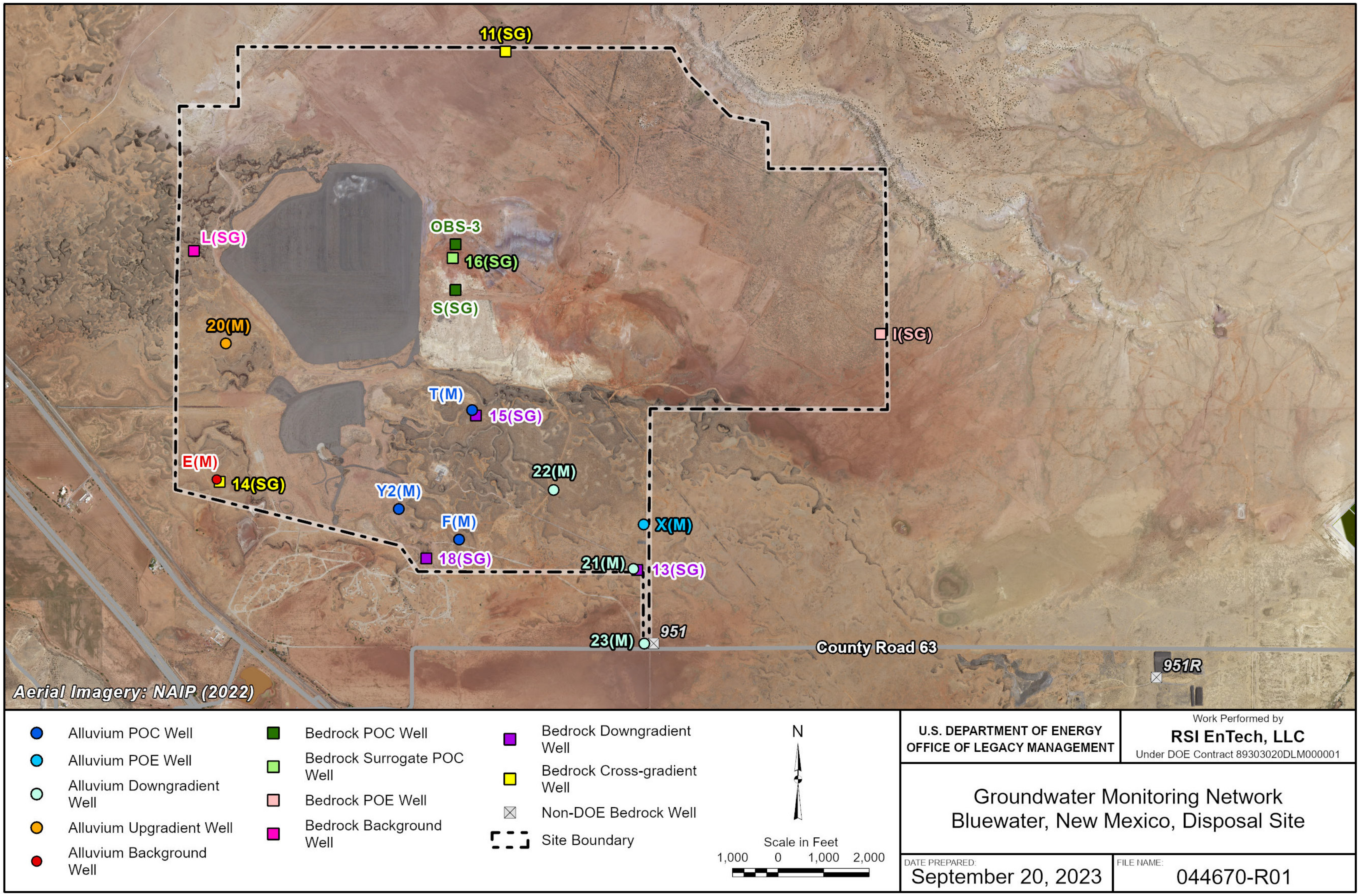
No other maintenance needs were identified.

Emergency measures are corrective actions that LM will take in response to unusual damage or disruption that threatens or compromises site health and safety, security, integrity, or compliance with 40 CFR 192. No emergency measures were identified.

1.7 Environmental Monitoring

Groundwater monitoring is required at the site (DOE 1997). The monitoring well network acquired by LM at the time of site transition and included in the LTSP consisted of wells E(M), F(M), T(M), X(M), Y2(M), L(SG), OBS-3, S(SG), and I(SG). Wells with an "(M)" suffix are screened in the alluvial aquifer, while wells with an "(SG)" suffix and well OBS-3 are screened in the San Andres – Glorieta (SAG) or bedrock aquifer. The LTSP requires triennial sampling for molybdenum, selenium, and uranium in the alluvial aquifer background and point of compliance (POC) wells. The LTSP also requires triennial sampling of the SAG (bedrock) aquifer background and POC wells for selenium and uranium. Alluvial aquifer well X(M) and bedrock aquifer well I(SG)—point of exposure (POE) wells along the east property boundary—are to be sampled only if specified ACLs are exceeded at POC wells (DOE 1997). The current groundwater monitoring network, including the 10 additional wells installed in 2011–2012, is shown in Figure 1-3.

LM has increased the sampling frequency in support of on-going evaluation initiatives. Currently, all 19 site wells, including POC and POE wells, are sampled semiannually for an expanded list of constituents as described in the following sections. The fall semiannual sampling event addressed in this report occurred November 29 and 30, 2022. The 2023 spring semiannual sampling occurred during the week of May 1, 2023. Results from the fall 2023 sampling event, conducted the week of November 13, 2023, will be documented in the 2024 Annual Inspection and Monitoring Report. Table 1-2 lists the monitoring wells routinely sampled at the Bluewater site along with their network application. ACLs for molybdenum (alluvial aquifer only), selenium, and uranium are listed in Table 1-3.



Note: Well T(M) has been dry or had insufficient water to sample since November 2012; well X(M) has been dry since 2021.

Figure 1-3. Groundwater Monitoring Network at Bluewater, New Mexico, Disposal Site

Table 1-2. Groundwater Monitoring Network at the Bluewater, New Mexico, Disposal Site

Monitoring Well	Network Application	Monitoring Well	Network Application
E(M)	Alluvium background well	I(SG)	Bedrock POE well
F(M)	Alluvium POC well	L(SG)	Bedrock background well
T(M)	Alluvium POC well	OBS-3	Bedrock POC well
X(M)	Alluvium POE well	S(SG)	Bedrock POC well
Y2(M)	Alluvium POC well	11(SG)	Bedrock cross-gradient well
20(M)	Alluvium upgradient well	13(SG)	Bedrock downgradient well
21(M)	Alluvium downgradient well	14(SG)	Bedrock cross-gradient well
22(M)	Alluvium downgradient well, surrogate POC well replacing T(M)	15(SG)	Bedrock downgradient well
23(M)	Alluvium downgradient well	16(SG)	Bedrock surrogate POC well
		18(SG)	Bedrock downgradient well

Table 1-3. Groundwater ACLs at the Bluewater, New Mexico, Disposal Site

POC Well	Constituent	ACL (mg/L)[a]
Alluvial aquifer wells F(M) and T(M)	Molybdenum Selenium Uranium	0.10 0.05 0.44[b]
Bedrock aquifer wells OBS-3 and S(SG)	Selenium Uranium	0.05 2.15[b]

Notes:
[a] Source: Table 3-4 of the LTSP (DOE 1997).
[b] The uranium ACL is based on a human health-based risk standard of 0.44 mg/L at the site boundary as approved by NRC in the Atlantic Richfield Company's ACL application (Applied Hydrology Associates Inc. 1995).

