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2024 Annual Inspection Report for the Parkersburg, West Virginia, Disposal Site

February 2025

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Abbreviations

amsl	above mean sea level
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
IC	institutional control
LM	Office of Legacy Management
LTSP	Long-Term Surveillance Plan
MCL	maximum concentration limit
MDC	minimal detectable concentration
mg/L	milligrams per liter
µg/L	micrograms per liter
mrem/year	millirem per year
pCi/L	picocuries per liter
PL	photograph location

1.0 Inspection Summary

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) Parkersburg, West Virginia, Disposal Site was inspected on October 31, 2024. No evidence of erosion or slope instability on the disposal cell was noted during the inspection. However, minor maintenance needs were noted during the inspection to address animal burrowing which continues to be a challenge. A follow-up or contingency inspection is not required. No evidence of trespassing was observed.

In 2024, several animal burrows were collapsed, filled in with clean topsoil, and revegetated. A few of the collapsed burrows showed signs of new activity but overall conditions were improved over the previous years.

The site *Long-Term Surveillance Plan for the Parkersburg, West Virginia, Disposal Site* (DOE 2019), called the LTSP, directs that routine water quality sampling and water level measurements be collected every 10 years. Routine groundwater sampling at the Parkersburg site is coordinated with sampling at the Canonsburg, Pennsylvania, Disposal Site and Burrell, Pennsylvania, Disposal Site to maximize cost efficiency. The most recent routine sampling event was conducted on October 26, 2023. Only one of the two available monitoring wells (MW-6) yielded water. No flow was obtained from monitoring well MW-5. The problem was attributed to a clogged pump, and the field crew could not resolve it. The pump needs to be fixed or replaced. Results from monitoring well MW-6 were below U.S. Environmental Protection Agency (EPA) maximum concentration limits (MCLs) and West Virginia groundwater standards found in *West Virginia Administrative Code* Title 47, Series 12, "Requirements Governing Groundwater Standards," Appendix A. A groundwater sampling event is planned for 2025, at which time the pump in monitoring well RW-5 will be replaced and the well will be sampled.

In the summer of 2024, DOE redeveloped four existing monitoring wells, MW-1 through MW-4, for the purpose of evaluating them as potential long term routine monitoring locations. Old sampling equipment was removed from the four wells, a downhole camera survey was conducted in each of the four wells, and a small amount of water was pumped from each of the four wells to reestablish good communication between the well screens and the surrounding aquifer. With the redevelopment of these four wells, DOE is planning to conduct nonroutine sampling of all six monitoring wells for parameters listed in the site LTSP and to install water level transducers in all six monitoring wells. DOE anticipates that this additional work will be conducted in 2025.

1.1 Inspection Requirements

Requirements for the long-term surveillance and maintenance of the site are specified in the LTSP (DOE 2019).

1.2 Institutional Controls

Institutional controls (ICs) at the site consist of LM ownership and ongoing stewardship of the site. IC features include perimeter signs placed along the property boundary, a site perimeter fence, and locked gates at the site entrances. ICs are verified during the annual inspection. The inspection team did not observe any evidence that the ICs have been compromised or are not functioning effectively as intended.

1.3 Inspection Team

K. Broberg and L. McHenry of the Legacy Management Support contractor conducted the inspection on October 31, 2024. A. Farinacci (LM site manager), T. Drake (LM), and A. McCreary (West Virginia Department of Environmental Protection) also participated in the inspection.

1.4 Site Surveillance Features

The locations of site surveillance features are shown in Figure A-1 (Appendix A). Inspection results and recommended maintenance activities associated with site surveillance features are described in the following subsections. Photographs to support specific observations are identified in the text and in Figure A-1 by photograph location (PL) number.

1.4.1 Access Route, Entrance Gates, and Entrance

The Parkersburg site is adjacent to land owned by the Northwest Pipe Company. Access to the site from Northwest Drive (formerly called Foster Drive) entails crossing a grass field. The access route is along a permanent 20-foot-wide right-of-way through the grass field owned by the Northwest Pipe Company.

A Northwest Pipe Company rail spur that crosses the site right-of-way was replaced in 2016. Northwest Pipe Company maintains a gravel crossing where the rail spur crosses the site right-of-way to provide vehicle access to the site. The gravel crossing was found to be well maintained.

