2.0 Burrell, Pennsylvania, Disposal Site

2.1 Compliance Summary

The Burrell, Pennsylvania, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Disposal Site (site) was inspected on October 21, 2020. No changes were observed on the disposal cell or in the associated drainage features. Inspectors identified minor maintenance needs but found no cause for a follow-up inspection.

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) conducts routine groundwater monitoring every 5 years as a best management practice to aid evaluation of the disposal cell's performance. The most recent routine groundwater sampling event occurred in November 2018, and results were reported in the 2018 site inspection report. However, due to an increase in molybdenum concentration in one of the downgradient wells, LM resampled all four downgradient wells on October 19, 2020 (ahead of the required 5-year sampling frequency), to observe whether the increase persists. When finalized, these nonroutine sampling results will be reported and published on the LM Geospatial Environmental Mapping System (GEMS) website (https://gems.lm.doe.gov/#site=BUR) and in the annual compliance report for 2021.

2.2 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 2000) in accordance with procedures established to comply with the requirements of the U.S. Nuclear Regulatory Commission (NRC) general license at Title 10 *Code of Federal Regulations* Section 40.27 (10 CFR 40.27). Table 2-1 lists these requirements.

Table 2-1. License Requirements for the Burrell, Pennsylvania, Disposal Site

Requirement	LTSP	This Report	10 CFR 40.27
Annual Inspection and Report	Sections 3.3 and 3.4	Section 2.4	(b)(3)
Follow-Up Inspections	Section 3.5	Section 2.5	(b)(4)
Maintenance	Section 3.6	Section 2.6	(b)(5)
Emergency Measures	Section 3.6	Section 2.7	(b)(5)
Environmental Monitoring	Section 3.7	Section 2.8	(b)(2)

2.3 Institutional Controls

The 72-acre site, identified by the property boundary shown in Figure 2-1, is owned by the United States and was accepted under the NRC general license in 1994. DOE is the licensee and, in accordance with requirements for UMTRCA Title I sites, is responsible for the custody and long-term care of the site. Institutional controls (ICs) at the site include federal ownership of the property, administrative controls, and the following physical ICs that are inspected annually: the disposal cell and associated drainage features, entrance gate and sign, security fence, perimeter signs, site marker, survey and boundary monuments, erosion control markers, quality control monuments, and wellhead protectors.

2.4 Inspection Results

The site, 1 mile east of Blairsville, Pennsylvania, was inspected on October 21, 2020. The inspection was conducted by K. Broberg and H. Swiger of the Legacy Management Support (LMS) contractor. C. Carpenter (LM site manager), D. Shearer (Pennsylvania Department of Environmental Protection), and T. Biller (site herbicide subcontractor Lawn RX) attended the inspection. The purposes of the inspection were to confirm the integrity of visible features at the site, identify changes in conditions that might affect conformance with the LTSP, and evaluate the need, if any, for maintenance or additional inspection and monitoring.

2.4.1 Site Surveillance Features

Figure 2-1 shows the locations of site features in black and gray font, including site surveillance features and inspection areas. Site features that are present but not required to be inspected are shown in italic font. Observations from previous inspections that are currently monitored are shown in blue text, and new observations identified during the 2020 annual inspection are shown in red. Inspection results and recommended maintenance activities associated with site surveillance features are included in the following subsections. Photographs to support specific observations are identified in the text and in Figure 2-1 by photograph location (PL) numbers. The photographs and photograph log are presented in Section 2.10.

2.4.1.1 Access Road, Entrance Gate, and Entrance Sign

Access to the site is from a road leading from Strangford Road, along a DOE right-of-way through a parcel of private property (Tract 201-E), and across DOE's leased crossing over Norfolk Southern Railroad tracks. Entrance to the site is through a locked gate in the east end of the security fence. Local residents have historically used the area along the DOE right-of-way for unpermitted dumping, hunting, target shooting, and riding all-terrain vehicles. Personnel associated with commercial interests use the road for access to the railroad tracks and several nearby natural gas wells. Because the DOE right-of-way cannot be controlled, NRC concurred that the entrance gate in the site security fence is the IC for site access rather than the gate across the access road. The entrance gate was locked and functional. The site entrance sign on the entrance gate was legible. No maintenance needs were identified.

