19.0 Tuba City, Arizona, Disposal Site

19.1 Compliance Summary

The Tuba City, Arizona, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Disposal Site (site) was inspected on October 15, 2020. No changes were observed on the disposal cell or in the associated drainage features. Inspectors identified maintenance needs but found no cause for a follow-up inspection.

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) conducts semiannual groundwater monitoring to compare current conditions to baseline postconstruction groundwater quality at the site. Evaluative groundwater monitoring is performed in lieu of normal point-of-compliance (POC) monitoring, as preexisting milling-related groundwater contamination may mask contamination leaching from the disposal cell. Analytical results from the February 2020 evaluative monitoring event indicate that groundwater quality downgradient from the former mill site is still degraded. Concentrations of regulated contaminants (i.e., molybdenum, nitrate, selenium, and uranium) in the downgradient plume are elevated in comparison with unimpacted (upgradient) groundwater quality. The second 2020 semiannual sampling event would have been performed in August, but was cancelled due to travel restrictions imposed in response to the novel coronavirus pandemic.

Active groundwater remediation is ongoing. Remediation includes operation of extraction wells and conveyance of the extracted (contaminated) groundwater to the onsite evaporation pond. Extraction wells located in areas and depths of greatest contamination are operated to maximize source mass removal. However, annual extraction volume is constrained to 5 million gallons due to evaporation pond capacity. For the past 3 years, the remediation system was operated in "high-intensity, short-duration" campaigns of 4 months, beginning in July and ending in October. The progress of groundwater remediation is evaluated and reported annually, separately from this compliance evaluation.

19.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the site are specified in the site-specific Long-Term Surveillance Plan (LTSP) (DOE 1996) in accordance with procedures established to comply with 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 19-1 lists these requirements.

Table 19-1. License Requirements for the Tuba City, Arizona, Disposal Site

Requirement	LTSP	This Report	10 CFR 40.27
Annual Inspection and Report	Section 6.0	Section 19.4	(b)(3)
Follow-Up Inspections	Section 7.0	Section 19.5	(b)(4)
Maintenance and Repairs	Section 8.0	Section 19.6	(b)(5)
Environmental Monitoring	Section 5.2	Section 19.7	(b)(2)
Corrective Action	Section 9.0	Section 19.8	—

19.3 Institutional Controls

The 145-acre disposal site, identified by the property boundary shown in Figure 19-1, is held in trust by the U.S. Bureau of Indian Affairs. The Navajo Nation retains title to the land. UMTRCA authorized DOE to enter into a Cooperative Agreement (DE-FC04-85AL26731) (DOE 1984) with the Navajo Nation to perform remedial actions at the former uranium processing sites. DOE and the Navajo Nation executed a Custodial Access Agreement that conveys to the federal government title to the residual radioactive materials stabilized at the disposal site and ensures that DOE has perpetual access to the site.

The site was accepted under the NRC general license in 1996. 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 custody of the disposal cell and its engineered features, administrative controls, and the following physical ICs that are inspected annually: the disposal cell and associated drainage features, entrance gate and sign, perimeter fence and signs, site markers, survey and boundary monuments, and wellhead protectors.

19.4 Inspection Results

The site, 5 miles northeast of Tuba City, Arizona, was inspected on October 15, 2020. An action plan for the inspection was developed to allow for modified stakeholder-assisted execution, thus avoiding the need for Grand Junction-based Legacy Management Support (LMS) staff to travel to the Navajo Nation while coronavirus-related travel restrictions were in effect. The inspection was conducted by L. Scott, an LMS Tuba City disposal site operations staff member who lives on the Navajo Nation. Due to the coronavirus pandemic and associated travel restrictions, LMS and LM staff living in locations off the Navajo Nation did not travel to the site to perform the annual inspection. Instead, LMS staff enlisted the assistance of individuals from tribal organizations who are familiar with the Tuba City disposal site. Online training on the inspection process was provided to the assisting parties by LMS prior to the inspections. Tribal individuals who assisted with the inspection were S. Salt (Navajo Abandoned Mine Lands/Uranium Mill Tailings Remedial Action [Navajo AML/UMTRA]), J. Tallbull (Navajo AML/UMTRA), and L. Leslie (Hopi Tribe's Office of Mining and Mineral Resources). 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 the need, if any, for maintenance or additional inspection and monitoring.

19.4.1 Site Surveillance Features

Figure 19-1 shows the locations of site features, including site surveillance features and inspection areas, in black and gray font. 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 2020 annual inspection are shown in red font. 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 19-1 by photograph location (PL) numbers. The photographs and photograph log are presented in Section 19.10.