All entrance gates were properly secured, and signage posted on the gates was current with the exception of the phone number. The phone number was updated using a sticker (PL-1).

1.4.2 Perimeter Fence and Perimeter Signs

The perimeter fence was replaced in 2007. The site maintenance subcontractor maintains a vegetation-free zone along the base of the fence line and ensures that vegetation does not grow on the fence fabric. The vegetation-free zone along the fence line was being maintained (PL-2), and the fence fabric was free of vegetation.

The site has an entrance sign and 16 perimeter signs. All signs were replaced in 2021 and remain in good condition. The phone number on all signs was updated during the inspection by placing a sticker with the updated number over the old phone number.

1.4.3 Survey Monuments and Boundary Monuments

The Parkersburg site has six boundary monuments and one concrete survey monument. All six boundary monuments and the concrete survey monument were located during the inspection. A new trail marker was installed next to boundary monument 1 to make the monument visible to mowing crews (PL-3). The top of the concrete survey monument is missing, but its replacement is not necessary.

Boundary monument BM-3 is about 6 inches beneath ground surface. A 6-inch section of PVC pipe was installed around the monument and filled with pea gravel to make it flush with the ground surface (PL-4).

1.4.4 Monitoring Wells

There are six groundwater monitoring wells at the Parkersburg site. All six wells are inside the security fence. The wells are numbered in the chronological order in which they were drilled and installed. All six wells were properly locked. The site maintenance subcontractor clears vegetation around the monitoring wells. Vegetation was being properly controlled around the monitoring wells (PL-5).

1.5 Transects

To ensure a thorough and efficient inspection, inspectors divided the site into two transects as follows: (1) the disposal cell and (2) the site perimeter and outlying area.

Inspectors walked a series of traverses within each transect. They examined specific site surveillance features, drainage structures, vegetation, and other features. Inspectors also looked for evidence of settlement, erosion, or other modifying processes that might affect site integrity or long-term performance.

1.5.1 Disposal Cell

At the time of the inspection, vegetation on top of the disposal cell had been recently mowed. No evidence of erosion or slope instability on the disposal cell was noted during the inspection (PL-6).

Animal burrowing activity at the site continues to be a challenge. In descending order, the cell cap consists of a 30-inch layer of topsoil, a 12-inch layer of impermeable clay, then a 6-inch layer of compacted clay. There is concern that if the burrowing is not controlled, the protective nature of the cell cap might be compromised. In 2021, 2 weeks of trap-and-release were conducted to remove two groundhogs from the site. Existing burrows were collapsed, filled with clean soil, and reseeded. Additional burrows were collapsed, filled with clean soil, and reseeded in 2022 and again in 2023. In 2022, a coyote den was found and collapsed. In 2024, several weeks of capture were conducted and several additional groundhogs were captured. During the site inspection, new additional animal burrows were discovered. Their locations are identified on the site map (Figure A-1). These new burrows will be collapsed, filled with clean soil, and reseeded as deemed appropriate. Inspectors also noted that some of the recently collapsed burrows showed signs of new animal activity. Additional trapping is planned for 2025 (PL-7).

1.5.2 Site Perimeter and Outlying Area

The drainage channel in the southwest corner of the site, lined with high-density polyethylene honeycomb baffles and brick energy-dissipation baffles in August 1996, is functioning as designed. Erosion in the channel appears to be unchanged from last year.

The Parkersburg site is in a developed industrial area. Inspectors noted that conditions at the neighboring Northwest Pipe Company property were similar to conditions observed in 2023.

1.6 Follow-Up or Contingency Inspections

LM will conduct follow-up inspections if (1) an annual inspection or other site visit reveals a condition that must be reevaluated during a return to the site or (2) a citizen or outside agency notifies LM that conditions at the site are substantially changed.

No follow-up or contingency inspections were required in 2024.

1.7 Routine Maintenance and Repairs

LM needs to be vigilant about addressing animal burrows on the disposal cell. As burrows are located, they need to be collapsed, filled with clean soil, and reseeded. On going routine annual pest management is being conducted at the site.

The pump in monitoring well MW-5 needs to be fixed or replaced and a water sample collected. For efficiency, this effort is being coordinated with a nonroutine sampling event planned at the site in 2025.

