

3.0 Canonsburg, Pennsylvania, Disposal Site

3.1 Compliance Summary

The Canonsburg, Pennsylvania, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Disposal Site (site) was inspected on October 20, 2020. No changes were observed on the disposal cell or in the associated drainage features. Inspectors identified a few minor maintenance needs.

Engineered repairs were completed to the riprap-armored embankment of Chartiers Creek north of the disposal cell in 2019. A riparian forest buffer was also planted above and along the embankment as part of that project. Disturbed areas were seeded with a pollinator-friendly native grass and wildflower mix. This riparian forest buffer corridor will work with the engineered riprap embankment to further stabilize the area against future stream flooding events and to reduce erosion upgradient of the riprap embankment. No concerns with the riprap embankment were noted during the inspection. Plantings in the riparian forest buffer experienced a 1-year survival rate of 97%. The main challenge ahead for the young plants is the local deer community.

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) conducts groundwater and surface water monitoring every 5 years to provide data to document that the site remains protective of human health, safety, and the environment. The most recent sampling event occurred in October 2018. All sampling results were below the site-specific alternate concentration limit (ACL) for uranium in groundwater and the point-of-exposure (POE) limit in surface water.

3.2 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 2013) 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 3-1 lists these requirements.

Table 3-1. License Requirements for the Canonsburg, Pennsylvania, Disposal Site

Requirement	LTSP	This Report	10 CFR 40.27
Annual Inspection and Report	Section 3.3	Section 3.4	(b)(3)
Follow-Up Inspections	Section 3.4	Section 3.5	(b)(4)
Maintenance	Section 3.5	Section 3.6	(b)(5)
Environmental Monitoring	Section 3.7	Section 3.7	(b)(2)
Emergency Response	Section 3.6	Section 3.7.3	(b)(5)

3.3 Institutional Controls

The 34.2-acre site, identified by the property boundary shown in Figure 3-1, is owned by the United States and was accepted under the NRC general license in 1996. 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 gates and sign, security fence, perimeter signs, site markers, survey and boundary monuments, erosion control markers, quality control markers, and wellhead protectors.

In addition to the area within the property boundary, separate ICs are applied to Area C and the east portion of Tract 117, both of which are southeast of Strabane Avenue. Area C (3.1 acres) was sold and transferred in 2005, and the east portion of Tract 117 (0.431 acre) was sold and transferred in 2009 to the same private owner. DOE and the Commonwealth of Pennsylvania complied with restrictions on parcel transfers stipulated in UMTRCA and in the cooperative agreement between DOE and the Commonwealth. The deeds for Area C and Tract 117 establish restrictions to limit excavation, prohibit disturbance of the streambank, maintain access for monitoring and streambank maintenance, and prevent the areas from being used for residential purposes. Use of groundwater is unrestricted. Adherence to these ICs is evaluated during the annual inspection. There was no evidence that any of the ICs were violated.

3.4 Inspection Results

The site, in Canonsburg, Pennsylvania, was inspected on October 20, 2020. The inspection was conducted by K. Broberg and H. Swiger of the Legacy Management Support contractor. C. Carpenter (LM site manager), D. Shearer (Pennsylvania Department of Environmental Protection), and T. Biller (site herbicide contractor Lawn RX) attended the inspection. The mayor of Canonsburg stopped by briefly about halfway through the inspection; other commitments that day kept him from attending the entire inspection. The purposes of the inspection were to confirm the integrity of visible features at the site, identify changes in conditions that may affect conformance with the LTSP, and evaluate the need, if any, for maintenance or additional inspection and monitoring.

3.4.1 Site Surveillance Features

Figure 3-1 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 3-1 by photograph location (PL) numbers. The photographs and photograph log are presented in Section 3.10.