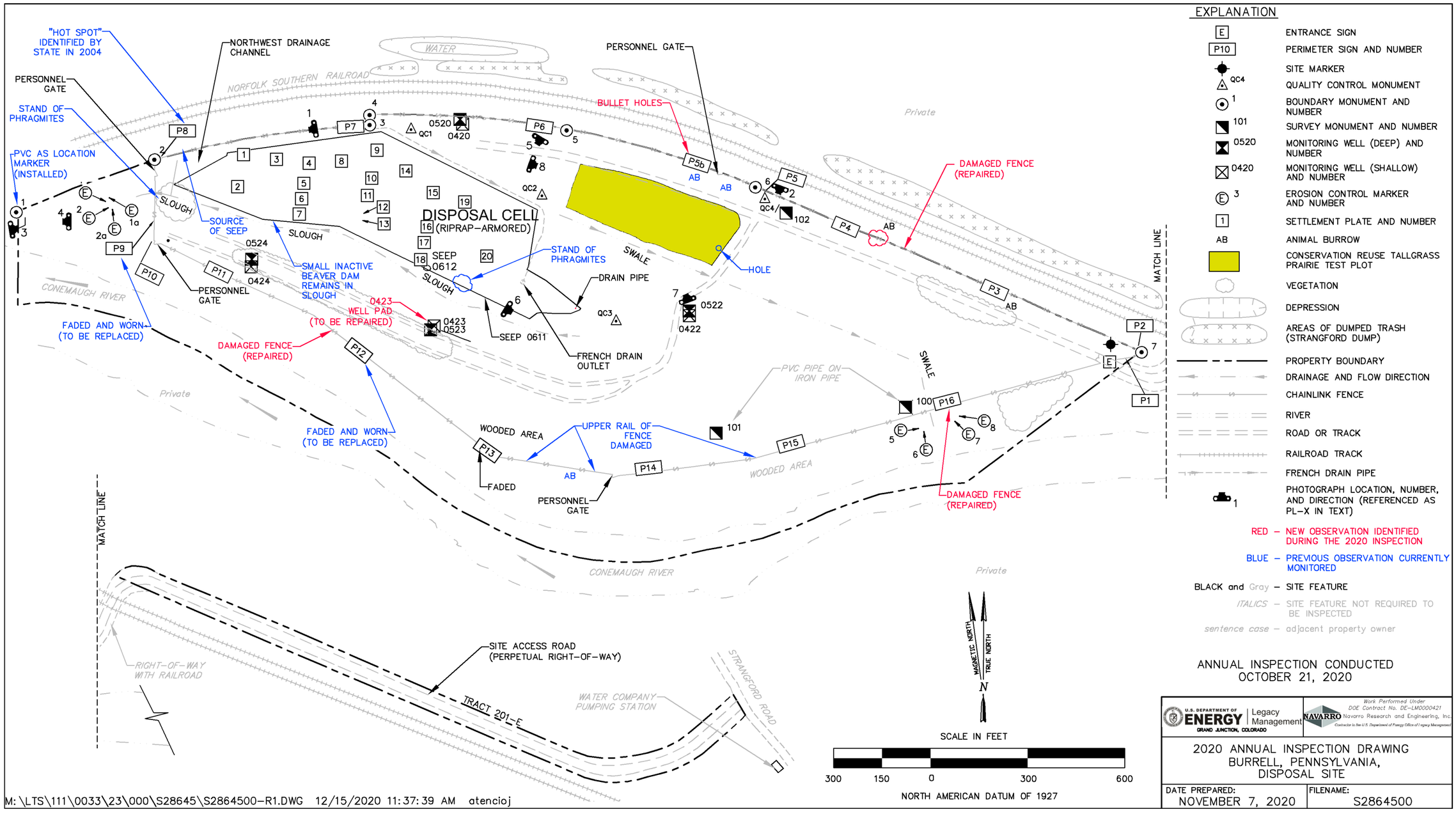

Figure 2-1. 2020 Annual Inspection Drawing for the Burrell, Pennsylvania, Disposal Site

This page intentionally left blank

2.4.1.2 Security Fence and Perimeter Signs

A chainlink security fence encloses the disposal cell and drainage features (PL-1). The site herbicide subcontractor keeps the fence line clear of vegetation, which should prolong the life of the security fence. Trees felled by strong storms in 2020 damaged the fence in two places. Fence repairs were made before the 2020 site inspection.