1.8 Environmental Monitoring

1.8.1 Groundwater Monitoring

During site characterization, a modeling exercise was conducted to estimate the number of years, after site closure (1982), that it would take a contaminant plume to travel through unsaturated materials, reach the water table, travel in groundwater, and reach monitoring wells MW-5 or MW-6. The modeling exercise assumed a hypothetical worst case in that it was assumed that the disposal mound cover failed to function as designed, and subsequently allowed precipitation to infiltrate and saturate the buried waste materials resulting in a leachate plume (DOE 1995). The following two models were used in the modeling exercise: the Hydrologic Evaluation of Landfill Performance model and the Multimedia Exposure Assessment model.

The following three different modeling scenarios were assessed: (1) worst case, (2) most likely case, and (3) best case:

- Worst case: 15–20 years after 1982 site closure (i.e., between 1997 and 2002)
- Most likely case: 35–40 years after 1982 site closure (i.e., between 2017 and 2022)
- Best case: 95–100 years after 1982 site closure (i.e., between 2078 and 2082)

The Site Characterization Report (DOE 1995) states that groundwater quality at the site should be sampled again 15–20 years after site closure (1997 to 2002). Because modeling results indicate that contamination of the aquifer, should it occur, would occur relatively slowly, groundwater-water quality could be monitored once every 5–10 years. Future analytical results should be compared to 1994 and 1995 results to determine if changes in groundwater quality have occurred.

Sampling was conducted on a 5-year frequency through 2013. Following the 2013 sampling event, the site LTSP was revised to direct that routine water quality sampling and water level measurements be collected every 10 years. This frequency was based on the DOE 1995 Site Characterization (DOE 1995) and sampling results collected through 2013 (DOE 2014). This

frequency also corresponds to the end of the next model-predicted interval of 2017 and 2022. Sampling was last conducted on October 26, 2023. Routine groundwater sampling at the Parkersburg site is coordinated with sampling at the Canonsburg and Burrell sites to maximize cost efficiency.

The sampling network at the Parkersburg site consists of six monitoring wells (MW-1 through MW-6). As prescribed by the site LTSP, only monitoring wells MW-5 and MW-6 were being routinely sampled for water quality parameters. Water levels were being measured in all six wells.

In the summer of 2024, DOE redeveloped four existing monitoring wells MW-1 through MW-4. Old sampling equipment was removed from the four wells, a downhole camera survey was conducted in each of the four wells, and a small amount of water was pumped from each of the four wells to reestablish good communication between the well screens and the surrounding aquifer. With the redevelopment of these four wells, DOE is planning to conduct a nonroutine sampling of all six monitoring wells for parameters listed in the site LTSP and to install water level transducers in all six monitoring wells. DOE anticipates that this additional work will be conducted in 2025.

Only monitoring well MW-6 was sampled during the most recent routine sampling round conducted in 2023.The dedicated pump in monitoring well MW-5 was not functioning, preventing sample collection. Pump replacement is planned for 2025, at which time a water quality sample will be collected.

Due to only being able to collect a sample from one of the two wells, results from 2023 are incomplete. As summarized below under site plans, LM plans to replace the pump in monitoring well RW-5 and sample the well during a nonroutine sampling of all six monitoring wells in 2025. Results from monitoring well MW-6 are provided in this report and presented in Table 1. A more comprehensive groundwater monitoring assessment will be prepared following the nonroutine sampling event. As shown in Table 1, all results from monitoring well MW-6 in 2023 were below EPA MCLs and West Virginia groundwater standards found in *West Virginia Administrative Code* Title 47, Series 12, Appendix A.

Results found in Table 1 are further discussed below.

Metals

Results from 2023 for monitoring well MW-6 are consistent with historical results dating back to 1994. All metals were undetected in 2023 with the exception of barium, which was 79.1 micrograms per liter (µg/L). The barium result is below the EPA MCL and West Virginia Water Quality Standard of 2000 µg/L.

Major Cations and Anions

A comparison of 2023 results from monitoring well MW-6 with historical results dating back to 1994 shows that all major cations and anions (with the exception of nitrate/nitrite) have increased since 1994, but between 2013 and 2023 (with the exception of sulfate), concentrations decreased. The 2023 concentration for nitrate/nitrite (7 milligrams per liter [mg/L]) was below the EPA MCL and West Virginia Water Quality Standards.

