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 11, 2018. No changes were observed on the disposal cell or in the associated drainage features. Inspectors identified several minor maintenance needs.

A follow-up inspection was conducted on April 5, 2018, by subject matter experts to evaluate additional erosion along the stream bank identified during the 2017 annual inspection. Repairs to the riprap along the stream bank are required to address the additional erosion and have been scheduled for late summer 2019 when stream flow is seasonally low. Another follow-up inspection by subject matter experts will be conducted in spring 2019 to verify that planned streambank repairs remain adequate.

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 uranium site-specific alternate concentration limit (ACL) in groundwater and 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) and in procedures LM established to comply with requirements of the U.S. Nuclear Regulatory Commission general license at Title 10 *Code of Federal Regulations* Section 40.27 (10 CFR 40.27). Table 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 3.8	(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 general license in 2008. 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, and wellhead protectors.

In addition to the area within the property boundary, separate ICs are applied to Area C and Tract 117, which are southeast of Strabane Avenue. Area C (3.1 acres) was sold and transferred in 2005, and 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 deed for Area C and Tract 117 establishes restrictions to limit excavation, prohibits the disturbance of the stream bank, maintains access for monitoring and stream bank maintenance, and prevents 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, located in Canonsburg, Pennsylvania, was inspected on October 11, 2018. The inspection was conducted by K. Broberg and H. Swiger of the Legacy Management Support (LMS) contractor. C. Carpenter (LM site manager), R. Powell, and B. Deboer (NRC) and T. Biller (site herbicide contractor 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 may affect conformance with the LTSP, and determine 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, including site surveillance features and inspection areas. Site features that are present but not required to be inspected are shown in italic font. Observations from previous inspections that are currently monitored are shown in blue text, and new observations identified during the 2018 annual inspection are shown in red. Inspection results and recommended maintenance activities associated with site surveillance features are included in the following subsections. Photographs to support specific observations are identified in the text and in Figure 3-1 by photograph location (PL) numbers. The photographs and photograph log are presented in Section 3.10.

3.4.1.1 Site Access, Entrance Gates, and Entrance Sign

Access to the site is from Strabane Avenue. There are two vehicle gates: an entrance gate at the southeast corner of the site along Strabane Avenue (the main entrance gate) and a vehicle access gate north of the disposal cell between perimeter signs P8 and P9. There are also three personnel access gates. All gates were locked and functional. The entrance sign is posted on the main entrance gate. No maintenance needs were identified.