Abbreviation:
mg/L = milligrams per liter

In 2008, NMED requested LM's assistance in investigating and evaluating regional groundwater contamination associated with the former Grants Mineral Belt uranium mining industry. NMED suspected that contaminants from the site had migrated offsite. In response to NMED, LM reinitiated annual sampling at most onsite monitoring wells, including the POE wells, in fall 2008. To support NMED's regional groundwater investigation, in 2009, LM began reevaluating the hydrogeology and groundwater quality at the site and also expanded the analytical scope to include a larger suite of constituents than required by the LTSP.[1] To address stakeholder concerns and in consultation with NRC, LM installed 10 additional monitoring wells in 2011–2012 and, in response to the initial exceedance of the uranium ACL in alluvial well T(M) in 2010 (discussed further in Section 1.7.1), began semiannual (versus annual) sampling at all wells at that time.

Subsequent evaluations included an assessment of the main tailings disposal cell performance (DOE 2013) and development of a conceptual model of contaminant transport processes in the

[1] In addition to the constituents listed in Table 1-3 (EPA's SW-846 Method 6020 used as the analytical test method [EPA 2015]), groundwater samples are analyzed routinely for chloride, nitrate + nitrite as nitrogen, sulfate, total dissolved solids, major cations (EPA's SW 846 Method 6010 used as the analytical test method [EPA 2015]), and field parameters (e.g., total alkalinity and dissolved oxygen).

aquifers impacted by the Bluewater site (DOE 2014). LM updated the uranium plume maps for both the alluvial aquifer and the SAG aquifer in a 2019 report (DOE 2019). This analysis was followed by an evaluation of the influence of high-volume pumping wells near the site on groundwater flow and contaminant trends in the SAG aquifer (DOE 2020). LM continues to update the site conceptual model describing groundwater flow and contaminant transport using three-dimensional data visualization approaches and regularly updates stakeholders as to the findings of these ongoing evaluations.

1.7.1 Alluvial Aquifer

Water-bearing alluvium underlies the southern portion of the site. The alluvium, deposited by the ancestral Rio San Jose, is covered by basalt lava flows. The alluvium consists of coarse sands and gravels in the main ancestral river channel and finer-grained floodplain deposits outside the channel (DOE 2014).

Alluvial aquifer analytical results from sampling events in November 2022 and May 2023 are provided in Table 1-4. POC well T(M) and POE well X(M) were not sampled during either event because they were dry or had insufficient water to sample. Well T(M) has been dry since 2012; well X(M) was dry at the time of the last five semiannual sampling events (since May 2021).

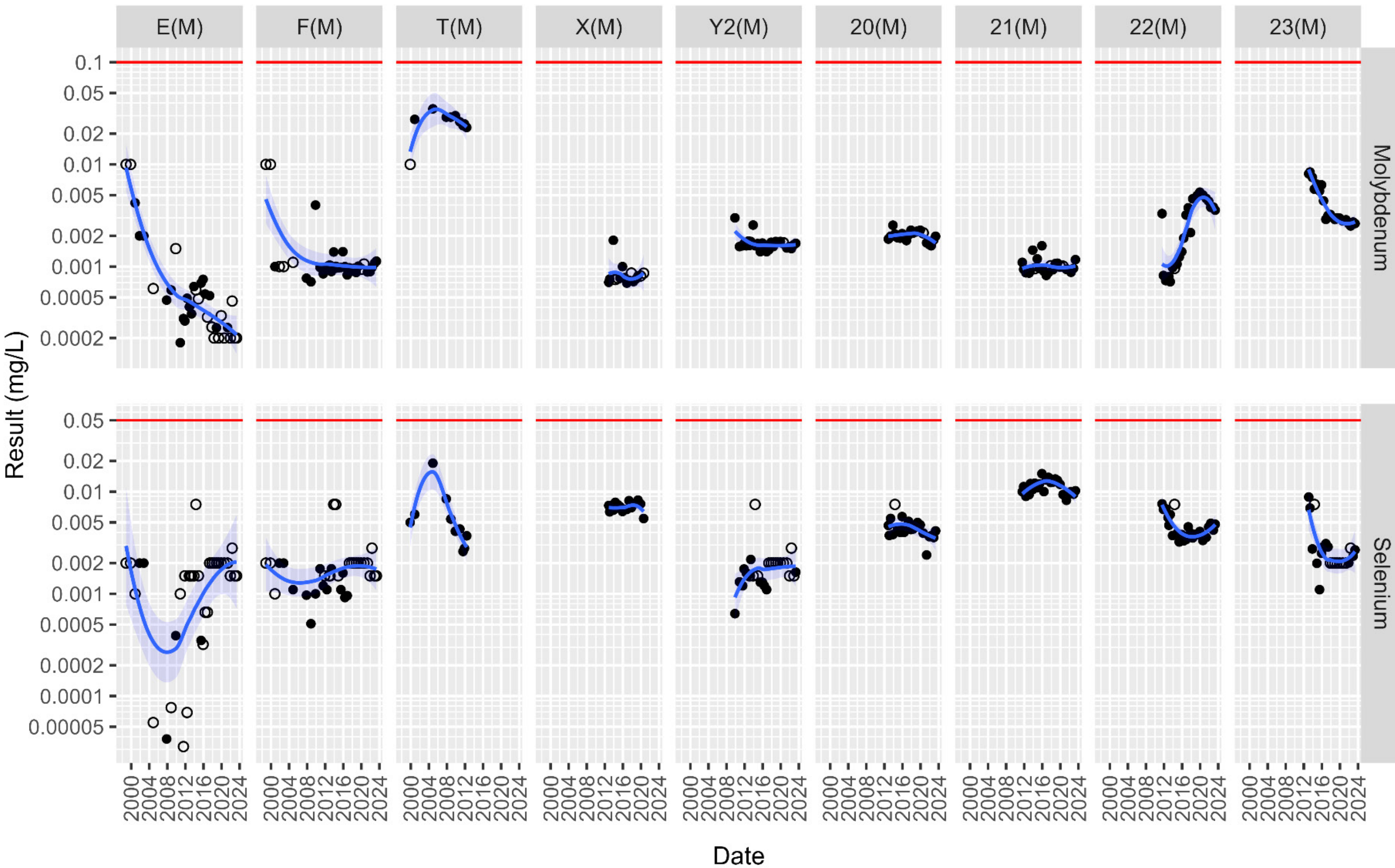
Because concentrations of molybdenum and selenium continue to be several orders of magnitude below corresponding ACLs as shown in Figure 1-4, the remainder of this section focuses mainly on uranium concentration trends.

Table 1-4. Alluvial Aquifer Monitoring Results from November 2022 and May 2023 at the Bluewater, New Mexico, Disposal Site

Monitoring Well	Molybdenum (mg/L) ACL = 0.10 mg/L		Selenium (mg/L) ACL = 0.05 mg/L		Uranium (mg/L) ACL = 0.44 mg/L	
	November 2022	May 2023	November 2022	May 2023	November 2022	May 2023
E(M)	<0.0002	<0.0002	<0.0015	<0.0015	<0.000067	<0.000067
F(M)	0.00108	0.00113	<0.0015	<0.0015	0.00549	0.00593
T(M)[a]	Not sampled (last sampled in May 2012)					
X(M)[a]	Not sampled (last sampled in August 2020)					
Y2(M)	0.00164	0.00169	<0.0015	0.00163	0.00411	0.00441
20(M)	0.00182	0.00198	0.00356	0.00413	0.0108	0.0113
21(M)	0.00096	0.00117	0.00945	0.0102	0.0875	0.0874
22(M)	0.00382	0.00357	0.00383	0.0048	0.325	0.326
23(M)	0.00273	0.00264	0.00234	0.00269	0.0135	0.0135

Notes:
Shaded cells denote results below the corresponding ACL but exceeding the 0.03 mg/L EPA standard for uranium.
For duplicate analyses, the maximum result is listed (raw data can be found at https://gems.lm.doe.gov/#site=BLU).
[a] Wells X(M) and T(M) were not sampled during this reporting period because they were dry or there was insufficient water to sample.