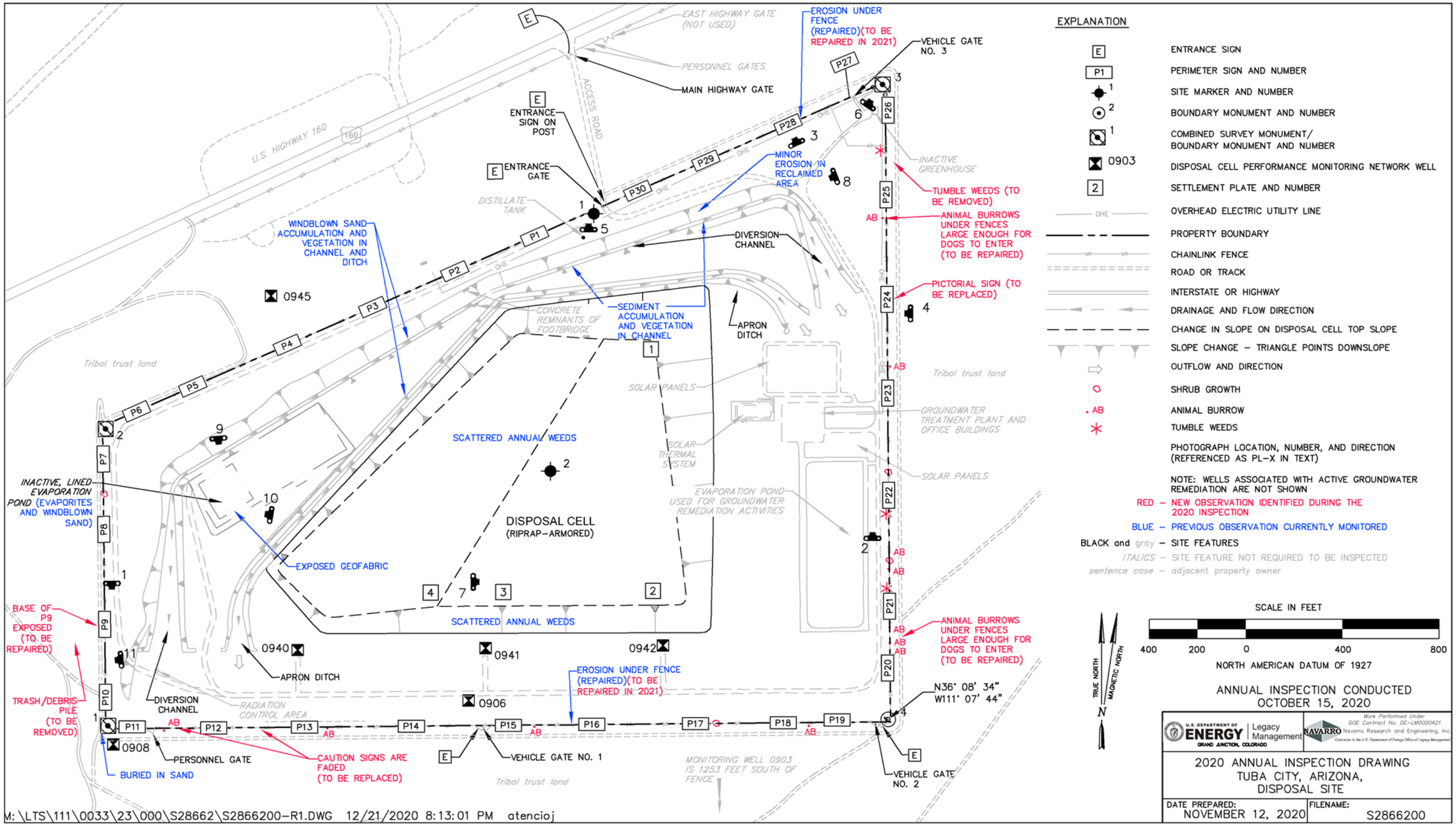

Figure 19-1. 2020 Annual Inspection Drawing for the Tuba City, Arizona, Disposal Site

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Many structures and features at the site are associated with the former groundwater treatment system. Beginning in 2002, contaminated groundwater was extracted and treated through ion exchange and distillation processes, then returned to the aquifer through an infiltration trench, upgradient of the disposal cell. Operation of the groundwater treatment plant (GWTP) was suspended in September 2014 due to hydrologic constraints on extraction and GWTP maintenance challenges. The structures associated with the GWTP remain onsite and include a control building; a shop and laboratory building; an ion exchange building, external tanks, and distillation skid; a solar water-heating system; two photovoltaic panel arrays for utility power generation; evaporation ponds; a network of extraction, injection, and monitoring wells; and a treated water infiltration trench.

An Interim Treatment Plan was prepared in 2015, after the GWTP operation was suspended. Active remediation continued in the form of extraction and conveyance of contaminated groundwater to the onsite evaporation pond. Under interim treatment, extraction of contaminant mass is to be optimized through operation of the extraction wells located in the areas of highest contaminant concentrations. The contaminant plume is to be monitored and additional mitigative actions are to be defined and implemented if monitoring reveals unacceptable migration of the plume.

From 2015 through 2017, the "extract-and-evaporate" system was operated year-round with the flow rate being adjusted to maintain a constant water level in the pond (i.e., higher extraction flow rate in hot, windy, dry weather conditions, and lower flow rate in cold, calm, humid conditions). The average annualized evaporation rate ranged from 7 to 10 gallons per minute (gpm), constraining annual groundwater extraction volume in a range of 3.7 million to 5.3 million gallons.

In 2018, 2019, and 2020, short-duration, high-intensity extraction campaigns were planned and executed. The operational objectives were to extract a volume of contaminated groundwater equivalent to the pond's annual evaporative capacity and to maintain the maximum source mass removal under the constraint of interim operation. As many as 11 extraction wells were operated at a cumulative flow rate of 40 to 50 gpm from July through October. In addition to the operational objectives, groundwater drawdown and recovery data were collected during and after the extraction campaign to refine the hydrologic site characterization and to define the effective capture zone of the most productive extraction wells.