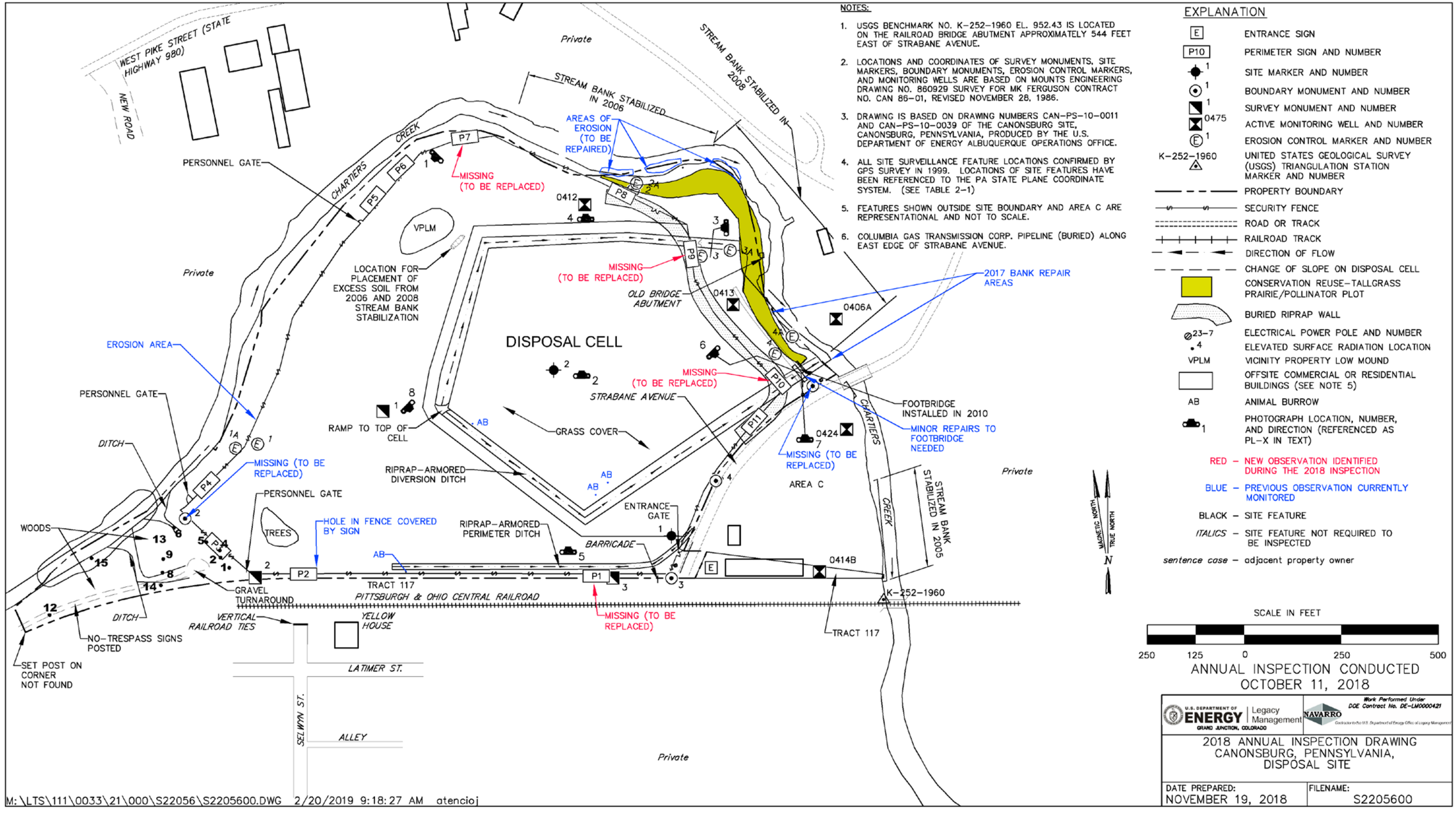

Figure 3-1. 2018 Annual Inspection Drawing for the Canonsburg, Pennsylvania, Disposal Site

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3.4.1.2 Security Fence and Perimeter Signs

A chain-link 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.

There are 11 perimeter signs attached to the security fence. Perimeter signs P1, P7, P9, and P10 were missing and will be replaced in 2019. 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-2). No maintenance needs were identified.

3.4.1.4 Survey and Boundary Monuments

The site has three survey monuments and four boundary monuments. Boundary monuments BM-1 and BM-2 (noted missing during the 2017 inspection) were not located and are scheduled to be replaced in 2019. No other maintenance needs were identified.

3.4.1.5 Erosion Control Markers

The site has four pairs of erosion control markers along the bank of Chartiers Creek (PL-3). No maintenance needs were identified.

3.4.1.6 Monitoring Wells

The site has five groundwater monitoring wells that are inspected when they are sampled (PL-4). Monitoring wells were sampled and inspected in October 2018. All wellhead protectors that were observed during the inspection were undamaged and locked. No maintenance needs were identified.

An off-property well (monitoring well 406A) was converted to a flush-mount completion in October 2018. The conversion resulted from a request by the property owner to have the well removed from his property. The well is located in a parking lot and has interfered with traffic. In order to retain this asset, LM proposed converting the well to a flush-mount completion. The property owner approved of this approach.

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-5). 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 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 the 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 present across the site. 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.

A small pedestrian bridge was installed northeast of the disposal cell in 2010 (PL-6). Minor repairs to the bridge are needed. A loose vertical handrail support was temporarily repaired in 2017 but requires a more permanent fix (PL-7), and the west end of the south handrail is beginning to rot. These repairs will be made at a later date pending budget and schedule. No other maintenance needs were identified.

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. No maintenance needs were identified.

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 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 was removed in December 2017 and no-trespassing signs in the area replaced in October 2018. No evidence of recent trespassing was observed during the 2018 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 posted around this area so the turnaround area will not become any larger. 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 2018. 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 stream bank west of the site indicate that the bank of the creek west of the site is stable. Between 2001 and 2008, several stabilization projects were conducted north and east of the site to stabilize the stream bank. The projects consisted of installing riprap armoring along the stream banks. Vegetation growth on the riprap-armored southern bank of Chartiers Creek is being controlled so visual inspections of riprap integrity can be performed. Age and recent heavy flow events in Chartiers Creek, though, are taking their toll on those riprap installations.