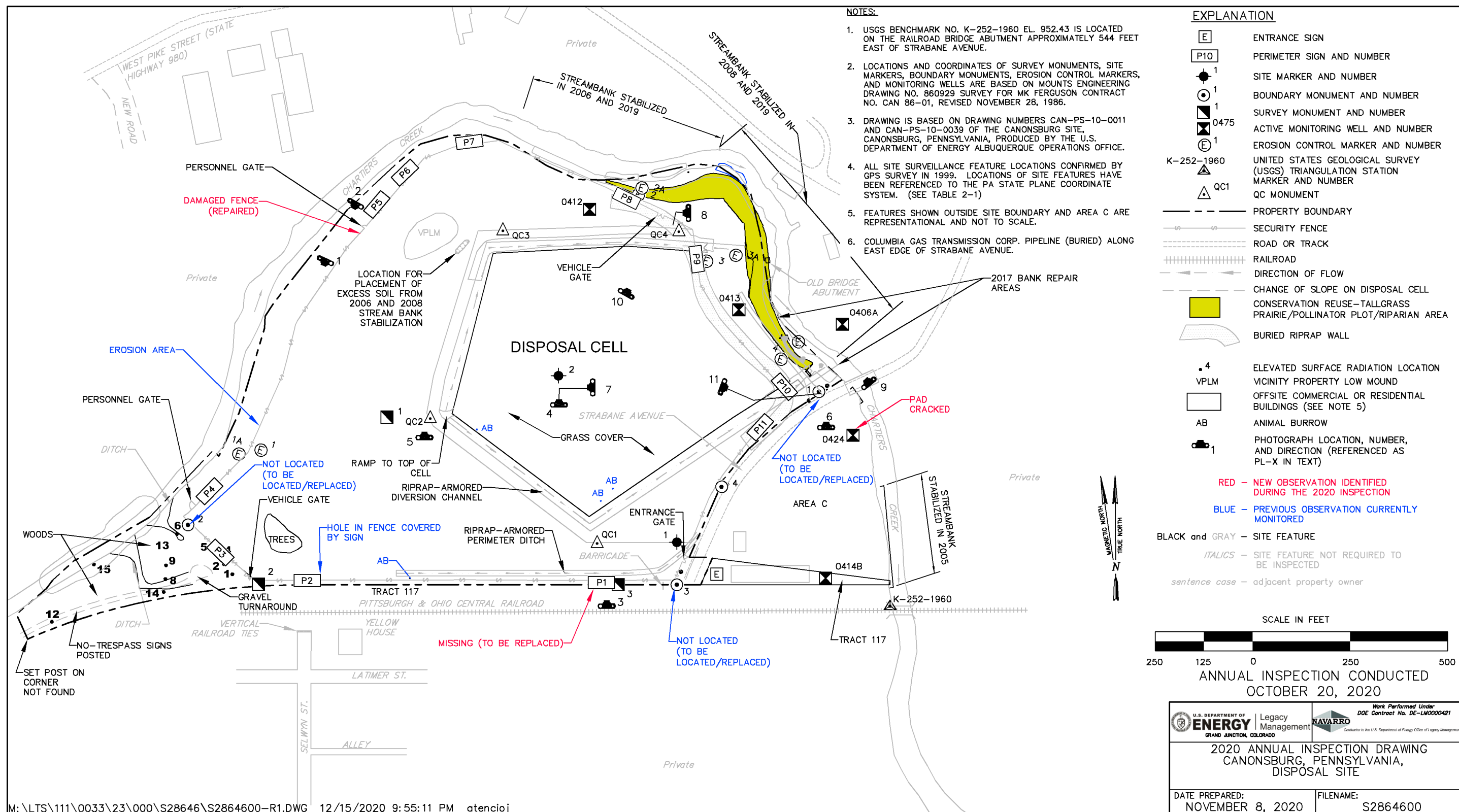


Figure 3-1. 2020 Annual Inspection Drawing for the Canonsburg, Pennsylvania, Disposal Site

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3.4.1.1 Site Access, Entrance Gates, and Entrance Sign

Main access to the site is from Strabane Avenue. There are three vehicle gates: the main entrance gate at the southeast corner of the site along Strabane Avenue, a vehicle access gate at the southwest corner of the site, and a vehicle access gate north of the disposal cell between perimeter signs P8 and P9. There are also two personnel access gates. All gates were locked and functional with the exception of the southwest personnel gate. The lock on the southwest personnel gate was in place but not fully clasped. Inspectors secured the lock on this gate. The entrance sign is posted on the main entrance gate. No maintenance needs were identified.

3.4.1.2 Security Fence and Perimeter Signs

A chainlink security fence encloses most of the site. A vegetation-free buffer zone is maintained around the entire security fence (PL-1). An area of erosion under the west security fence remains. The area appears to be stable and has not grown in several years. For added security, slats were installed in 2016 across the area beneath the fence to help fill in the gap.