The purpose of groundwater treatment is to remove contamination that resulted from past uranium-ore processing at the site. Groundwater remediation activities are not addressed in the LTSP because they are not related to the long-term disposal and stabilization of contaminated materials under the cell cover. Therefore, the features associated with groundwater treatment are not included in the annual inspection and are only addressed in this report as they relate to site integrity or safety concerns.

19.4.1.1 Access Road, Entrance Gates, and Entrance Signs

Access to the site is from U.S. Highway 160. Perpetual access to the site is granted by the Custodial Access Agreement. A gate in a chainlink fence on the highway right-of-way ("main highway gate" in Figure 19-1) allows access to the site via a gravel road. The entrance gate is in the inner chainlink perimeter fence between perimeter signs P1 and P30. Both gates were open at the time of the inspection because of ongoing site activities. Vehicle gates are also present in the

northeast corner of the site to allow access to Diné College's (inactive) greenhouse and along the southern fence line to facilitate access for offsite activities.

Entrance signs are posted on the main highway gate, on a post near the entrance gate (in the inner chainlink perimeter fence), and on two vehicle gates (No. 1 and No. 2). Vehicle Gate No. 3, in the northeast corner of the site, purposefully does not have a sign. No maintenance needs were identified.

19.4.1.2 Perimeter Fence and Signs

A chainlink perimeter fence encloses the site. Windblown sand continues to accumulate along the western perimeter fence and road (PL-1) and in a few areas along the western end of the north perimeter fence. The sand accumulation is not of concern at this time. Inspectors found numerous animal burrows (PL-2) and areas of erosion beneath the fence (PL-3). Gaps beneath the fence on the east side need to be repaired, and accumulated tumbleweeds need to be cleared from the fence near perimeter sign P25.

Thirty pairs of perimeter signs, designated P1 through P30, are attached to steel posts set in concrete directly inside and along the perimeter fence. One of the sign pairs is textual, and the other is pictorial. All were legible and stable, with the exception of the P24 pictorial sign, which is becoming faded (PL-4), and the P9 signpost, which is being undercut at its base from wind erosion. Two faded signs warning of high voltage need to be replaced near perimeter sign P12. Erosion under the fence near P16 and P28 was repaired last year, but there is new erosion that needs to be repaired. No other maintenance needs were identified.

19.4.1.3 Site Markers

The site has two granite site markers. Site marker SMK-1 (PL-5) is just inside the entrance gate, and site marker SMK-2 is on the top slope of the disposal cell. No maintenance needs were identified.

19.4.1.4 Survey and Boundary Monuments

One boundary monument and three combined survey and boundary monuments delineate the corners of the site. Combined survey and boundary monuments SM/BM-1 and SM/BM-3 tend to get covered with windblown sand and are marked with steel T-posts. Only survey and boundary monument SM/BM-3 was found in this condition during the inspection. SM/BM-3 was cleared and exposed for visual detection during the inspection (PL-6). All four survey and boundary monuments were located and in good condition. No other maintenance needs were identified.

19.4.1.5 Monitoring Wells

Seven monitoring wells (0903, 0906, 0908, 0940, 0941, 0942, and 0945) constitute the disposal cell performance monitoring network. Monitoring wells 0906, 0908, 0940, 0941, and 0942 are inside or immediately outside the perimeter fence. Inspectors checked the wellhead protectors (with the exception of distal downgradient well 0903, which is offsite), and all were found to be undamaged and locked. Monitoring wells are also inspected during semiannual groundwater sampling events; their condition and maintenance needs, if any, are reported. No maintenance needs were identified.

19.4.2 Inspection Areas

In accordance with the LTSP, the site is divided into three inspection areas (referred to as "transects" in the LTSP) to ensure a thorough and efficient inspection. The inspection areas are (1) the disposal cell, (2) the area between the disposal cell and the site boundary, and (3) 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.

19.4.2.1 Disposal Cell

The disposal cell, completed in 1989, occupies 50 acres. The disposal cell is armored with riprap to control erosion and deter animal and human intrusion (PL-7). There was no evidence of erosion, settling, slumping, or other modifying processes on the disposal cell.

In accordance with the LTSP, deep-rooted vegetation is controlled to prevent potential penetration of the radon barrier. Periodic spot-application of herbicide has been effective in controlling deep-rooted vegetation growth on the disposal cell cover. No deep-rooted shrubs were observed on the cell top or side slopes during the inspection. Scattered patches of annual weeds grow on the disposal cell top and side slopes, but these shallow-rooted plants are not a concern. Windblown sand and dirt continue to accumulate on the rock-covered surfaces, providing a favorable environment for plant growth. No maintenance needs were identified.

19.4.2.2 Area Between the Disposal Cell and the Site Boundary

The disposal cell is protected from stormwater runoff by a disposal cell apron ditch and a diversion channel, both armored with riprap and located along the north and northwest sides of the disposal cell. Windblown sand and vegetation accumulate in the apron ditch and the diversion channel (PL-8) along the north and northwest sides of the disposal cell. This sand deposition and associated vegetation establishment have not adversely affected the performance of these structures. No evidence of recent or past water flows was observed in the apron ditch or the diversion channel.

The north slope above the diversion channel, consisting of noncohesive sandy soil, is subject to erosion from stormwater runoff. Erosion repair conducted in this area in 2013 reduced the rate of erosion and subsequent soil deposition in the channel. Some erosion and deposition continue, however, and erosion control repairs are performed as needed. No repairs are necessary at this time.