Abbreviation:
mg/L = milligrams per liter



● Detect ○ Nondetect

Locally estimated scatterplot smoothing (LOESS) line and 95% confidence interval

ACL from Table 1-3

Note: Data are plotted from November 1998 to May 2023.

Abbreviation: mg/L = milligrams per liter

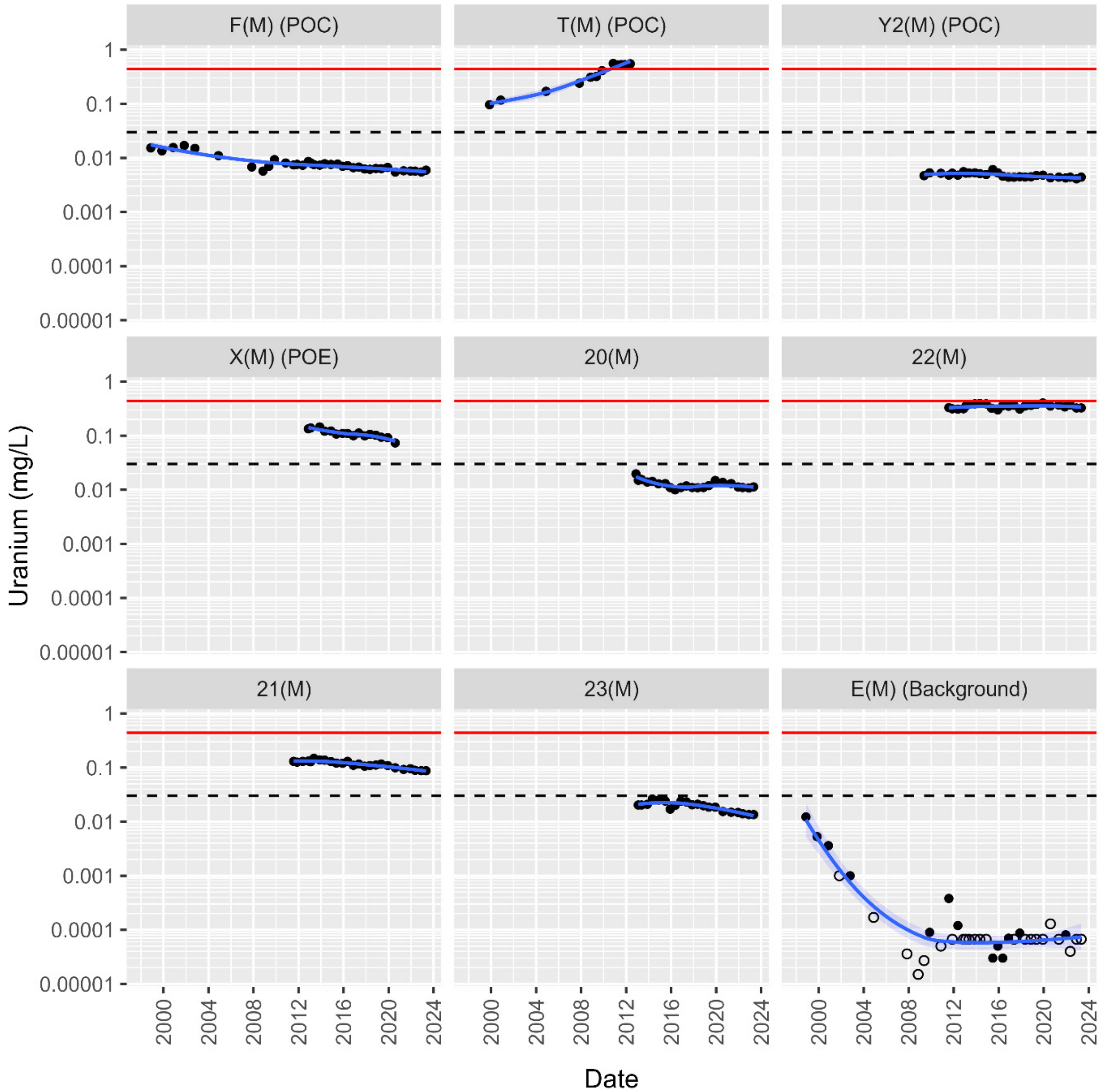
Figure 1-4. Molybdenum and Selenium Concentrations in Alluvial Aquifer Monitoring Wells at the Bluewater, New Mexico, Disposal Site: 1998–2023

Figure 1-5 shows historical uranium concentrations measured in all Bluewater site wells screened in the alluvial aquifer and listed in Table 1-2. In contrast to previous annual reports, Figure 1-4 and Figure 1-5 (and remaining time-concentration plots presented in this section) use a faceting approach, whereby data are partitioned into a matrix of panels, with each panel plotting data for a single well. In each facet plot, a nonparametric smoothing method—locally estimated scatterplot smoothing (LOESS)—is used. The surrounding shaded area represents the 95% pointwise confidence interval. Using this approach, overall trends in the data are more apparent and not obscured by "noise" or random variation.[2] To support interpretation of these figures, Mann-Kendall trend analysis was performed for each well-parameter combination to characterize whether trends in uranium (the primary site contaminant), molybdenum, or selenium are upward, stable (no trend), or declining. Detailed Mann-Kendall trend test results for Bluewater site alluvial wells are documented in Table 1-5.

Uranium concentrations in alluvial wells are currently below the corresponding ACL and NRC-approved health-based standard of 0.44 milligram per liter (mg/L) (Table 1-4). The only well in which the uranium ACL has been exceeded is POC well T(M), where uranium concentrations in well T(M) began trending upward in 1999, from 0.096 mg/L to 0.5–0.6 mg/L (Figure 1-5). The November 2010 concentration of 0.56 mg/L was the first of five results from this well that exceeded the ACL of 0.44 mg/L. LM notified NRC of the exceedance upon receiving the 2010 results from the laboratory. NRC requested that LM evaluate the performance of the main tailings disposal cell to assess whether the increase in uranium concentrations at well T(M) could be attributed to seepage from the cell. LM's subsequent evaluations (DOE 2014; SRNL 2014) concluded that this was not the case. There was no evidence of compromised disposal cell performance, nor any indication of seepage (DOE 2014). Rather, the increase in uranium concentrations was attributed to a concomitant decrease in water levels in the well between 2008 and 2012, during which time the groundwater elevation decreased to levels below the contact between the alluvium and underlying Chinle Formation (DOE 2014). Well T(M) was last sampled in May 2012, and the well has since been dry.

Wells 21(M) and 22(M) were installed in 2011 as a direct response to the ACL exceedance in well T(M) and to better monitor the alluvial aquifer downgradient of well T(M) (Figure 1-3). Although below the ACL, uranium concentrations in these two wells continue to exceed the 0.03 mg/L EPA drinking water standard (Table 1-4; Figure 1-5). Uranium concentrations in well 22(M), at the approximate midpoint between POC well T(M) (Figure 1-3), have been stable between 0.3 and 0.40 mg/L (just below the ACL). Uranium concentrations in downgradient well 21(M), at the southeast corner of the site, have been slightly lower (0.09–0.15 mg/L) and have (along with most other alluvial wells) a statistically significant decreasing trend (Table 1-5). Uranium concentrations in well X(M) have also been consistently above the EPA standard, with levels ranging from 0.073–0.145 mg/L (Figure 1-5). This well has not been sampled since August 2020 because it has been dry or had insufficient water to sample. Uranium concentrations in five of the nine alluvial wells have been consistently below the 0.03 mg/L EPA standard: POC wells F(M) and Y2(M), well 20(M), southeasternmost well 23(M), and background well E(M). Statistically significant decreasing trends in uranium concentrations were identified for all wells except T(M) (increasing trend before going dry) and well 22(M) (no trend) (Table 1-5).