During the 2015 annual inspection, a small area of erosion was noted along the top of the riprap installed north of the site just west of Strabane Avenue. The erosion appeared to be caused by surface water runoff to the creek. Runoff appears to have undermined the upper extent of the fabric beneath the riprap, resulting in removal of soil from beneath the riprap. The observation was also made that heavy mowing equipment operating near the edge of this area could contribute to the problem by undermining the surrounding soil. Four T-posts were installed around the erosion area to make it more visible to the mowing crews, who were instructed to keep heavy equipment back from the edge of the area to avoid further damage. In 2015, continued monitoring was deemed appropriate.

The area of erosion was larger during the 2016 annual inspection than during previous inspections. A follow-up inspection was conducted by LMS engineering staff in May 2017 when it was determined that repairs were necessary. Repairs to the riprap were completed in September 2017. It was also determined during the follow-up inspection that herbicide spraying along the top of the riprap was contributing to the onset of erosion by creating bare soil areas. The practice of spraying along the top of the riprap was discontinued. The mowing routine was also changed to allow a buffer strip of high, dense grass to remain along the stream bank. The high, dense grass helps baffle the flow of water down to the edge of the bank.

During the 2017 annual inspection, several other areas of the riprap bank (west of the 2017 repairs) were identified as needing to be evaluated for repair. A follow-up inspection by subject matter experts was completed on April 5, 2018. Repairs were deemed to be necessary. These repairs are planned for the late summer of 2019 when flow in Chartiers Creek is seasonally low.

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.

The landowner of Area C and Tract 117 continues to build aboveground storage units. ICs restrict structure excavations deeper than 4 feet (ft) and utilities excavation deeper than 6 ft. The storage units constructed so far do not violate these ICs.

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. Trash was not observed during the inspection. 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. New areas of erosion along Chartiers Creek were identified during the 2017 annual inspection as requiring a follow-up inspection. Subject matter experts conducted a follow-up inspection in April 2018 to evaluate the new areas of erosion along the Chartiers Creek stream bank north of the disposal cell and to collect design specification for mitigation actions for this new area. The evaluation indicated that 1266 linear ft of the bank needs to be repaired. Repairs have been scheduled to take place during the late summer of 2019 when flow in Chartiers Creek is seasonally low. A follow-up inspection is required in the spring of 2019 to verify that planned repairs remain adequate. Evaluation results of the spring 2019 follow-up inspection and summer 2019 repairs will be reported in the *2019 Annual Site Inspection and Monitoring Report for Uranium Mill Tailings Radiation Control Act Title I Disposal Sites*.

3.6 Maintenance

Before the inspection, several maintenance items identified in the *2017 Annual Site Inspection and Monitoring Report for Uranium Mill Tailings Radiation Control Act Title I Disposal Sites* (DOE 2018) were completed. LM removed the campsite observed during the 2017 annual inspection and associated trash in December 2018 and replaced no-trespassing signs in the area in October 2018. LM also converted offsite monitoring well 406A to a flush-mount completion.

During the inspection, inspectors documented minor maintenance needs that will be addressed in 2019, including:

- Replacing missing perimeter signs P1, P7, P9, and P10
- Replacing missing boundary monuments BM-1 and BM-2

Additionally, repairs will be made to erosion along Chartiers Creek in summer 2019. Minor repairs to the pedestrian bridge will be made at a later date pending budget and schedule. No other maintenance needs were identified.

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 Groundwater Compliance Action Plan, 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 for the constituent of concern, uranium. The ACL is 1.0 milligrams per liter (mg/L) at the POC wells. All groundwater monitoring results for the site are reported and published on the LM Geospatial Environmental Mapping System website (http://gems.lm.doe.gov/#site=CAN).

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	Point of compliance
0413	Downgradient	Point of compliance
0414B	Cross-gradient	Point of compliance
0424	Downgradient	Best management practice

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

Uranium concentrations in 2018 were below the established ACL (Figure 3-3). With the exception of monitoring wells 0412 and 0413, uranium concentrations in 2018 were also below the MCL of 0.044 mg/L.