Two of the three evaporation ponds near the northwest side of the disposal cell were removed in 2007. The area was reclaimed and seeded with a native seed mix in 2007 and again in 2013. Because the area is often scoured by wind, perennial vegetation is establishing extremely slowly (PL-9), and most of the plants are early successional annual species.

The remaining evaporation pond, filled minimally with windblown sand and evaporites, is retained as a backup for the main evaporation pond on the east side of the site. The steel cable and caution signs surrounding the pond were in good condition. The high-density polyethylene liner was in good condition. Lastly, the plastic geofabric that stabilizes the south-facing slope of the pond is still exposed (PL-10). No repairs of the geofabric are needed at this time, as it

remains mostly buried and continues to stabilize the slope. Inspectors will continue to monitor this area. No other maintenance needs were identified.

19.4.2.3 Outlying Area

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. A small pile of trash and debris was observed offsite on the west side near perimeter sign P9 (PL-11) and will be removed. No other issues were identified.

19.5 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.

19.6 Maintenance and Repairs

Inspectors observed and reported maintenance and repair tasks that will be completed following the lifting of the Navajo Nation's novel coronavirus travel ban. Maintenance will include:

- Repair of gaps beneath the fence created by animals and soil erosion.
- Replacement of the P24 pictorial perimeter sign.
- Repair of P9 perimeter signpost's exposed base, which was undercut by erosion.
- Replacement of two caution signs near perimeter sign P12 warning of high voltage.
- Removal of tumbleweeds from the chainlink fence near perimeter sign P25.
- Removal of small trash and debris pile near perimeter sign P9.

No other maintenance needs were identified.

19.7 Environmental Monitoring

In accordance with the LTSP, semiannual groundwater monitoring is conducted to compare current conditions to baseline postconstruction groundwater quality at the site. Groundwater quality beneath and downgradient of the disposal cell has been degraded by contamination from former uranium-processing activities. This preexisting milling-related contamination might mask contamination leaching from the disposal cell and limits the effectiveness of normal POC groundwater monitoring as a reliable indicator of disposal cell performance (40 CFR 192 Subpart A). In lieu of POC monitoring, groundwater monitoring is performed in accordance with Section 5.2.2 of the LTSP and is defined as evaluative monitoring. Evaluative monitoring is performed to "(1) evaluate trends in ground water quality, (2) monitor the downgradient extent of contamination in ground water, (3) analyze the impacts of transient drainage and surface runoff, and (4) assess the effects of ground water restoration measures associated with containing the contamination related to uranium processing activities." (DOE 1996). Evaluative groundwater monitoring was conducted once in February 2020. The second semiannual sampling event, which is normally performed in August, was cancelled due to novel coronavirus travel restrictions. The

progress of groundwater remediation is evaluated and reported annually, separately from this compliance evaluation.

Seven wells (Figure 19-2 and Table 19-2) identified in the LTSP are monitored for four hazardous constituents: molybdenum, nitrate, selenium, and uranium (DOE 1996). As a baseline for cell performance evaluation, provisional upper baseline limits (UBLs) for the four hazardous constituents were calculated in accordance with *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities–Interim Final Guidance* (EPA 1989) and documented in the LTSP (Table 19-3). UBLs were described in the LTSP as provisional because "baseline conditions were established for locations other than the disposal cell monitor wells." Establishing baseline conditions at wells 906 and 908 was intended for determination of "transient excursions from baseline conditions, potential chemical gradients between baseline and disposal cell locations, and stabilization of postclosure disposal cell hydrology" (DOE 1996). UBLs are concentrations that, with 95% confidence, would be exceeded less than 5% of the time during long-term monitoring if groundwater conditions near the monitoring well did not change. Because the four hazardous constituents are present in tailings material, are relatively mobile in groundwater, and are found in low concentrations in background groundwater quality, exceedance of UBLs in more than 5% of sampling events over the long term could indicate that the disposal cell is not performing to design standards. However, the LTSP also notes that elevated concentrations could result from transient drainage of tailings fluid into the subsurface (directly beneath the cell) or from rainfall infiltrating through contamination in the unsaturated zone in the area of the mill ponds (not covered by the disposal cell). Elevated concentrations attributed to transient drainage or infiltration would not be indicative of substandard performance for the cell.

Figure 19-2. Groundwater Monitoring Network at the Tuba City, Arizona, Disposal Site

Table 19-2. LTSP Groundwater Monitoring Network at the Tuba City, Arizona, Disposal Site

Monitoring Well	Hydrologic Relationship	Monitoring Frequency
0903	Downgradient (offsite)	Annually
0906	Downgradient	Semiannually
0908	Downgradient	Semiannually
0940[a]	Downgradient	Semiannually
0941	Downgradient	Semiannually
0942[b]	Downgradient	Semiannually
0945	Upgradient (background)	Annually

Notes:
[a] Between August 2004 and February 2010, samples from well 0940 could not be obtained because of an insufficient volume of water. This accounts for the data gaps in Figure 19-3 through Figure 19-6.
[b] Well 0942 was converted from a monitoring well to an extraction well in 2015.