Radionuclides

All radionuclides measured in monitoring well MW-6 in 2023 were below EPA MCL and State of West Virginia Water Quality Standards. A comparison of 2023 results with historical results dating back to 1994 shows that all radionuclides, with the exception of gross alpha, have increased.

Radium 226-228

The combined measurement of radium-226 (1.13 picocuries per liter [pCi/L]) and radium-228 (1.19 pCi/L) is 2.32 pCi/L, which is below the standard of 5 pCi/L for radium-226 and radium-228 combined. A "J" qualifier was applied to the results during the data validation process. A "J" qualifier is a routine qualifier attached to results that are low (close to the minimal detectable concentration [MDC]). It is applied when the result is < 3 times the MDC.

Gross Beta

The gross beta is measured in pCi/L and compared to a dose rate standard of 4 millirem per year (mrem/year). EPA offers guidelines to determine if a gross beta concentration measured in pCi/L complies with the 4 mrem/year dose standard. Per EPA guidance, (EPA 2002a, EPA 2002b) if the gross beta result is less than or equal to 50 pCi/L, the sample complies with the 4 mrem/year dose rate standard. The 2023 gross beta result from monitoring well MW-6 was 4.31 pCi/L. The 2023 water sample from monitoring well MW-6 had a potassium concentration of 3.0 mg/L which equates to 2.5 pCi/L. This is assumed to be naturally occurring.

Groundwater Levels

Groundwater levels were measured at all six monitoring wells in 2023. As shown in Figure A-2, water-level elevations at the site ranged from 581.36 feet to 581.07 feet above mean sea level (amsl), a difference of 0.29 feet. Similar to previous years, the distribution of water-level elevations suggests groundwater flow away from the site is northerly (DOE 2014). Given the small measurement range, water elevation contours were not added to the figure.

Figure A-3 is a graph that shows water level measurements from 1994 to 2023. As shown in Figure A-3, the water levels have collectively risen from between 570 to 571 feet amsl in 1994 to slightly above approximately 581 feet amsl in 2023; a rise of approximately 11 feet in 29 years. As discussed below, LM plans to install water level transducers in all six monitoring wells to obtain more frequent water level measurements.

Table 1. Monitoring Well MW-6 Water Quality, 1994 Through 2023

Analyte	Units	1994		1995		1998		2003		2008		2013		2023		EPA MCL	WVa Std
		Result	VQ	Value	VQ	Value	VQ	Value	VQ	Value	VQ	Value	VQ	Value	VQ		
Metals																	
Antimony	µg/L	1.1	B	1	B	U		0.95	B	U		0.44		U		6	NS
Barium	µg/L	89.3	B	88.9	B	92.9	B	85	B	82		160		79.1		2000	2000
Beryllium	µg/L	U		U		U		U		0.33	B	U		U		4	4
Cadmium	µg/L	U		U		U		U		U		U		U		5	5
Chromium	µg/L	U		U		U		U		0.57	B	U		U		100	100
Lead	µg/L	U		U		U		U		0.14	B	0.24	B	U		15[e]	15
Mercury	µg/L	U		U		U		U		U		U		U		2	2
Nickel	µg/L	U		U		U		U		1	B	U		U		NS	NS
Selenium	µg/L	U		U		U		U		0.046	B	U		U		50	50
Thallium	µg/L	U		U		U		U		0.029	B	U		U		2	2
Hafnium	µg/L	1.1	B	U		U		U		[a]		[a]		U		NS	NS
Zirconium	µg/L	1.5	B	U		U		U		U		U		U		NS	NS
Thiocyanate	µg/L	U		U		U		U		U		U		U		NS	NS
Major Cations and Ions																	
Calcium	mg/L	133		122		114		99.7		100		190		165		NS	NS
Magnesium	mg/L	14.8		13.2		12.4		11.4		11		24		23		NS	NS
Potassium	mg/L	2.34		1.78		1.83		1.76		2.1		3.3		3	B	NS	NS
Sodium	mg/L	13.9		12.9		14.6		14.4		19		32		32		NS	NS
Chloride	mg/L	31.6		26		24.5		52.5		38		120		72		NS	NS
Sulfate	mg/L	101		81		58.8		48.6		70		91		179		NS	NS
Nitrate/nitrite[b]	mg/L	10		9.71		6.37		1.9		1.7		14		7		10	10
Radionuclides																	
Radium-226	pCi/L	0.25		0.1		U		U		U		U		1.13	J	5[c]	5[c]
Radium-228	pCi/L	U		U		U		U		U		U		1.19	J	5[c]	5[c]
Uranium	µg/L	U		U		U		0.44	B	0.44		0.64		0.69		30	30
Gross alpha	pCi/L	U		U		U		U		U		U		U		15	15
Gross beta	pCi/L	U		U		U		U		U		3.37[f]		4.31[f]		4[d]	4[d]