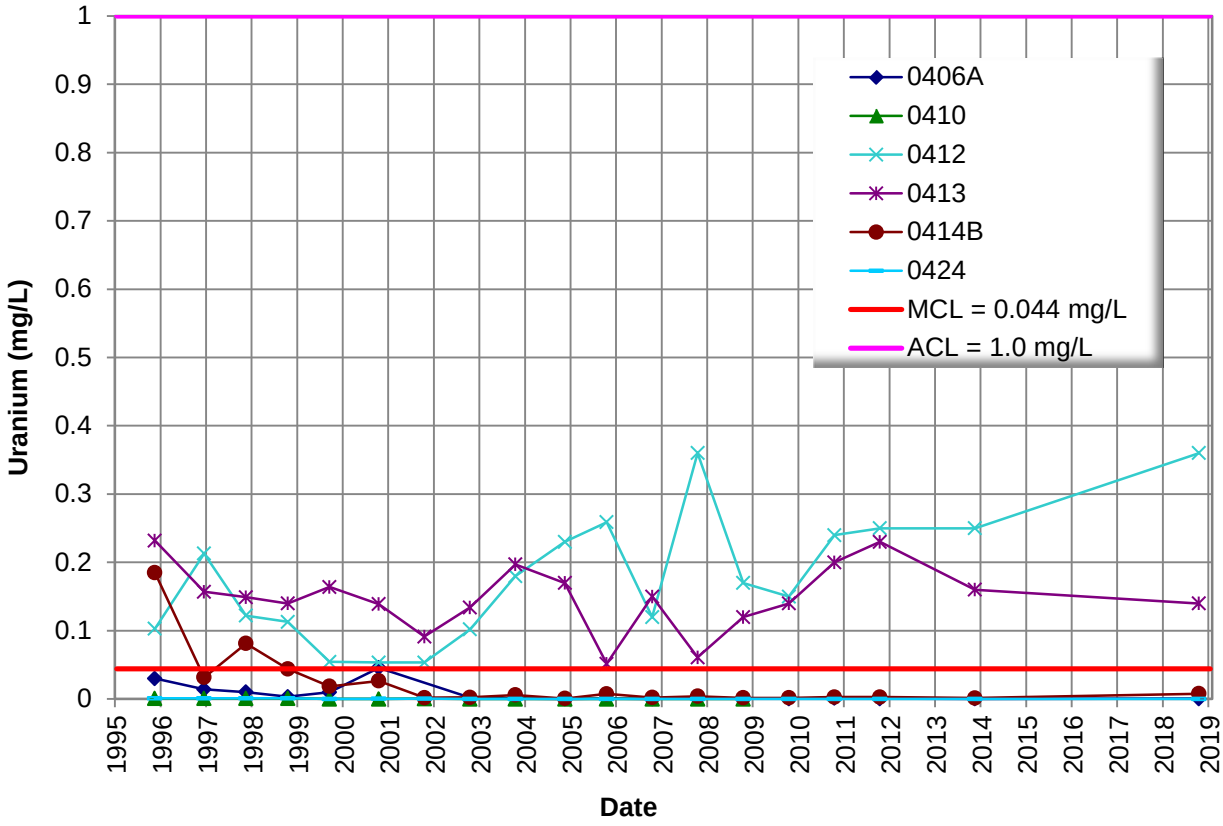

Figure 3-3. Uranium in Groundwater at the Canonsburg, Pennsylvania, Disposal Site

3.7.2 Surface Water Monitoring

In accordance with the LTSP, LM conducts surface water monitoring every 5 years. The most recent sampling event occurred in October 2018.

Only one location, 0602, is sampled in Chartiers Creek. The location is considered a POE for the site and is sampled for uranium; a limit of 0.01 mg/L is applied. Before the LTSP revision in 2008, two additional locations were sampled in Chartiers Creek: 0601 and 0603. These locations are no longer required to be sampled.

All surface water monitoring results for the site are reported and published on the LM Geospatial Environmental Mapping System website (http://gems.lm.doe.gov/#site=CAN). The 2018 uranium concentration of surface water at location 0602 remained significantly below the established concentration limit of 0.01 mg/L (Figure 3-4).