Table 19-3. Provisional Upper Baseline Limits for Groundwater at the Tuba City, Arizona, Disposal Site

Constituent	Provisional UBL (mg/L)[a]	MCL (mg/L)[b]
Molybdenum	0.14	0.10
Nitrate (as nitrogen)	311	10
Selenium	0.05	0.01
Uranium	1.17	0.044

Notes:
[a] As documented in the 1996 LTSP.
[b] MCLs as listed in 40 CFR 192 Subpart A.

Abbreviations:
MCL = maximum concentration limit
mg/L = milligrams per liter

Active groundwater remediation was anticipated when the LTSP was prepared in 1996, and it was expected that deviations from anticipated disposal cell performance could be detected even with groundwater remediation ongoing. However, the LTSP also noted that (1) POC sampling and analysis protocol to monitor cell performance could not be established until groundwater restoration was complete and (2) the LTSP would be revised at that time.

As noted in the definition of UBLs above, the UBL value should not be exceeded more than 5% of the time as long as conditions near the monitoring well do not change. Due to implementation of active remediation (2000–2014) and interim treatment (2015 to present), the conditions near the LTSP cell performance wells have constantly been affected, and exceedance of UBLs cannot be attributed to disposal cell performance. Recent operation of the interim treatment system, potentially affecting concentrations of target analytes in the LTSP-specified evaluative monitoring wells, is described in the following paragraphs.

Throughout the period of interim treatment (2015 to present) active remediation has been performed by pumping contaminated groundwater directly to the onsite evaporation pond (DOE 2015). The volume of contaminated groundwater that can be extracted is limited to the

pond's evaporation rate, at approximately 5 million gallons annually. From 2015 through 2017 groundwater extraction was operated year-round and the extraction flow rate was adjusted seasonally, operating at a relatively high rate in warm weather and at a lower rate in cold weather. In these years, three extraction wells were typically operated at flow rates ranging from 5 gallons per minute (gpm) to 30 gpm, dependent on seasonal changes in evaporation. The wells were used because of their consistent productivity and for maximum contaminant mass removal.

In 2018, 2019, and 2020, extraction pumping was conducted in high-intensity/short-duration campaigns, with the objective of evaluating the effects on plume capture and maximum groundwater drawdown achievable under the interim treatment regime. In 2018, the high-intensity/short-duration pumping campaign used 11 extraction wells operating at a cumulative flow rate of 44 gpm for 76 days. In 2019, the pumping campaign used nine extraction wells at a cumulative pumping rate of 33 gpm for 99 days. The 2020 pumping campaign was similar to 2018 in the number of wells operated, cumulative flow rate, and duration. Groundwater levels were constantly measured in a surrounding network of monitoring wells. Results and evaluation of the recent pumping campaigns will be reported in a groundwater performance report.

Figure 19-3 through Figure 19-6 show time-concentration plots for the four target analytes, along with corresponding UBLs and MCLs. All 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=TUB). MCLs are presented as information only. The LTSP requirement related to disposal cell performance is for evaluative monitoring over time, in comparison with UBLs.

Since 2004, molybdenum concentrations have been below both the 0.10 milligram per liter (mg/L) MCL and the 0.14 mg/L UBL in all LTSP evaluative wells except well 0906 in August 2019 (Figure 19-3). Molybdenum concentrations in the westernmost downgradient well 0908 and in distal downgradient well 0903 (approximately 1250 feet south of the site perimeter) continue to be comparable to concentrations in background well 0945. Well 0906 exceeded the UBL for molybdenum in August 2019 for the first time since 1999. The UBL exceedance in well 0906 was measured during the 2019 pumping campaign. In February 2020, when there was no pumping, the molybdenum concentration in well 0906 decreased below the MCL.

Nitrate concentrations have historically exceeded the 10 mg/L MCL in all LTSP evaluative wells, except background well 0945 (Figure 19-4). Exceedances of the 311 mg/L UBL were observed at compliance wells 0906 (350 mg/L) and 0940 (610 mg/L) in February 2020. Nitrate concentrations in well 0908 dropped below the UBL in February 2020 after exceeding it for the first time in August 2019. Nitrate concentrations in distal downgradient well 0903 have regularly exceeded the MCL since 2004 but remained below the UBL in 2020.