Notes:
Maximum value reported.
[a] Zirconium used as proxy for hafnium.
[b] Nitrate/nitrite as nitrogen.
[c] Radium-226 and radium-228 combined.
[d] mrem = rem (roentgen equivalent man).
[e] Action limit.
[f] Screening level of concern for gross beta is 50 pCi/L.

Abbreviations:
B = result is between instrument detection limit and contract required detection limit; EPA MCL = EPA federal Safe Drinking Water Act standard; J = estimated; mg/L = milligrams per liter; µg/L = micrograms per liter; NS = no standard, pCi/L = picocuries per liter; U = result was below detection limit; VQ = validation qualifier; WVa Std = *West Virginia Administrative Code* Title 47, Series 12, "Requirements Governing Groundwater Standards," Appendix A

1.8.2 Site Groundwater Monitoring Plans

In 2025, LM plans to perform the following work:

- Install low-flow sampling equipment in monitoring wells MW-1 through MW-4.
- Replace the low-flow sampling equipment in monitoring well MW-5.
- Sample all six wells for analytes listed in the site LTSP.
- Install water level transducers in all six monitoring wells.
- Prepare a groundwater monitoring assessment report that will include recommendations for future groundwater monitoring activities that are consistent with the findings of the assessment.

Once results have been reported, and future monitoring plans determined, the site LTSP will be revised to reflect monitoring program changes.

1.8.3 Vegetation Management

Vegetation management at the Parkersburg site involves periodic mowing and spot herbicide application. Vegetation along the fence line and around the monitoring wells was being sufficiently controlled.

The current approach of mowing followed by spot herbicide application appears to provide sufficient control of poisonous and noxious weeds at this time but could be improved by adding an additional round of mowing and spraying. Species of concern include Canada thistle (*Cirsium arvense*), poison hemlock (*Conium maculatum*), teasel (*Dipsacus fullonum*), reed canary grass (*Phalaris arundinacea*), Johnsongrass (*Sorghum halepense*), curly dock (*Rumex crispus*), and eastern poison ivy (*Toxicodendron radicans*). The only species of concern observed in 2024 were scattered poison hemlock on the western edge of the mowed field outside the fence and scattered curly dock in the northwest corner of the mowed field inside the perimeter fence.

A number of native species continued to be observed in 2024, consistent with findings from previous inspections. LM is looking for innovative ways to provide reuse at the Parkersburg site and providing a native prairie for pollinator purposes is one possibility. While the open portions of the site consist primarily of cool-season grasses and weedy species, native species, such as mistflower (*Conoclinium coelestinum*), wingstem (*Verbesina alternifolia*), Indianhemp (*Apocynum cannabinum*), and goldenrod (*Solidago* species), were also observed.

1.9 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create potential health and safety problems or that might affect the integrity of the disposal cell or compliance with Title 40 *Code of Federal Regulations* Section 192.

No corrective actions were identified based on the inspection.

2.0 References

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

DOE (U.S. Department of Energy), 1995. *AMAX Radioactive Material Storage Area, Parkersburg, West Virginia, Site Characterization Results*, GJPO-ES-15, September.

DOE (U.S. Department of Energy), 2014. *Groundwater Monitoring Assessment Parkersburg, West Virginia, Disposal Site,* LMS/PKB/S11932, Office of Legacy Management, June.

DOE (U.S. Department of Energy), 2019. *Long-Term Surveillance Plan for the Parkersburg, West Virginia, Disposal Site*, LMS/PKB/S11796, Office of Legacy Management, May.

EPA (U.S. Environmental Protection Agency), 2002a. *Implementation Guidance for Radionuclides*, Office of Ground Water and Drinking Water (4606M) EPA 816-F-00-002, March.

EPA (U.S. Environmental Protection Agency), 2002b. *Radionuclides in Drinking Water: A Small Entity Compliance Guide*, Office of Ground Water and Drinking Water (4606M) EPA-R-02-001, February.