There are 16 perimeter signs attached to the outside of the security fence. All 16 perimeter signs were present. Perimeter sign P5b on the north fence has some bullet holes but is legible.

2.4.1.3 Site Marker

The site has one granite site marker just inside the main entrance gate. The concrete pad is cracked but remains functional. No maintenance needs were identified.

2.4.1.4 Survey and Boundary Monuments

The site has three survey monuments and seven boundary monuments. Survey monument SM-102 was noted as missing in the 2017 and 2018 inspections. Quality control monument QC4 was installed in 2019 as a replacement for survey monument SM-102 (PL-2).

In past inspections, boundary monument BM-1 was difficult to locate because it was buried by dirt. LM installed a 4-foot-tall, 4-inch-diameter PVC pipe around and over boundary monument BM-1 in 2020 to aid in locating the monument (PL-3). LM also cut through a downed tree to provide access across the footpath leading back to boundary monument BM-1 (PL-4). Boundary monument BM-2 was not located during this year's inspection. A metal detector will be used during the 2021 inspection to locate it. No new maintenance needs were identified.

2.4.1.5 Aerial Survey Quality Control Monuments

Four aerial survey quality control monuments, installed in 2019, were inspected during the 2020 annual inspection. No maintenance needs were identified.

2.4.1.6 Erosion Control Markers

The site has eight erosion control markers. No maintenance needs were identified.

2.4.1.7 Monitoring Wells

The site has eight monitoring wells that were last routinely sampled and inspected in November 2018. As a best management practice, concrete well pads were installed at five monitoring wells (0420, 0520, 0422, 0522, and 0523) during the October 2018 sampling event. Monitoring well 0423 already had a concrete well pad. Saturated ground prevented the installation of concrete well pads at monitoring wells 0424 and 0524 in 2018, but these will be installed in the future. All wellhead protectors that were observed during the annual inspection were locked and undamaged. During this year's inspection the well pad at well 0423 wobbled when pressure was applied to a corner of the pad. This condition will be further evaluated and corrected the next time the sampling crew is onsite. No other new maintenance needs were identified.

2.4.2 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 disposal cell, (2) the area adjacent to the disposal cell, (3) the site perimeter, and (4) the outlying area, including the access road that leads to the site. 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.

2.4.2.1 Disposal Cell

The disposal cell, completed in 1987, occupies 5 acres and is armored with riprap to control erosion and deter animal intrusion (PL-5). There was no evidence of erosion, settling, slumping, or any other modifying process that might affect the integrity of the disposal cell.

Control of vegetation (including woody vegetation) on the disposal cell is not required by the LTSP. A screening-level risk assessment conducted by DOE from 1996 to 1997 concluded that plant succession on the disposal cell does not present significant or credible risk to human health or the environment and, due to reduced hydraulic flux through the cover from evapotranspiration, may improve the long-term performance of the disposal cell. The LTSP was revised in 2000 to reflect these findings; at that time, NRC suggested that LM reevaluate the effects of vegetation on cover performance in 10 or 20 years (i.e., between 2010 and 2020) to confirm performance parameters and predictions. The assessment will revisit the issue of vegetation growth on the disposal cell cover to evaluate whether it remains protective of human health and the environment or interferes with the ability of inspectors to assess disposal cell cover stability. The 2017 inspection report (DOE 2018) noted that LM was planning to conduct a follow-up assessment in fiscal year 2019. LM delayed the assessment to further consult with NRC on the scope of the study. Currently, NRC and LM are working on joint research to analyze disposal cell cover performance and pedogenesis at other UMTRCA sites that could support development of the scope for a Burrell site study.