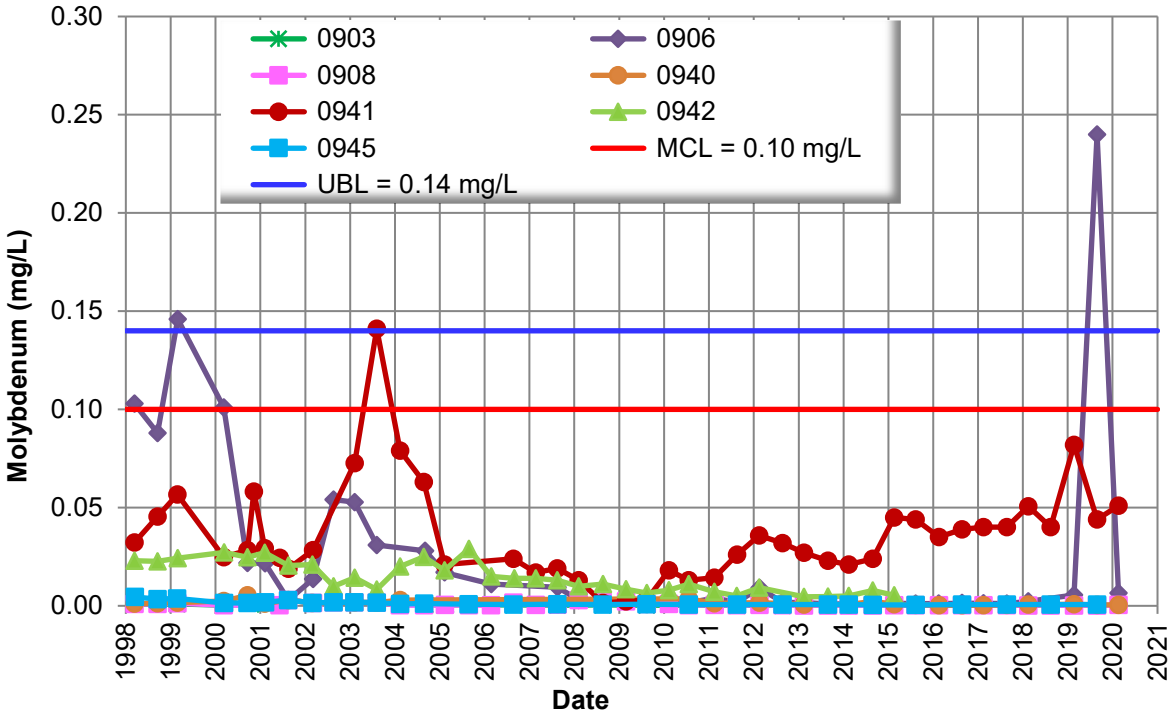

Figure 19-3. Molybdenum in Groundwater at the Tuba City, Arizona, Disposal Site

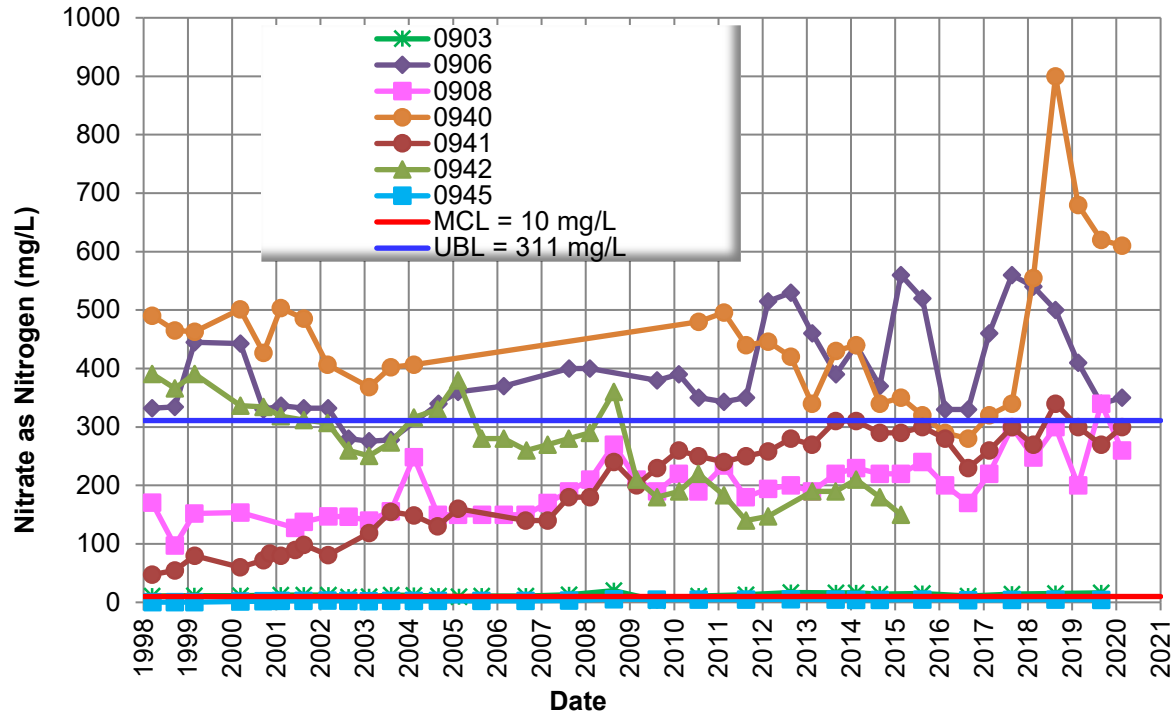

Figure 19-4. Nitrate in Groundwater at the Tuba City, Arizona, Disposal Site

Selenium concentrations have historically exceeded the 0.01 mg/L MCL in all LTSP evaluative wells except background well 0945 and distal well 0903 (Figure 19-5). Concentrations in well 0908 exceeded the UBL for selenium in 1997 and have since remained at or slightly above the 0.01 mg/L MCL since August 2018. Selenium concentrations in well 0942 exceeded the UBL in February 2015, and that well has not been sampled since. Concentrations continued to exceed the 0.05 mg/L UBL in wells 0906, 0940, and 0941, all of which are immediately downgradient of the disposal cell. Selenium concentrations increased in well 0906 to 0.16 mg/L during the high-intensity pumping campaign in August 2019, the highest level since 1997. Selenium concentrations increased in well 0941 from 0.018 mg/L in 1998 to 0.08 mg/L in 2020. Selenium concentrations in distal downgradient well 0903 have consistently been below both the UBL and the MCL and, since late 2004, below levels measured in background well 0945.