3.0 Photographs

Photo Location Number	Azimuth	Photograph Description
PL-1	315	Updated Phone Number
PL-2	135	Fence Line
PL-3	225	New Trail Marker Installed next to Boundary Monument BM-1
PL-4	—	Location of Boundary Monument BM-3
PL-5	270	Monitoring Well MW-6
PL-6	270	Disposal Cell Surface
PL-7	—	Recent Activity at Animal Burrow

Note:
— = Photograph taken vertically from above.

PL-1. Updated Phone Number

PL-2. Fence Line

PL-3. New Trail Marker Installed next to Boundary Monument BM-1

PL-4. Location of Boundary Monument BM-3

PL-5. Monitoring Well MW-6

PL-6. Disposal Cell Surface

PL-7. Recent Activity at Animal Burrow

Appendix A

Site Drawings

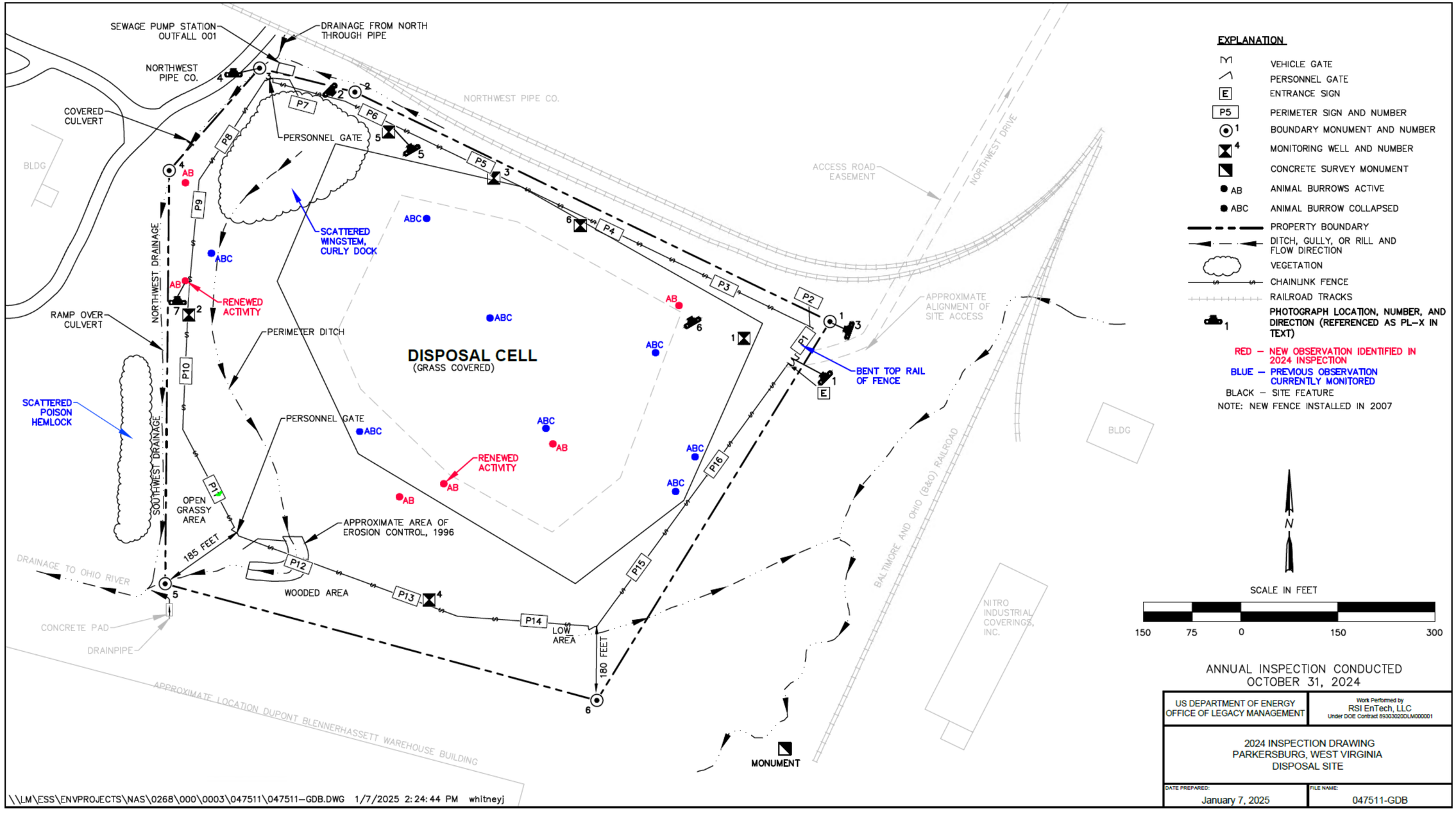

Figure A-1. 2024 Annual Inspection Drawing for the Parkersburg, West Virginia, Disposal Site