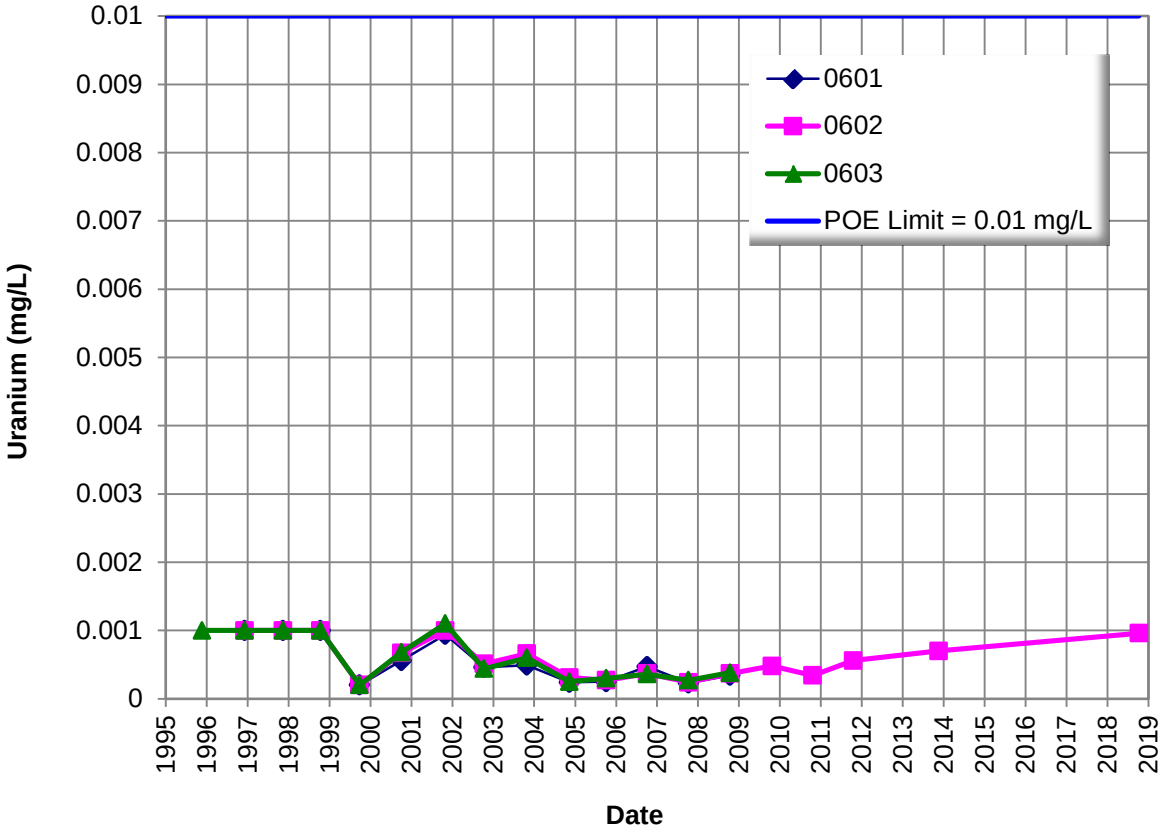

Figure 3-4. Uranium in Surface Water at the Canonsburg, Pennsylvania, Disposal Site

3.7.3 Vegetation Management

Vegetation management activities continue to be conducted at the site in accordance with the LTSP. Vegetation management activities include spot-treating tree of heaven (an invasive tree), physical removal and spot herbicide application targeting 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.

A conservation reuse initiative is being pursued that involves the establishment of a tallgrass prairie buffer strip along the bank of Chartiers Creek north of the disposal cell. The project is designed to add passive protection to the upper edge of the riprap-armored stream bank. The tall grass will provide thicker vegetation to baffle and slow the movement of water toward the bank's edge during rain events. The deeper roots of the prairie grass will serve to better stabilize the flood plain from future erosion. Based upon the need for additional repairs to the riprap-armored stream bank, which abuts the reuse area, preparation and seeding will be carried out as part of future stream bank stabilization repair projects.

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), 2015. *2014 Annual Site Inspection and Monitoring Report for Uranium Mill Tailings Radiation Control Act Title I Disposal Sites,* LMS/S12245, March.

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.

3.10 Photographs

Photograph Location Number	Azimuth	Photograph Description
PL-1	225	Security Fence Line
PL-2	0	Site Marker SMK-2
PL-3	270	Erosion Control Marker EC-3
PL-4	0	Monitoring Well 0412
PL-5	0	Southeast Corner of Disposal Cell
PL-6	135	Pedestrian Footbridge
PL-7	0	Temporary Repair to Pedestrian Footbridge Rail Support
PL-8	135	Riprap-Armored Diversion Ditch

PL-1. Security Fence Line

PL-2. Site Marker SMK-2

PL-3. Erosion Control Marker EC-3

PL-4. Monitoring Well 0412

PL-5. Southeast Corner of Disposal Cell

PL-6. Pedestrian Footbridge

PL-7. Temporary Repair to Pedestrian Footbridge Rail Support

PL-8. Riprap-Armored Diversion Ditch

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