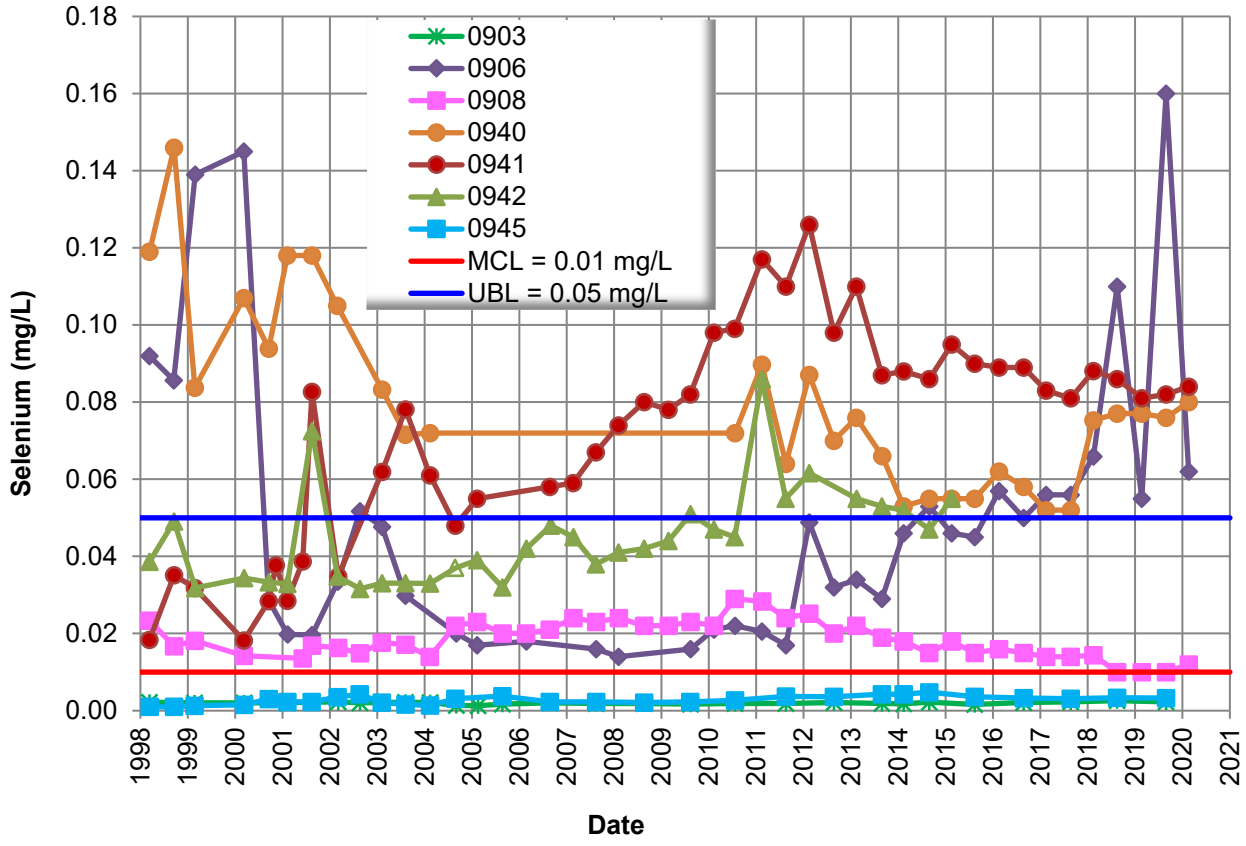

Figure 19-5. Selenium in Groundwater at the Tuba City, Arizona, Disposal Site

Uranium concentrations have historically exceeded the 0.044 mg/L MCL in all compliance wells except for distal downgradient well 0903 and background well 0945, both of which have always been below the MCL (Figure 19-6).

Uranium concentrations in central downgradient well 0941 have gradually increased since 2005 from 0.05 mg/L to 0.27 mg/L. Concentrations in well 0906 have more recently increased from 0.36 mg/L in February 2017 to 1.4 mg/L in February 2020. The February 2020 concentration is above the UBL of 1.17 UBL and is the first recorded UBL exceedance of uranium at the site.