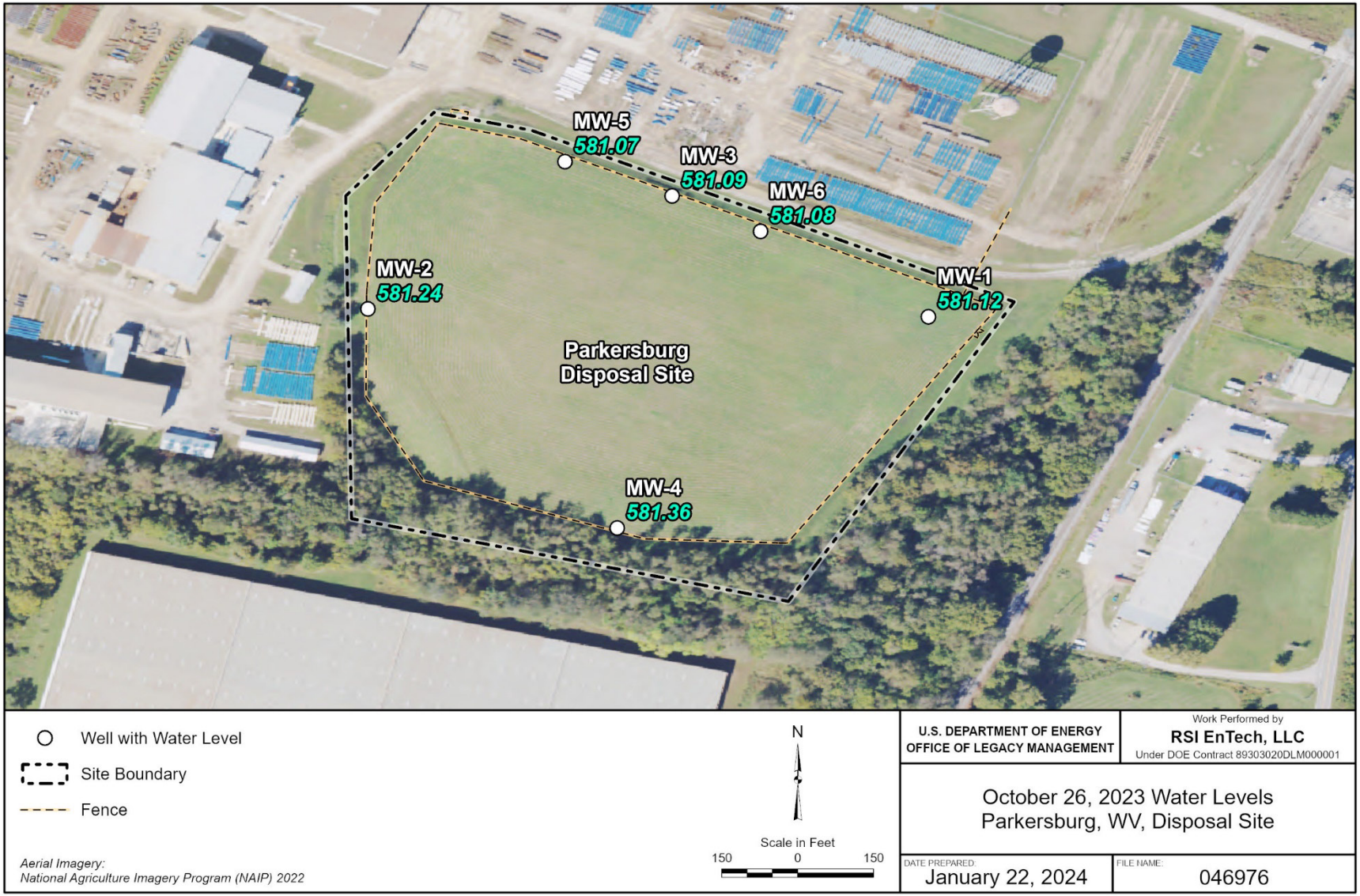

Figure A-2. 2023 Water Levels, Parkersburg, West