The security fence was damaged in late 2019. A large tree fell on the fence and damaged both the fence and the northwest personnel gate. Repairs were made before the 2020 inspection (PL-2).

There are 11 perimeter signs attached to the security fence. All but one of the perimeter signs were accounted for and legible in 2020. The fence fabric around perimeter sign P1 was cut, and the sign was removed (PL-3). The sign will be replaced. No other maintenance needs were identified.

3.4.1.3 Site Markers

The site has two granite site markers. Site marker SMK-1 is just inside the main entrance gate, and site marker SMK-2 is on the top slope of the disposal cell (PL-4). No maintenance needs were identified.

3.4.1.4 Survey, Boundary Monuments

The site has three survey monuments and four boundary monuments. Boundary monuments BM-1 and BM-2 (noted as missing since the 2017 inspection) were not located. Boundary monument BM-3 was not located in 2019 or in 2020. Boundary monuments BM-1 and BM-2 are scheduled to be replaced in FY 2021. Boundary monument BM-3 will also be replaced if it cannot be located by the survey crew. Vertical location markers may be installed to mark their location to make them easier to find. No other maintenance needs were identified.

3.4.1.5 Aerial Survey Quality Control Monuments

Four aerial survey quality control monuments, installed in 2019, were inspected during the 2020 annual inspection (PL-5). No maintenance needs were identified.

3.4.1.6 Erosion Control Markers

The site has four pairs of erosion control markers along the bank of Chartiers Creek. No maintenance needs were identified.

3.4.1.7 Monitoring Wells

The site has five groundwater monitoring wells that are inspected on the inside when they are sampled. Monitoring wells were last sampled and inspected in October 2018. During the 2020 inspection, the outside of the wells were inspected, and the wellhead protectors were undamaged and locked. There is a crack in the well pad of monitoring well 0424 (PL-6). The pad remains serviceable. It will be evaluated for replacement or repair during the next regularly scheduled sampling event. No other maintenance needs were identified.

3.4.2 Inspection Areas

In accordance with the LTSP, the site is divided into five 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 diversion channels and perimeter ditches, (4) the site perimeter and security fence, and (5) the outlying areas. 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.

3.4.2.1 Disposal Cell

The disposal cell, completed in 1985, occupies 6.8 acres and is covered in grass (PL-7). There was no evidence of erosion, settling, slumping, or other modifying processes that might affect the integrity of the disposal cell. Animals burrow on the disposal cell cover, but such burrows should not pose a risk to disposal cell integrity or public health because the buried tailings are overlain by a 36-inch-thick clay layer (radon barrier), an 18-inch-thick biointrusion rock layer, and a 12-inch-thick topsoil layer. Biointrusion down to or through the radon barrier is unlikely. Inspectors will continue to monitor the location and significance of burrows. No new significant burrows were noted on the disposal cell during the inspection. No maintenance needs were identified.

3.4.2.2 Area Adjacent to the Disposal Cell

The site consists primarily of mowed grasses within the security fence and on the disposal cell cover, with seeded fescues and crown vetch being prevalent. The spray-and-mow approach to vegetation management at the site continues to be effective. Noxious weeds within the security fence area are limited to resprouting seedlings that were observed in portions of mowed areas.

3.4.2.3 Diversion Channels and Perimeter Ditches

There was no evidence of rock deterioration or woody vegetation in the diversion channels and perimeter ditches (PL-8). Periodic physical removal and spot herbicide applications have been effective at reducing woody vegetation and will continue to be conducted as needed.

3.4.2.4 Site Perimeter

In 2007, a radiological survey was conducted on a small parcel of land southwest of the security fence to evaluate its release for industrial reuse. The survey identified isolated radium-226 contamination in the soil in excess of the established average criterion for the site. As a result, the release criteria were not satisfied for the entire parcel, and it was removed as a reuse candidate. Under current property usage, these radiological conditions do not pose a risk to personnel, and no corrective measures are required. LM controls land use through ownership. Inspectors will continue to check the area for evidence of trespassing.

During the 2017 annual inspection, an abandoned campsite was observed on the southwest corner of the site. The site and associated trash were removed in December 2017, and no-trespassing signs were posted. No evidence of recent trespassing was observed during the 2020 annual inspection.