[2] All facet plots provided in this section were developed using R, version 4.3.1 (The R Foundation 2023) and the ggplot2 package, version 3.4.2 (Wickham 2016).



● Detect ○ Nondetect
LOESS line and 95% confidence interval
0.44 mg/L ACL
- - - - 0.03 mg/L EPA standard

Notes: The date scale begins in 1998, the first sampling event after the LTSP was issued (DOE 1997). Wells are ordered by purpose as follows: POC and POE wells are listed first, followed by the remaining alluvial wells listed in Table 1-2, ordered by flow direction (upgradient to downgradient) as shown in Figure 1-3. Data for background well E(M) are plotted last. Based on observations and measurements during semiannual sampling events, POC well T(M) has been dry since November 2012. POE well X(M) has been dry or had insufficient water to sample since May 2021. Statistically significant decreasing trends in uranium concentrations were identified for all wells except T(M) (increasing trend) and well 22(M) (no trend) (Table 1-5).

Figure 1-5. Uranium Concentrations in Alluvial Aquifer Monitoring Wells at the Bluewater, New Mexico, Disposal Site

Table 1-5. Mann-Kendall Trend Analysis Results for Uranium, Molybdenum, and Selenium in Bluewater Site Alluvial Monitoring Wells

Well[c]	Initial Trend Analysis Date	Final Trend Analysis Date	Number of Samples	Number of Nondetects	Kendall's tau[d]	p-value[d]	Trend[d]
Uranium							
20(M)	11/14/2012	5/2/2023	22	0	−0.377	0.015	Decreasing
21(M)	7/27/2011	5/3/2023	25	0	−0.753	<0.0001	Decreasing
22(M)	7/27/2011	5/2/2023	25	0	0.117	0.43	No Trend
23(M)	1/28/2013	5/3/2023	21	0	−0.648	<0.0001	Decreasing
E(M)	11/14/1998	5/2/2023	36	23	−0.235	0.031	Decreasing
F(M)[a]	11/14/1998	5/3/2023	36	0	−0.654	<0.0001	Decreasing
T(M)[a]	11/11/1999	5/15/2012	12	0	0.879	<0.0001	Increasing
X(M)	11/15/2012	8/5/2020	16	0	−0.758	<0.0001	Decreasing
Y2(M)	5/13/2009	5/3/2023	28	0	−0.492	0.00025	Decreasing
Molybdenum							
20(M)	11/14/2012	5/2/2023	22	1	−0.0606	0.71	No Trend
21(M)	7/27/2011	5/3/2023	25	4	0.0467	0.76	No Trend
22(M)[a]	7/27/2011	5/2/2023	25	1	0.603	<0.0001	Increasing
23(M)	1/28/2013	5/3/2023	21	0	−0.838	<0.0001	Decreasing
E(M)	11/14/1998	5/2/2023	35	16	−0.333	0.0041	Decreasing
F(M)	11/14/1998	5/3/2023	35	9	0.151	0.20	No Trend
T(M)	11/11/1999	5/15/2012	10	1	−0.267	0.32	No Trend
X(M)[b]	11/15/2012	8/5/2020	16	5	0	1	No Trend
Y2(M)	11/10/2009	5/3/2023	27	1	−0.0883	0.53	No Trend
Selenium							
20(M)	11/14/2012	5/2/2023	22	1	−0.238	0.12	No Trend
21(M)	7/27/2011	5/3/2023	25	0	0	1	No Trend
22(M)	7/27/2011	5/2/2023	25	1	−0.193	0.18	No Trend
23(M)	1/28/2013	5/3/2023	21	9	−0.238	0.12	No Trend
E(M)	11/14/1998	5/2/2023	35	30	−0.0807	0.47	No Trend
F(M)	11/14/1998	5/3/2023	35	21	−0.0538	0.64	No Trend
T(M)	11/11/1999	5/15/2012	10	0	−0.556	0.032	Decreasing
X(M)[b]	11/15/2012	8/5/2020	16	0	0.208	0.28	No Trend
Y2(M)[a]	11/10/2009	5/3/2023	27	16	−0.0142	0.93	No Trend

Notes:

[a] POC well.

[b] POE well.

[c] Results for uranium are listed first as concentrations of molybdenum and selenium have been well below corresponding ACLs in all wells as shown in Figure 1-4.

[d] Trend tests were performed using the "NADA: Nondetects and Data Analysis for Environmental Data" package in R, version 1.6-1.1 (Lee 2020). The NADA trend test is similar to the traditional Mann-Kendall trend test except that it accounts for the presence of nondetects at multiple detection limits. Trend analyses were conducted at the 0.05 significance (or alpha) level using a two-sided test. The test statistic, Kendall's tau, is a measure of the strength of the association between two variables, with values always falling between −1 and +1.

The continued elevated uranium concentrations in downgradient wells 22(M) and 21(M) and POE well X(M) (before the well went dry) indicate that alluvial groundwater with uranium concentrations exceeding the EPA drinking water standard (0.03 mg/L) is moving downgradient from the site boundary to the southeast. The extent of uranium contamination in the alluvial aquifer was evaluated as part of a conceptual model developed for the Bluewater site (DOE 2014) and in a subsequent updated map of the uranium plume (DOE 2019). The updated evaluations indicated that groundwater flows preferentially east-southeast through coarse-grained sediments (clean sands and gravels) in a paleochannel of the ancestral Rio San Jose (DOE 2019). Approximately 1 mile downgradient of the site, Bluewater site-derived contaminated groundwater in the paleochannel merges with other contaminated alluvial groundwater in another paleochannel at the base of the San Mateo Creek alluvial aquifer flowing westward from the Homestake Mining Company (Homestake) mill site. Downgradient of the confluence of the Rio San Jose and San Mateo Creek alluvial aquifers, groundwater flow is to the southeast toward the village of Milan (DOE 2014; DOE 2017).

To support ongoing site reclamation activities, Homestake continually monitors an extensive network of alluvial wells in the region as documented in annual monitoring reports (e.g., HMC and Hydro-Engineering, 2021). Although some non-LM alluvial-aquifer wells downgradient of the Bluewater site (e.g., wells 636, 637 and 686, intermittently monitored by Homestake) have had uranium concentrations exceeding the EPA standard (e.g., Figure 53 in DOE 2014), the provenance of this contamination is not known. Also, there is no evidence that these wells are used for domestic purposes. The New Mexico Office of the State Engineer implemented a prohibition on new wells within the alluvial aquifer in May 2018. The prohibition applies to new private use wells near and downgradient of the Bluewater site (Romero 2018).

1.7.2 SAG Bedrock Aquifer

Table 1-6 lists analytical results for selenium and uranium in the SAG aquifer wells for groundwater samples collected in November 2022 and May 2023. As has been the case historically, selenium and uranium concentrations did not exceed corresponding ACLs in any of the site wells during the 2022–2023 reporting period.