Although vegetation is allowed to grow on the disposal cell, noxious weeds and invasive plants are controlled on the disposal cell and the site through spraying and mowing. In 2008, a site Vegetation Management Plan (DOE 2008) was issued that included the control of noxious and invasive vegetation on the disposal cell cover to facilitate inspection activities. Vegetation management is effective at limiting the spread of noxious weeds. Other woody species continue to establish but are controlled. No other maintenance needs were identified.

2.4.2.2 Area Adjacent to the Disposal Cell

A French drain was installed parallel to the north slope of the disposal cell in 1998 to prevent the ponding of water next to the cell. The outlet for the French drain, on the south slope of the disposal cell, was not flowing during the inspection, and no outflow has ever been observed during inspections. Water was not ponded anywhere along the French drain, and no wetland vegetation was observed; these conditions indicate it is operating properly. Inspectors will continue to monitor the French drain area to verify that it continues to operate as designed.

A large tree fell in the slough south of the disposal cell in 2019. Given the way the tree fell and its location on a steep slope, it may not need to be removed. In 2020, inspectors observed that the downed tree is not interfering with drainage in the slough.

A small, inactive beaver dam remains in the slough south of the disposal cell. The site herbicide contractor indicated that the dam was inactive in 2020, as no evidence of recent activity was observed around the dam (e.g., animal tracks, new cuts). In its current state, it does not interfere with the flow of water enough to warrant action (PL-6). No maintenance needs were identified.

2.4.2.3 Site Perimeter

An active seep near the north security fence, about 60 feet east of perimeter sign P8 and west of the disposal cell, was not flowing during this year's inspection, but the area around the seep was moist. The seep does not pose a threat to the integrity of the disposal cell. Inspectors will continue to monitor this area. Conceivably, the seep could destabilize the nearby railroad embankment. The water for the seep along the fence line appears to be coming from the bluffs north of the railroad tracks. No other maintenance needs were identified.

2.4.2.4 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. No activities that could affect the long-term integrity of the site were observed.

North of the site, a dirt road parallels the railroad tracks and provides access to a long, narrow wooded area that has been used as an illegal dump. No new piles of trash were observed during the inspection. The dumping of trash is not a threat to the disposal site but indicates the overall level of activity near the disposal site and may be a predictor of vandalism. Inspectors will continue to note any dumping activity.

In 2004, a representative from the Pennsylvania Department of Environmental Protection showed inspectors a "hot spot" (an area having gamma radiation levels of 5 millirem per hour) in the rock ballast adjacent to the railroad tracks northeast of perimeter sign P8. A review of LM records confirmed that the area in question was addressed in a property completion report for the Uranium Mill Tailings Remedial Action Project. Supplemental standards have been applied to contamination beneath the tracks, because the benefit of removal does not justify the cost. LM communicated the results of a records search to the Commonwealth of Pennsylvania in late 2004. The hot spot was the subject of a follow-up discussion with Pennsylvania representatives in 2006. In October 2018, NRC personnel revisited the hot spot area and measured a gamma radiation level of 200 microrem per hour, which is considerably lower than the 2004 measurement. The area is marked on the site inspection map for future reference. The area is not on DOE property; the Commonwealth of Pennsylvania is the responsible authority.

2.5 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.

2.6 Maintenance

Minor maintenance needs identified by the inspectors during the 2019 annual inspection and completed in 2020 include the following:

- Installing 4-inch PVC pipe over boundary monument BM-1 for easier identification
- Removing a downed tree across the path leading to boundary monument BM-1

Perimeter signs P9 and P12 were identified for replacement in 2019 because they are faded. They were not replaced in 2020 but are being targeted for replacement in 2021.

Fence repairs in several places were made before the 2020 inspection. The wobbling well pad at monitoring well 0423 will be addressed the next time the sampling crew is onsite.