A local plastics company has cleared some of DOE's property north of the railroad tracks and spread gravel to create a turnaround for its trucks. No-trespassing signs are now posted around this area to prevent unauthorized expansion of the turnaround. An access agreement was established in 2017 with the plastics company for continued use of the turnaround. No changes to the size of the turnaround were observed in 2020. No maintenance needs were identified.

3.4.2.5 Outlying Area

Chartiers Creek Bank: Chartiers Creek is an active, meandering waterway west, north, and east of the disposal site. Bedrock outcrops and mature trees on the streambank west of the site indicate that the bank of that creek is stable.

Between 2001 and 2008, several streambank-stabilization projects were conducted north and east of the site. The projects consisted of installing riprap armoring along the streambanks. Years of flow and heavy flow events in Chartiers Creek in late 2017 and early 2018 damaged those riprap installations. In late summer 2019, the entire length of the riprap embankment along Chartiers Creek north of the disposal cell (approximately 1200 linear feet) was repaired during low streamflow conditions. The work consisted of minor grading, replacing geotextile filter fabric, and importing and placing 2-feet-thick R6 riprap slopes (PL-9).

A conservation reuse initiative was included as part of the streambank stabilization repair project. A riparian forest buffer was planted following the riprap slope repair; it consisted of 525 new native trees and shrubs within a 1.7-acre corridor adjacent to Chartiers Creek. Disturbed areas were then seeded with a pollinator-friendly native grass and wildflower mix. This corridor will further protect the Chartiers Creek streambank and help prevent erosion above the riprap embankment. The riparian forest buffer is also recognized as a means to improve stream quality. This effort is part of the Commonwealth of Pennsylvania's goal to establish 95,000 acres of riparian forest buffer by 2025. The Pennsylvania Department of Conservation and Natural Resources was notified of the project. No concerns with the riprap embankment were noted during the inspection. Plantings in the riparian forest buffer experienced a 1-year survival rate of 97%. The general long-term health of the young plants in the riparian buffer area is tenuous due to browsing deer. A plan to better protect the plantings from deer needs to be developed. The

current use of deer tubes held up by wooden stakes is not adequate to protect the trees from browse or rub (PL-10).

Additional control of invasive vegetation on Area C between Strabane Avenue and monitoring well 0424A is recommended to enhance the health of the riparian corridor being established along Chartiers Creek north of the disposal cell. The current vegetation management approach does not address the spread of invasive vegetation from Area C to the recently planted riparian buffer area. The site vegetation management plan includes herbicide application to control invasive weeds around monitoring well 0424 (PL-11). Additional management, to include spraying and mowing in the area between the 0424 wellhead and Strabane Avenue, will be implemented to further address this invasive vegetation development.

Area C and Tract 117: Area C and Tract 117 form a triangular parcel of property east of the site bounded by Strabane Avenue, Chartiers Creek, and the Pittsburgh and Ohio Central Railroad. Area C and Tract 117 are included in the annual inspection to ensure compliance with ICs put in place to address land use and site access requirements. There was no evidence that any of the ICs in place for Area C and Tract 117 had been violated.

Strabane Avenue: The maintenance subcontractor, Lawn RX, periodically removes trash found on and adjacent to the site to maintain the site's appearance. Inspectors also pick up trash as necessary. Inspectors observed that Strabane Avenue, next to the site, was relatively clear of trash. No other maintenance needs were identified.

3.5 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 have substantially changed. No need for a follow-up inspection was identified.

3.6 Maintenance

Inspectors documented minor maintenance that was performed before the 2020 inspection. Maintenance included:

- Repairing the security fence and damaged personnel gate.

Inspectors documented minor maintenance needs that will be addressed in 2021, including:

- Locating and replacing (if necessary) boundary monuments BM-1, BM-2, and BM-3.
- Replacing perimeter sign P1.

3.7 Environmental Monitoring

3.7.1 Groundwater Monitoring

In accordance with the LTSP, LM conducts groundwater monitoring every 5 years to (1) evaluate downgradient contaminant trends in groundwater in the shallow, unconsolidated materials and in surface water; (2) demonstrate that concentrations of uranium at

point-of-compliance (POC) wells are decreasing as predicted and that the system remains in compliance with the *Ground Water Compliance Action Plan for the Canonsburg, Pennsylvania, UMTRA Project Site* (DOE 2000); and (3) ensure that remedial actions at the disposal site and Area C continue to protect human health, safety, and the environment. The most recent sampling event occurred in October 2018.