To gain a better understanding of the hydrogeological characteristics of the SAG aquifer at the site, wells 11(SG), 13(SG), 14(SG), 15(SG), 16(SG), and 18(SG) were installed in summer 2012 at the locations shown in Figure 1-3. Wells 11(SG) and 14(SG) are cross gradient of the disposal cell; all the other new wells are downgradient. Before installation of the new SAG wells, POC wells OBS−3 and S(SG) were found to have highly corroded well screens, resulting in samples with anomalously low uranium concentrations. Therefore, well 16(SG) was installed in the same vicinity (Figure 1-3) and intended as a surrogate or replacement POC well. Although wells OBS–3 and S(SG) continue to be sampled in accordance with the LTSP (DOE 2014), they are no longer considered representative of aquifer conditions in this region.

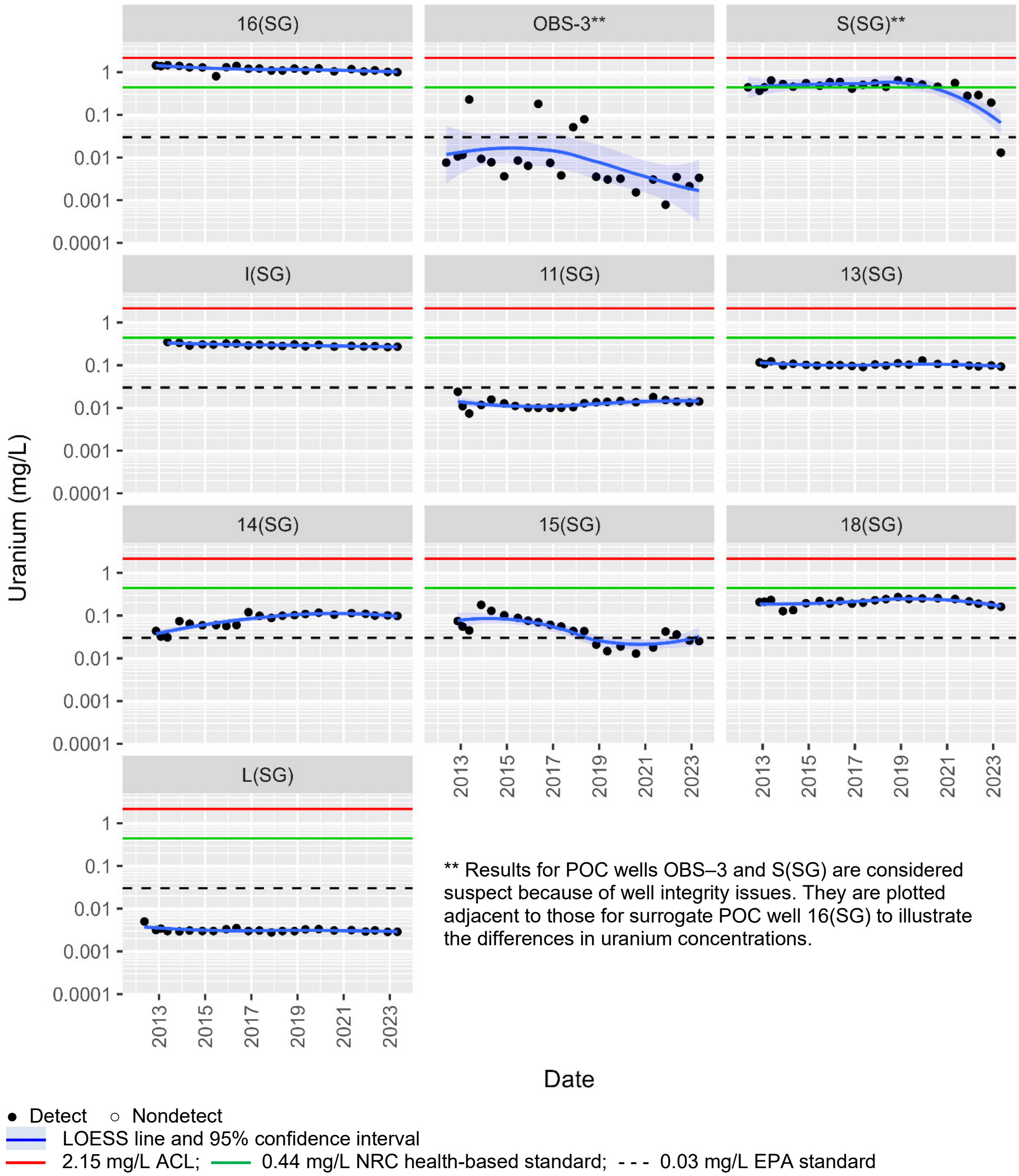
As shown in Table 1-6, selenium results for half of the 10 SAG wells currently monitored were below detection limits; the remainder were (and have been) below the 0.05 mg/L ACL. Uranium concentrations in site wells continue to be below the 2.15 mg/L ACL. For all wells except surrogate POC well 16(SG), with current levels of about 1 mg/L, uranium concentrations are also below the 0.44 mg/L NRC-approved health-based standard. Before discussing uranium and selenium concentration trends in Bluewater site SAG wells, a brief discussion is warranted about the changes in the SAG aquifer monitoring network since the LTSP was issued.

Table 1-6. SAG Aquifer Monitoring Results for November 2022 and May 2023 at the Bluewater, New Mexico, Disposal Site

Monitoring Well	Selenium (mg/L) ACL = 0.05 mg/L		Uranium (mg/L) ACL = 2.15 mg/L	
	November 2022	May 2023	November 2022	May 2023
11(SG)	<0.0015	<0.0015	0.0133	0.0141
13(SG)	0.00664	0.00734	0.0988	0.0928
14(SG)	<0.0015	<0.0015	0.101	0.098
15(SG)	<0.0015	<0.0015	0.026	0.0252
16(SG)[a]	0.0131	0.0146	1.01	0.994
18(SG)	0.0053	0.00581	0.176	0.161
I(SG)[b]	0.00617	0.00674	0.265	0.271
L(SG)	<0.0015	<0.0015	0.00286	0.00288
OBS−3[a,c]	<0.0015	<0.0015	0.00213	0.00334
S(SG)[a,c]	0.00375	<0.0015	0.193	0.013

Notes:
For duplicate analyses, the maximum result is listed.
[a] Surrogate POC well (for wells OBS-3 and S(SG)).
[b] POE well.
[c] Results for POC wells OBS–3 and S(SG) (shaded cells) are not considered representative of aquifer conditions due to corrosion in the well screen and other factors. Results for surrogate POC well 16(SG) are considered most representative of aquifer conditions in this region of the site.

Figure 1-6 plots uranium concentrations in the SAG aquifer monitoring wells for 2012–2023. This time frame was chosen because (1) monitoring at most of the wells—11(SG) through 18(SG)—did not begin until November 2012 and (2) some results for remaining wells with a longer monitoring history are considered erroneous due to either insufficient sample depths or well integrity issues. For example, previous results for well I(SG) are not shown because incorrect sampling depths in the well led to erroneously low results from 2008 to 2013 (DOE 2014). Although results are shown in Figure 1-6, uranium concentrations measured in POC wells S(SG) and OBS−3, in particular, are not considered representative of aquifer conditions. These results are plotted alongside those for surrogate POC well 16(SG) in Figure 1-6 to facilitate comparisons but are not used in the following interpretations.



Notes: The date scale begins in 2012, coinciding with the installation of the 11–18(SG) well series. Data for wells with a longer monitoring history (e.g., POE well I[SG] and background well L[SG]) are not shown because previous incorrect sample depths at times yielded erroneously low results. Wells are ordered by purpose: POC and POE wells are listed first, followed by the remaining wells listed in Table 1-2; data for background well L(SG) are plotted last. Statistically significant increasing trends in uranium concentrations were found for wells 11(SG), 14(SG), and 18(SG). Significant decreasing trends were found for all remaining wells except 13(SG) and background well L(SG), both with no trend (Table 1-7).