2.7 Emergency Measures

Emergency measures are actions LM will take in response to unusual damage or disruption that threatens or compromises site safety, security, or integrity in compliance with 10 CFR 40 Appendix A. No need for emergency measures was identified.

2.8 Environmental Monitoring

2.8.1 Groundwater Monitoring

In accordance with the LTSP, LM conducts routine groundwater monitoring every 5 years as a best management practice to aid evaluation of the disposal cell's performance. The most recent routine sampling event occurred in October 2018. The groundwater monitoring network consists of four sets of monitoring wells (eight monitoring wells total) and two seeps (Table 2-2 and Figure 2-2). Each set of wells consists of a shallow well completed in unconsolidated fill and alluvium (400-series wells) and a deeper well completed in the bedrock of the Casselman Formation (500-series wells). Groundwater is sampled for standard water quality indicators and four analytes: lead, molybdenum, selenium, and uranium. The maximum concentration limits (MCLs) for these four analytes in groundwater (40 CFR 192 Table 1 Subpart A) are listed in Table 2-3.

Table 2-2. Groundwater Monitoring Network for the Burrell, Pennsylvania, Disposal Site

Monitoring Well or Seep	Hydrologic Relationship
0420 and 0520	Upgradient or background monitoring well
0422 and 0522	Cross-gradient monitoring well
0423 and 0523	Downgradient monitoring well
0424 and 0524	Downgradient monitoring well
0611 and 0612	Seep