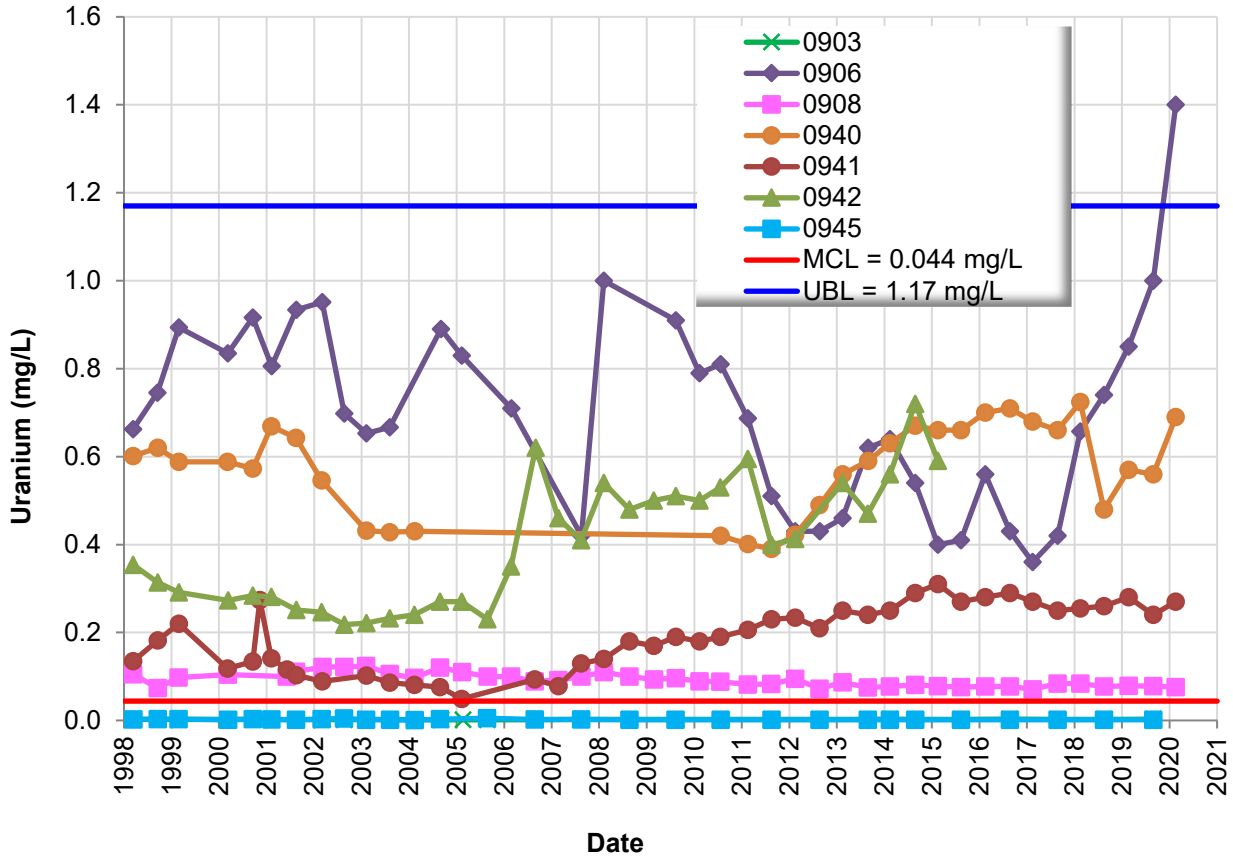

Figure 19-6. Uranium in Groundwater at the Tuba City, Arizona, Disposal Site

Sample results from the 2020 evaluative monitoring indicate that groundwater quality immediately downgradient of the former mill site (in wells 0906, 0908, 0940, 0941, and 0942) is still degraded relative to concentrations of molybdenum, nitrate, selenium, and uranium in background well 0945. Concentrations of all four analytes in distal downgradient well 0903 are comparable with those measured in background well 0945 and below corresponding UBLs, although nitrate concentrations continue to be slightly above the MCL. Analysis of water quality trending and progress of the groundwater remedy are reported in the site-specific annual groundwater report for the Tuba City site. No concerns about disposal cell performance are identified in the evaluative monitoring results.

19.8 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. No need for corrective action was identified.

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

40 CFR 192 Subpart A. U.S. Environmental Protection Agency, "Standards for the Control of Residual Radioactive Materials from Inactive Uranium Processing Sites," *Code of Federal Regulations.*

DOE (U.S. Department of Energy), 1984. *Cooperative Agreement Between the United States Department of Energy, the Navajo Tribe of Indians, and the Hopi Tribe of Indians*, DE-FC04-85AL26731, December.

DOE (U.S. Department of Energy), 1996. *Long-Term Surveillance Plan for the Tuba City, Arizona, Disposal Site,* DOE/AL/62350-182, Rev. 0, Office of Legacy Management, October.

DOE (U.S. Department of Energy), 2015. *Plan for Interim Treatment During Distillation Shutdown for the Tuba City, Arizona, Disposal Site*, LMS/TUB/S12431.

EPA (U.S. Environmental Protection Agency), 1989. *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities-Interim Final Guidance*, EPA/530-SW-89-026, Office of Solid Waste, Waste Management Division, Washington, D.C.

19.10 Photographs

Photograph Location Number	Azimuth	Photograph Description
PL-1	180	Sand Accumulation and Treated Woody Vegetation Along West Fence
PL-2	0	Animal Burrow
PL-3	335	Erosion Under Fence
PL-4	279	Faded Pictorial Perimeter Sign P24
PL-5	—	Site Marker SMK-1
PL-6	45	Survey/Boundary Monument SM/BM-3 with Sand Accumulation
PL-7	90	Disposal Cell Top and Side Slope
PL-8	250	Diversion Channel
PL-9	175	Inactive, Lined Evaporation Pond
PL-10	280	Exposed Geofabric on South Side of Inactive, Lined Evaporation Pond
PL-11	265	Offsite Trash and Debris Pile

Note:
— = Photograph taken vertically from above.

PL-1. Sand Accumulation and Treated Woody Vegetation Along West Fence

PL-2. Animal Burrow

PL-3. Erosion Under Fence

PL-4. Faded Pictorial Perimeter Sign P24

PL-5. Site Marker SMK-1

PL-6. Survey/Boundary Monument SM/BM-3 with Sand Accumulation

PL-7. Disposal Cell Top and Side Slope

PL-8. Diversion Channel

PL-9. Inactive, Lined Evaporation Pond

PL-10. Exposed Geofabric on South Side of Inactive, Lined Evaporation Pond

PL-11. Offsite Trash and Debris Pile