Figure 1-6. Uranium Concentrations in the SAG Aquifer at the Bluewater, New Mexico, Disposal Site

Uranium concentrations in all Bluewater site SAG wells have been consistently below the 2.15 mg/L ACL (Figure 1-6). Uranium concentrations have also been below the site-specific NRC-approved health-based standard of 0.44 mg/L, with the exception of well 16(SG), with concentrations ranging from 0.8–1.45 mg/L. However, onsite SAG wells, including SAG wells near the downgradient site boundary, have consistently exceeded the 0.03 mg/L EPA drinking water standard for uranium. Exceptions are well 11(SG) at the northern site boundary, background well L(SG), and, periodically, well 15(SG) (Figure 1-6). Mann-Kendall trend analysis identified statistically significant decreasing uranium trends in well 15(SG), installed near alluvial well T(M), well 16(SG), and POE well I(SG) (Table 1-7). Uranium concentrations in well I(SG), at the eastern site boundary, have ranged from 0.15–0.35 mg/L; the most recent (May 2023) result was 0.271 mg/L (Table 1-6).

Statistically significant increasing trends in uranium concentrations were identified for two SAG wells: cross-gradient well 11(SG) (northern site boundary) and 14(SG), at the southwestern site boundary. The significant increase in well 14(SG) reflects an increase from 0.031 mg/L in 2013 to 1.2 mg/L in November 2016, but since then, concentrations have remained relatively constant at about 0.l mg/L (most recent result of 0.098 mg/L). No significant trend was found for three wells: 13(SG), 18(SG), and background well L(SG) (Table 1-6).

Uranium concentration trends in offsite wells, including privately owned and nearby municipal drinking water wells monitored by Homestake or NMED, were described in *Evaluating the Influence of High-Production Pumping Wells on Impacted Groundwater at the Bluewater, New Mexico, Disposal Site* (DOE 2020). Offsite wells either had a decreasing statistically significant trend or no statistical trend in uranium concentration between 2012 and 2018. At that time, all offsite wells had uranium concentrations below the EPA standard of 0.03 mg/L except for two wells (951 and 951R) owned by Homestake Mining Company, with uranium concentrations slightly exceeding the EPA standard. Well 951 is just outside the southeastern boundary of the Bluewater site (Figure 1-3) and is routinely monitored by LM (and was previously intermittently monitored by Homestake). Using validated data since 2013, uranium concentrations in this well have been stable (no significant trend), with a mean and standard deviation of 0.032 ± 0.005 mg/L. Uranium concentrations in 2022 and 2023 were at or slightly below the standard (0.0278–0.0295 mg/L). Monitoring well 951R also had no trend (DOE 2020) and is approximately 2 miles southeast of the site, nearer to the Homestake site (Figure 1-3). LM continues to monitor groundwater quality in offsite wells completed in the SAG aquifer as part of the cooperative agreement between DOE and NMED and to assess potential offsite migration of contaminants.

Although monitoring of the SAG aquifer at the site has focused on uranium, selenium is also a required analyte in accordance with the LTSP (Table 1-3). To conclude this section and to demonstrate that selenium concentrations in SAG aquifer wells at the site have been consistently below the ACL, Figure 1-7 plots selenium data from 2012–2023. Selenium concentrations in most wells continue to be well below the 0.05 mg/L ACL and are often below detection limits. The highest selenium concentrations have been measured in well 16(SG), where results have ranged from 0.01–0.02 mg/L (most recent result of 0.0146 mg/L) and a statistically significant decreasing trend was identified (Table 1-7). A statistically significant decreasing trend in selenium concentrations was also identified for well I(SG), reflecting the trend in results after the initial nondetect observation (Figure 1-7). No significant trends in selenium concentrations were found for the remaining SAG aquifer wells.

Table 1-7. Mann-Kendall Trend Analysis Results for Uranium and Selenium in Bluewater Site SAG Monitoring Wells

Well[a]	Initial Trend Analysis Date	Final Trend Analysis Date	Number of Samples	Number of Nondetects	Kendall's tau[b]	p-value[b]	Trend[b]
Uranium							
11(SG)	11/14/2012	5/2/2023	22	0	0.325	0.037	Increasing
13(SG)	11/15/2012	5/3/2023	22	0	−0.234	0.13	No Trend
14(SG)	11/14/2012	5/2/2023	22	0	0.528	0.00064	Increasing
15(SG)	11/13/2012	5/2/2023	22	0	−0.619	<0.0001	Decreasing
16(SG)[c]	11/13/2012	5/1/2023	22	0	−0.619	<0.0001	Decreasing
18(SG)	11/14/2012	5/3/2023	22	0	0.143	0.37	No Trend
I(SG)[d]	5/15/2013	5/2/2023	20	0	−0.642	<0.0001	Decreasing
L(SG)	5/15/2012	5/2/2023	23	0	−0.261	0.085	No Trend
Selenium							
11(SG)	11/14/2012	5/2/2023	22	21	−0.0303	0.84	No Trend
13(SG)	11/15/2012	5/3/2023	22	1	0.203	0.19	No Trend
14(SG)	11/14/2012	5/2/2023	22	21	−0.0173	0.92	No Trend
15(SG)	11/13/2012	5/2/2023	22	21	−0.0563	0.70	No Trend
16(SG)[c]	11/13/2012	5/1/2023	22	0	−0.468	0.0025	Decreasing
18(SG)	11/14/2012	5/3/2023	22	1	0.152	0.33	No Trend
I(SG)[d]	5/15/2012	5/2/2023	21	1	−0.467	0.0034	Decreasing
L(SG)	5/15/2012	5/2/2023	23	22	0.00395	1	No Trend