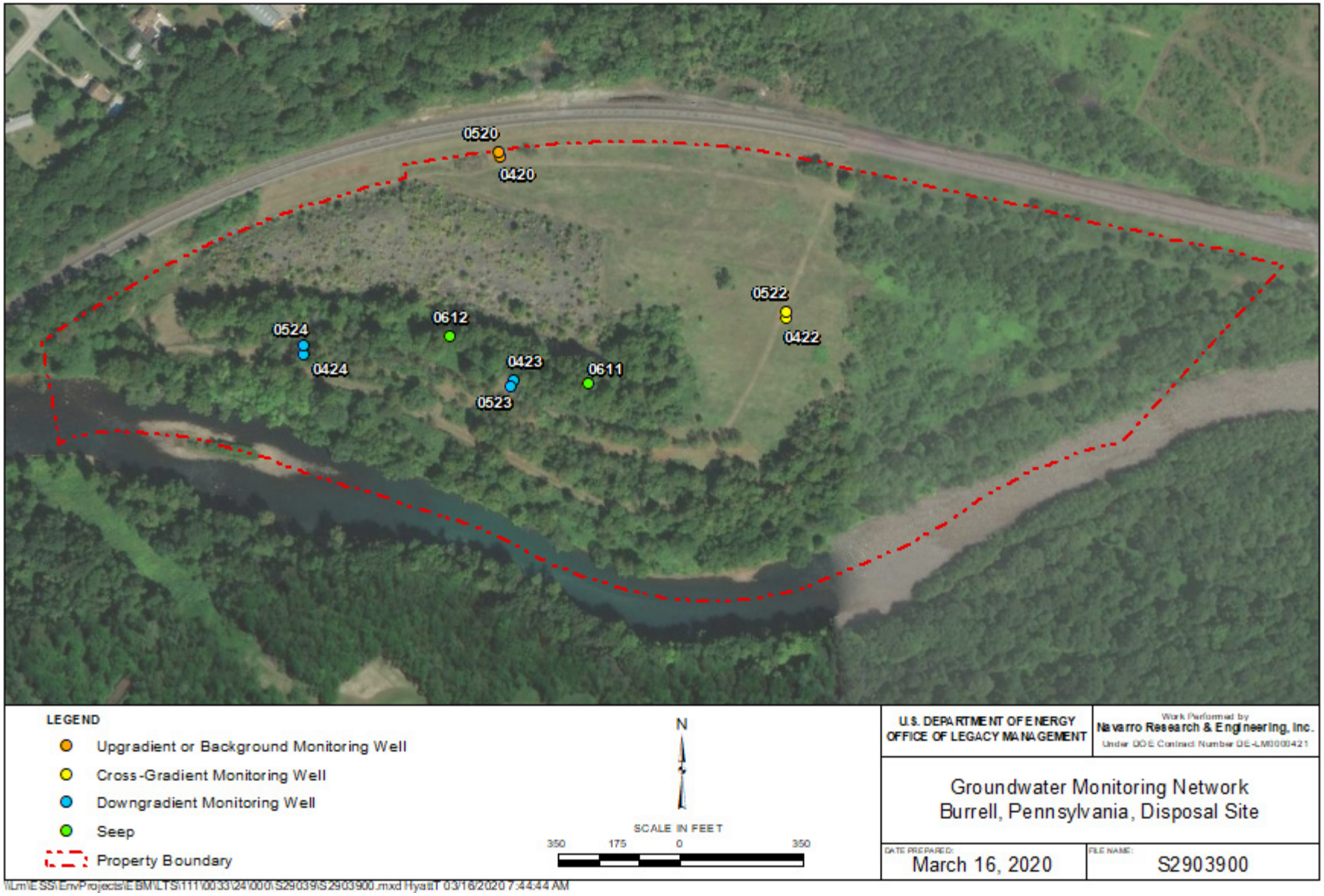

Figure 2-2. Groundwater Monitoring Network for the Burrell, Pennsylvania, Disposal Site

Table 2-3. Maximum Concentration Limits for Groundwater at the Burrell, Pennsylvania, Disposal Site

Constituent	MCL[a] (mg/L)
Lead	0.05
Molybdenum	0.1
Selenium	0.01
Uranium	0.044

Note:
[a] MCLs as listed in 40 CFR 192 Table 1 Subpart A.

Abbreviation:
mg/L = milligrams per liter

The November 2018 routine groundwater sampling results were reported in the *2018 Annual Site Inspection and Monitoring Report for Uranium Mill Tailings Radiation Control Act Title I Disposal Sites* (DOE 2019). The results show that four analytes monitored (i.e., lead, molybdenum, selenium, and uranium) remain below MCLs found in 40 CFR 192 Table 1 Subpart A, but all four analytes increased in concentration in one or both downgradient monitoring wells. The increases for three of the target analytes (lead, selenium, and uranium) regarding their respective MCLs were considered insignificant. Should the increasing trend continue, the concentrations would not exceed the MCL for some time; this provides time for LM to investigate the cause before concentrations reach the MCL and to determine if the increase is the result of cell performance. An increase for molybdenum in one of the downgradient wells could be considered potentially significant in that it may exceed the MCL before the next routine sampling event in 2023. To be conservative, LM resampled the four downgradient wells on October 19, 2020 for molybdenum (3 years ahead of the required 5-year sampling frequency), to confirm if the increase persists. Because the sampling crew was there, LM also sampled for lead, selenium, and uranium. These nonroutine sampling results will be reported and published on the GEMS website (http://gems.lm.doe.gov/#site=BUR) and in the annual compliance report for 2021.

2.8.2 Vegetation Management

In accordance with the Vegetation Management Plan, mowing and spot herbicide application continues. Vegetation management activities include ensuring the fence line and access paths remain clear of Japanese knotweed (an invasive species), applying herbicides where needed, and regularly mowing open areas of the site. These activities have been successful in controlling Pennsylvania-listed noxious weeds onsite. Pennsylvania-listed noxious weeds purple loosestrife, poison hemlock, and multiflora rose were not observed in 2020, except for sporadic resprouts following mowing. Additional invasive species that were identified in 2019, including teasel and tree of heaven, have been addressed as well. Several other invasive plants, including Japanese knotweed and common reed, persist. A stand of common reed that was identified during previous inspections remains at the west end of the disposal cell and has spread along the southern edge of the disposal cell. This stand is very difficult to access because of standing water and its location adjacent to the perimeter fence. Wooded areas remained heavily vegetated with Japanese knotweed. Privet is an invasive shrub that was observed in several areas. Pursuant to the Vegetation Management Plan, access paths to monitoring wells and the fence line have been effectively maintained.