Virginia, Disposal Site

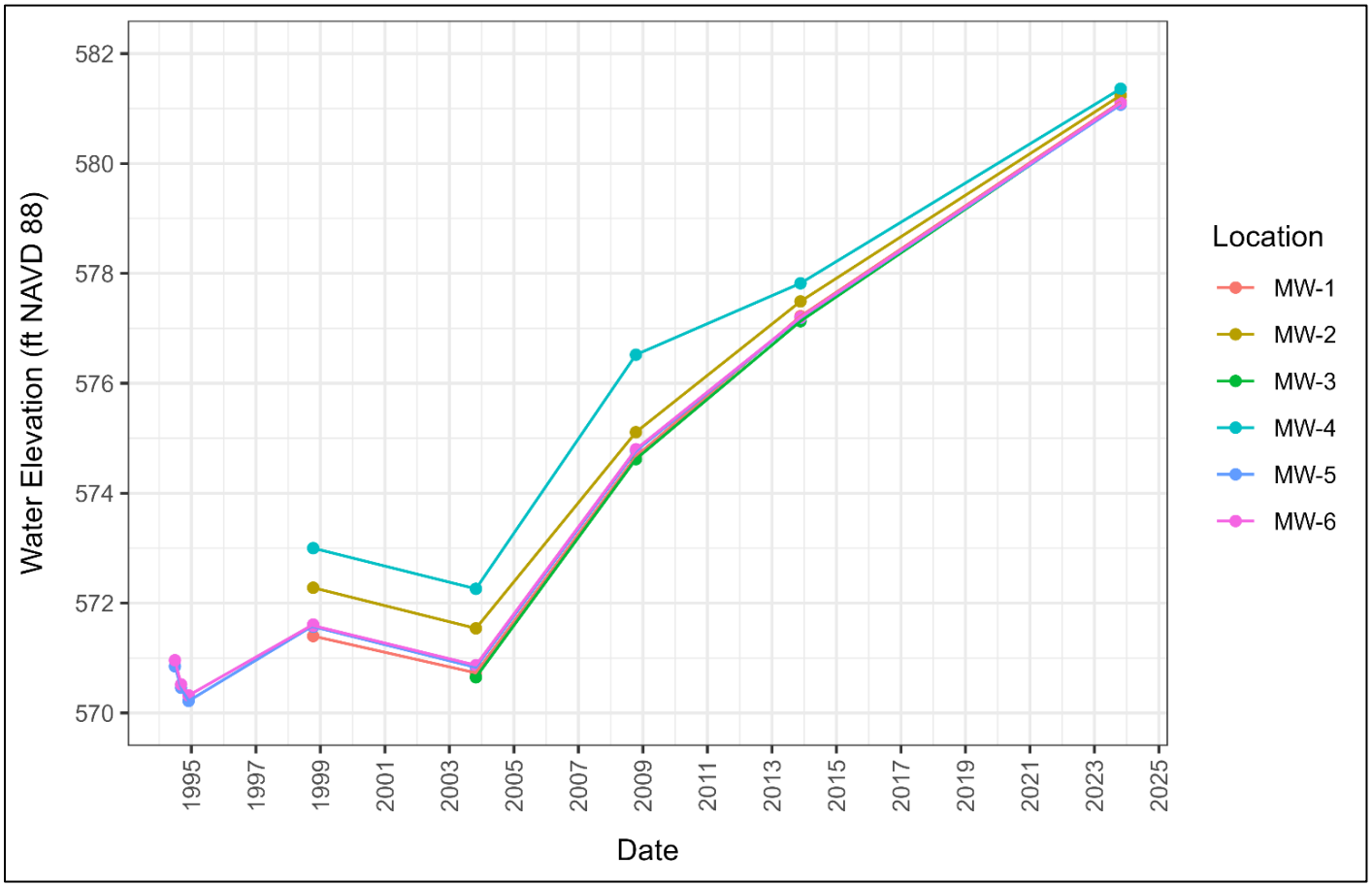

Figure A-3. Water Levels