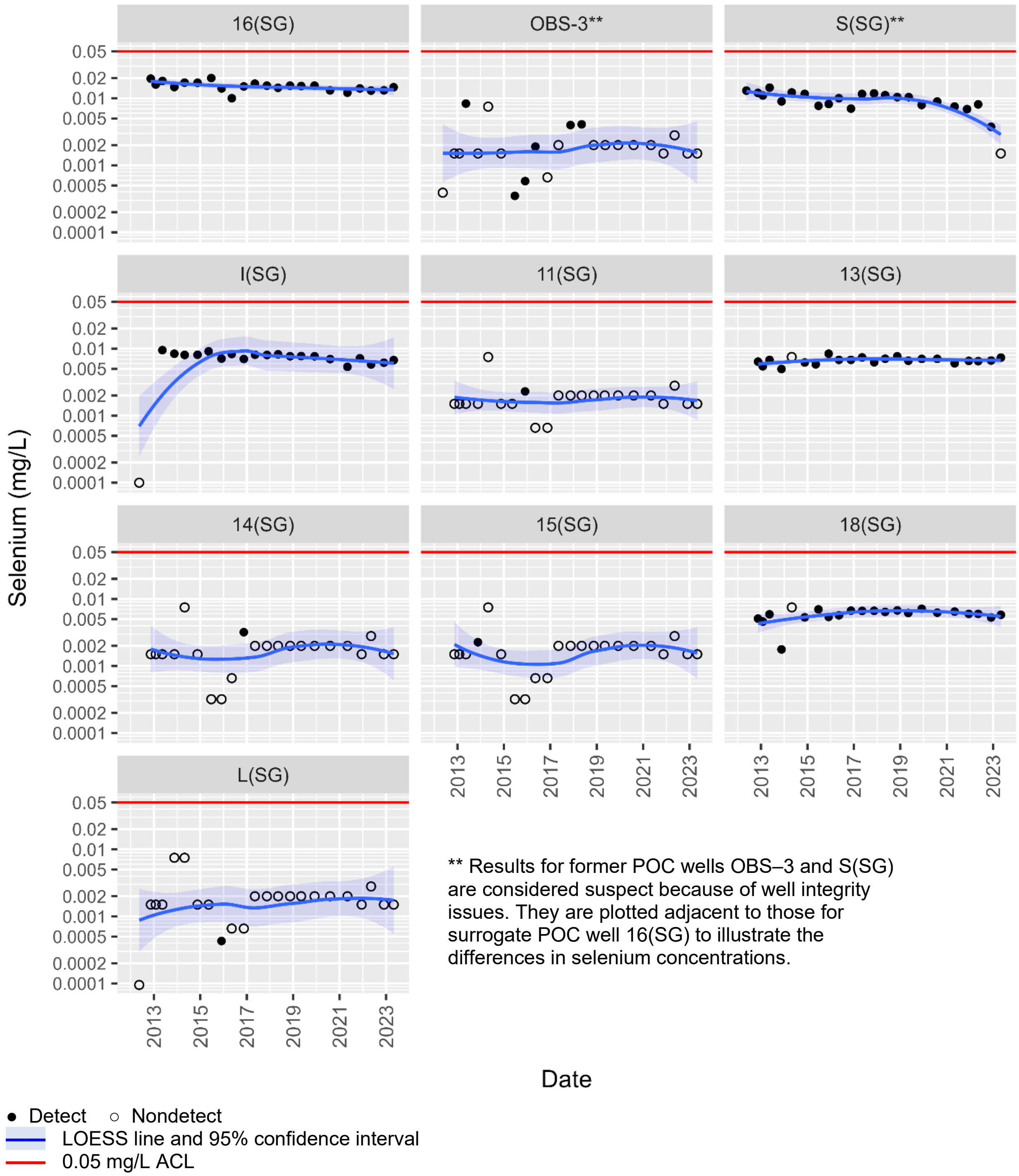
Notes:

[a] Trend analyses were not conducted for initial POC wells OBS–3 and S(SG) because these wells are no longer considered representative of aquifer conditions. Results for surrogate POC well 16(SG) are considered most representative of aquifer conditions in this region of the site.

[b] Trend tests were performed using the "NADA: Nondetects and Data Analysis for Environmental Data" package in R, version 1.6-1.1 (Lee 2020). The NADA trend test is similar to the traditional Mann-Kendall trend test except that it accounts for the presence of nondetects at multiple detection limits. Trend analyses were conducted at the 0.05 significance (or alpha) level using a two-sided test. The test statistic, Kendall's tau, is a measure of the strength of the association between two variables, with values always falling between −1 and +1.

[c] Surrogate POC well for wells OBS-3 and S(SG).

[d] POE well.



Notes: The date scale begins in 2012, coinciding with the installation of the 11–18(SG) well series. Refer to notes supporting Figure 1-6 for additional details. Wells are ordered by purpose: POC and POE wells are listed first, followed by the remaining wells listed in Table 1-2; data for background well L(SG) are plotted last. Mann-Kendall trend analysis identified a significant decreasing trend in selenium concentrations for surrogate POC well 16(SG). No significant trends were found for remaining wells (Table 1-7).

Figure 1-7. Selenium Concentrations in the SAG Aquifer at the Bluewater, New Mexico, Disposal Site

1.8 References

10 CFR 40.28. U.S. Nuclear Regulatory Commission, "General License for Custody and Long−Term Care of Uranium or Thorium Byproduct Materials Disposal Sites," *Code of Federal Regulations.*

40 CFR 192. U.S. Environmental Protection Agency, "Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings," *Code of Federal Regulations.*

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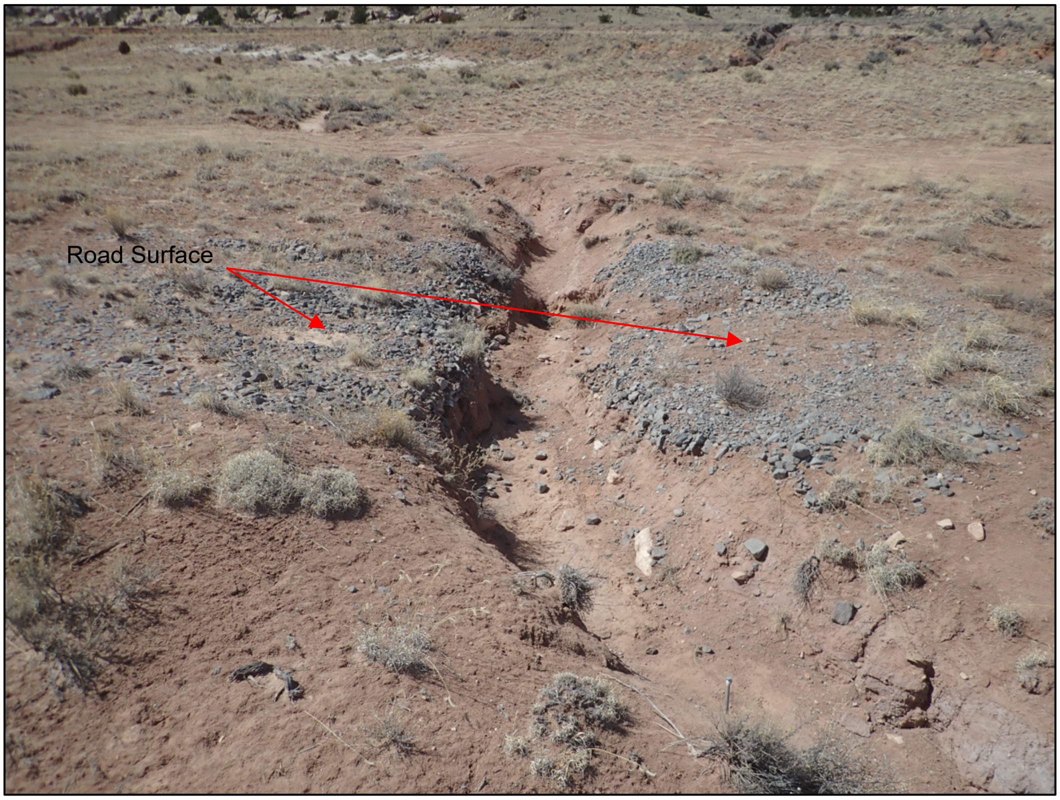
1.9 Photographs