A conservation reuse initiative is being pursued at the site that involves the establishment of a tallgrass prairie. In 2017, a 2-acre plot in the mowed field east of the disposal cell was staked out as a test plot. In October 2018, that area was prepped and seeded. Maintenance through 2019 included mowing that helped prevent the establishment of unwanted vegetation. Following the 2019 inspection, field personnel broadcast Indiangrass to augment the 2018 seeding effort. The prairie was not mowed in 2020.

Several seeded wildflowers were observed during the 2020 inspection, and the prairie plot appears to be progressing as planned (PL-7). Prairie grasses and wildflowers are long-lived perennials that take their first couple of growing seasons to establish roots. A diverse flowering community is not expected for several years.

The prairie was surveyed during the 2020 inspection, and all but two plots had native grasses or forbs present from the seed mix (PL-8). Grasses found in the area included switchgrass and little bluestem. A wide variety of forbs were found: wild bergamot, gray-headed coneflower, purple coneflower, sawtooth sunflower, prairie dock, goldenrod species, and asters. Though the forbs were well mixed across the area, some clumps of single species are already forming. The forbs in some areas filled as much as 50% of a meter-square area, while the average 1-meter plot had about 15% coverage. Many of the late-flowering aster, sunflower, and goldenrod species still had flowers. The coneflowers and bergamot heads were dispersing seed. The native species are doing well in their second year.

In 2021, the cool-season grasses and clovers in the prairie will need to be controlled to aid in the establishment of the native grasses and forbs. It is recommended that the prairie be mowed while flowers are on the cool-season grasses and clovers and before they set seed. Mowing the last 2 weeks of May or the first week of June should prevent the cool-season grasses from seeding out and will open the canopy for the native species when they are beginning to leaf out.

2.9 References

10 CFR 40 Appendix A. U.S. Nuclear Regulatory Commission, "Criteria Relating to the Operation of Uranium Mills and the Disposition of Tailings or Wastes Produced by the Extraction or Concentration of Source Material from Ores Processed Primarily for Their Source Material Content," *Code of Federal Regulations*.

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

DOE (U.S. Department of Energy), 2000. *Long-Term Surveillance Plan for the U.S. Department of Energy Burrell Vicinity Property, Blairsville, Pennsylvania,* GJO-2002-331-TAR, April.

DOE (U.S. Department of Energy), 2008. *Burrell, Pennsylvania, Site Vegetation Management Plan*, DOE-LM/1566-2008, January.

DOE (U.S. Department of Energy), 2018. *2017 Annual Site Inspection and Monitoring Report for Uranium Mill Tailings Radiation Control Act Title I Disposal Sites,* LMS/S17252, March.

DOE (U.S. Department of Energy), 2019. *2018 Annual Site Inspection and Monitoring Report for Uranium Mill Tailings Radiation Control Act Title I Disposal Sites,* LMS/S22053, March.

2.10 Photographs

Photograph Location Number	Azimuth	Photograph Description
PL-1	260	Fence Line Along Northwest Side of Disposal Cell
PL-2	200	Aerial Survey Quality Control Monument QC4 and Survey Monument SM-102
PL-3	285	New Pipe Installed at Boundary Monument BM1
PL-4	270	Cleared Tree on Path to Boundary Monument BM1
PL-5	210	Northeast Side of Disposal Cell
PL-6	120	Upper Reach of Slough
PL-7	340	South View of Conservation Reuse Tallgrass Prairie Test Plot
PL-8	110	Conservation Reuse Tallgrass Prairie Test Plot

PL-1. Fence Line along Northwest Side of Disposal Cell

PL-2. Aerial Survey Quality Control Monument QC4 and Survey Monument SM-102

PL-3. New Pipe Installed at Boundary Monument BM1

PL-4. Cleared Tree on Path to Boundary Monument BM1

PL-5. Northeast Side of Disposal Cell

PL-6. Upper Reach of Slough

PL-7. South View of Conservation Reuse Tallgrass Prairie Test Plot

PL-8. Conservation Reuse Tallgrass Prairie Test Plot