The groundwater monitoring network consists of five monitoring wells, including three POC wells and two best management practice wells (Table 3-2 and Figure 3-2). All monitoring wells are completed in the uppermost aquifer (shallow, unconsolidated materials). Groundwater is sampled and analyzed for the one constituent of concern, uranium. The ACL is 1 milligram per liter (mg/L) at the POC wells. With the exception of monitoring wells 0412 and 0413, uranium concentrations in 2018 were also below the UMTRCA maximum concentration limit (MCL) of 0.044 mg/L.

Table 3-2. Groundwater Monitoring Network for the Canonsburg, Pennsylvania, Disposal Site

Monitoring Well	Hydrologic Relationship	Groundwater Monitoring Purpose
0406A	Downgradient	Best management practice
0412	Downgradient	POC
0413	Downgradient	POC
0414B	Cross gradient	POC
0424	Downgradient	Best management practice

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=CAN>). Additionally, the *2018 Annual Site Inspection and Monitoring Report for Uranium Mill Tailings Radiation Control Act Title I Disposal Sites* (DOE 2019) presents the comprehensive monitoring results for 2018.

3.7.2 Surface Water Monitoring

In accordance with the LTSP, LM also conducts surface water monitoring every 5 years. The most recent sampling event occurred in October 2018. Uranium concentrations in surface water sampled in 2018 were below the established ACL of 0.01 mg/L.

One surface location, 0602, is the POE for Chartiers Creek and is sampled and analyzed for uranium. In 2018, the uranium concentration from location 0602 had a concentration of 0.00096 mg/L, significantly below the MCL.

The *2018 Annual Site Inspection and Monitoring Report for Uranium Mill Tailings Radiation Control Act Title I Disposal Sites* (DOE 2019) presents the comprehensive monitoring results for 2018.



Figure 3-2. Groundwater and Surface Water Monitoring Network for the Canonsburg, Pennsylvania, Disposal Site

3.7.3 Vegetation Management

Vegetation management activities continue to be conducted at the site in accordance with the LTSP. They include spot-treating tree of heaven (an invasive species), physical removal, spot-application of herbicides to target woody vegetation in diversion channels and perimeter ditches, and the spray-and-mow approach. These activities are mostly successful. Noxious weeds within the fenced area are limited to resprouting seedlings, which were observed in portions of mowed areas. No changes to the current vegetation management approach are recommended, other than around and in the riparian buffer area discussed earlier.

3.8 Emergency Response

Emergency responses are the 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 Criterion 12. No need for emergency response was identified.

3.9 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*.

DOE (U.S. Department of Energy), 2013. *Long-Term Surveillance Plan for the U.S. Department of Energy Canonsburg Uranium Mill Tailings Disposal Site, Canonsburg, Pennsylvania*, LMS/CAN/S00404, 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.

DOE (U.S. Department of Energy), 2000. *Ground Water Compliance Action Plan for the Canonsburg, Pennsylvania, UMTRA Project Site*, LMS/U0035901, February.

3.10 Photographs

Photograph Location Number	Azimuth	Photograph Description
PL-1	205	West Fence Line
PL-2	210	Repaired Fence Line
PL-3	0	Disposal Cell with Missing Perimeter Sign P1
PL-4	0	Site Marker SMK-2
PL-5	—	Quality Control Monument QC2
PL-6	0	Monitoring Well 0424
PL-7	270	Disposal Cell Top Slope
PL-8	270	Riprap Diversion Ditch Outlet
PL-9	320	Riprap Embankment
PL-10	30	Deer Tubes in the Riparian Forest Buffer Area
PL-11	110	Effective Invasive Weed Treatment Near Monitoring Well 0424 (not pictured)

Note:

— = Photograph taken vertically from above.



PL-1. West Fence Line



PL-2. Repaired Fence Line



PL-3. Disposal Cell with Missing Perimeter Sign P1



PL-4. Site Marker SMK-2



PL-5. Quality Control Monument QC2



PL-6. Monitoring Well 0424



PL-7. Disposal Cell Top Slope



PL-8. Riprap Diversion Ditch Outlet



PL-9. Riprap Embankment



PL-10. Deer Tubes in the Riparian Forest Buffer Area



PL-11. Effective Invasive Weed Treatment Near Monitoring Well 0424 (not pictured)