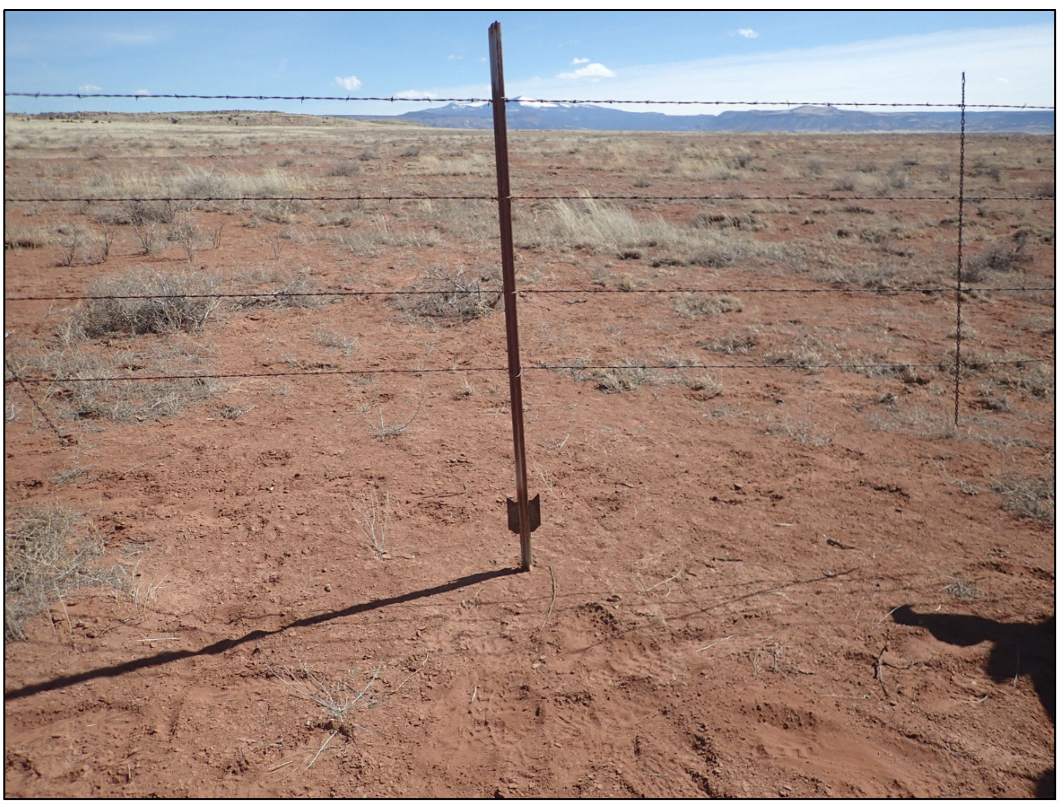
Photograph Location Number	Azimuth	Photograph Description
PL−1	250	Erosion of Site Road Along Northwestern Corner
PL−2	90	Wind Erosion on Eastern Fence Line (Hanging T-Post)
PL−3	350	Hanging T-Posts Between Boundary Monuments BM-12 and BM-11
PL−4	180	Perimeter Sign P36
PL−5	—	Site Marker
PL−6	300	Boundary Monument BM-2
PL−7	300	Perimeter Sign P28 and Quality Control Monument QC-1
PL−8	0	SOARS Station
PL−9	340	Abandoned Animal Burrows near Monitoring Well F(M)
PL−10	0	Main Tailings Disposal Cell Top Slope Vegetation
PL−11	170	Overview of Siphon and Vegetation on Disposal Cell Top Slope
PL−12	180	Siphon Outlet on Main Tailings Disposal Cell North Side Slope
PL−13	70	Potential Depression Area on Top Slope at Top Slope/Side Slope Boundary
PL−14	160	Potential Depression Area on Main Tailings Disposal Cell Southwest Side Slope
PL−15	290	Minor Depression on Main Tailings Disposal Cell South Side Slope
PL−16	220	Minor Depression on Main Tailings Disposal Cell South Side Slope
PL−17	290	Rilling Between Perimeter Signs P31 and P30
PL−18	150	Rilling near Perimeter Sign P24
PL−19	290	Animal Burrow on Acid Tailings Disposal Area
PL−20	340	Shallow Depression on Northwest Extension of Carbonate Tailings

Photograph Location Number	Azimuth	Photograph Description
PL−21	330	Minor Depression with Vegetation Growth on Carbonate Tailings Disposal Cell Top Slope
PL−22	85	PCB Disposal Area Cover
PL−23	—	East Dump Minor Erosion Area
PL−24	0	Dry Ephemeral Pond

Note:
— = Photograph taken vertically from above.



PL−1. Erosion of Site Road Along Northwestern Corner



PL−2. Wind Erosion on Eastern Fence Line (Hanging T-Post)

PL−3. Hanging T-Posts Between Boundary Monuments BM-12 and BM-11

PL−4. Perimeter Sign P36

PL−5. Site Marker

PL−6. Boundary Monument BM-2

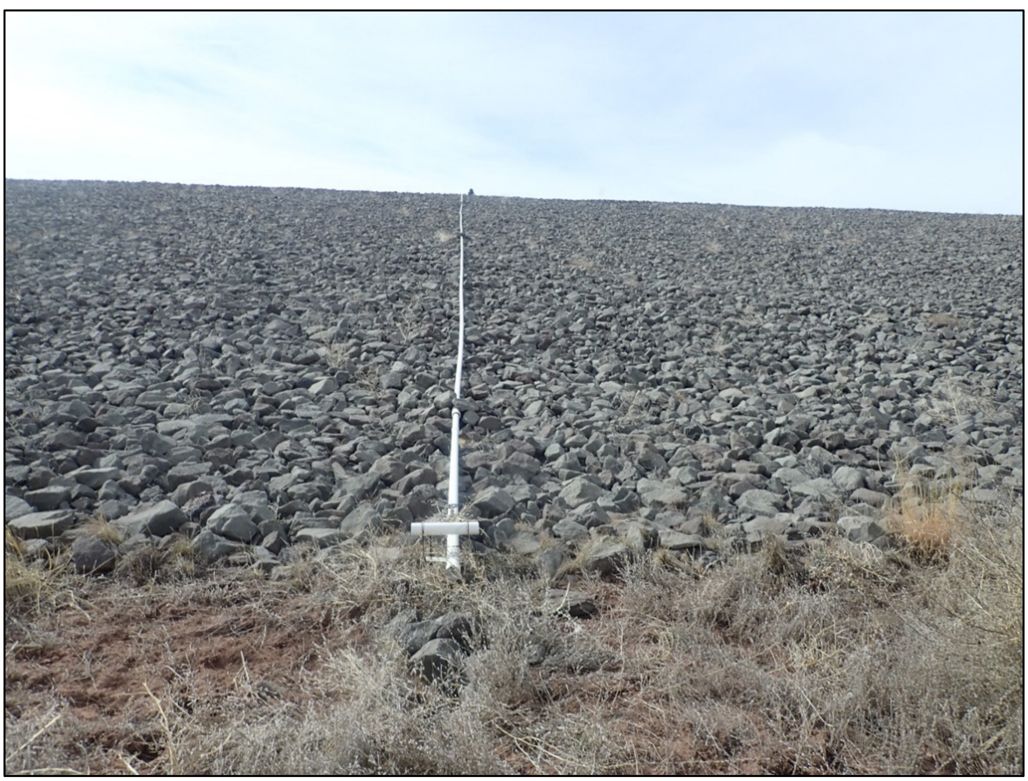
PL−7. Perimeter Sign P28 and Quality Control Monument QC-1

PL−8. SOARS Station

PL−9. Abandoned Animal Burrows near Monitoring Well F(M)

PL−10. Main Tailings Disposal Cell Top Slope Vegetation

PL−11. Overview of Siphon and Vegetation on Disposal Cell Top Slope



PL−12. Siphon Outlet on Main Tailings Disposal Cell North Side Slope

PL−13. Potential Depression Area on Top Slope at Top Slope/Side Slope Boundary

PL−14. Potential Depression Area on Main Tailings Disposal Cell Southwest Side Slope

PL−15. Minor Depression on Main Tailings Disposal Cell South Side Slope

PL−16. Minor Depression on Main Tailings Disposal Cell South Side Slope

PL−17. Rilling Between Perimeter Signs P31 and P30

PL−18. Rilling near Perimeter Sign P24

PL−19. Animal Burrow on Acid Tailings Disposal Area

PL−20. Shallow Depression on Northwest Extension of Carbonate Tailings

PL−21. Minor Depression with Vegetation Growth on Carbonate Tailings Disposal Cell Top Slope

PL−22. PCB Disposal Area Cover

PL−23. East Dump Minor Erosion Area

PL−24. Dry Ephemeral Pond