Fact Sheet

U.S. DEPARTMENT OF ENERGY | Legacy Management

Parkersburg, West Virginia, Disposal Site

An NWPA Site

This fact sheet provides information about the **Parkersburg Site**. This site is managed by the **U.S. Department of Energy Office of Legacy Management** under **Section 151** of the **Nuclear Waste Policy Act**.

Site Information and History

The 15-acre Parkersburg site is located 8 miles southwest of Parkersburg, West Virginia, in Wood County, near the east bank of the Ohio River. The surrounding land is primarily agricultural and industrial with some residential use.

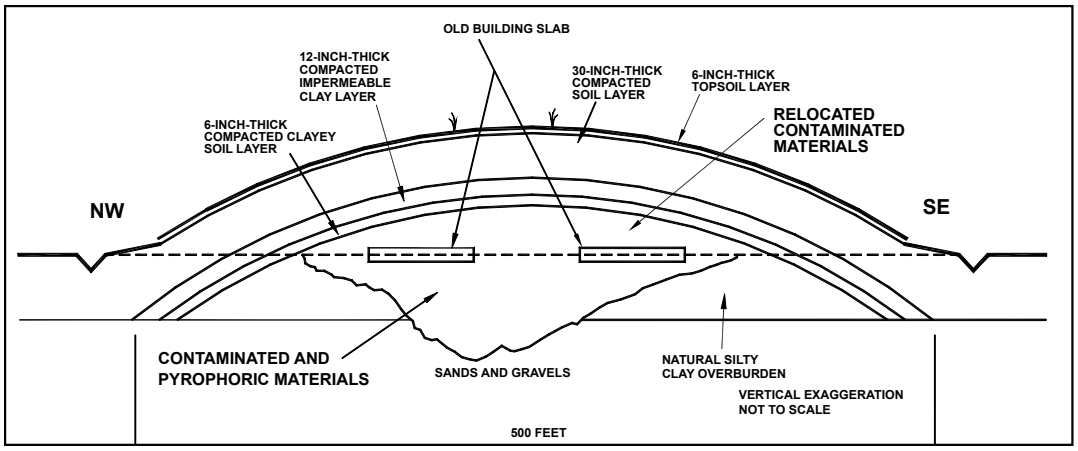
The Carborundum Company built the original facility at the Parkersburg site in 1957 to produce zirconium metal for use in constructing nuclear reactors for the U.S. Navy. In May 1967, AMAX, a division of American Metals Climax, Inc., became the sole owner of the facility. During its years of operation, the mill processed an estimated 2 million pounds of zirconium ore, mainly from Nigeria.

In addition to zirconium, the ore processed at the plant also contained oxides of hafnium, thorium, and uranium. The initial processing methods generated waste material that was pyrophoric (capable of causing fires and explosions). Ore and waste materials were stored in drums on the site. By 1968, some of the drums had deteriorated, and the radioactive ore and pyrophoric materials had spilled into the soils in the storage area. Radioactivity in the contaminated soils exceeded regulatory limits, and in September 1968, approximately 3,000 drums of zirconium ore and soils contaminated with radioactive materials were transported from the site to the U.S. Atomic Energy Commission's low-level radioactive waste site at Maxey Flats, Kentucky.

AMAX ceased production in 1974 and began conducting laboratory-scale experiments on baddeleyite ore, an oxide of zirconium. In 1977, AMAX sold the property to L.B. Foster Company, a manufacturer of steel pipe. The U.S. Nuclear Regulatory Commission (NRC) conducted site inspections in September and October 1977 and found areas of residual soil contamination. The ensuing cleanup program produced 70 drums of contaminated soil, which were shipped offsite to an NRC-approved disposal site. During building construction activities by L.B. Foster Company in 1978, a backhoe excavation uncovered pyrophoric waste materials that caused several fires and explosions. AMAX subsequently repurchased the property from L.B. Foster and began radiological, geological, and hydrological characterization to evaluate the site for cleanup.

In 1980, AMAX issued a plan for remedial action at the site. Remediation consisted of consolidating the waste into an area formerly occupied by the zirconium-processing operations and restoring most of the property to a condition suitable for unrestricted use. AMAX proceeded with site cleanup and construction of a disposal cell, originally termed the "stabilization mound," from July to November 1982. The disposal cell was completed in 1983. In 1984, Oak Ridge Associated Universities performed a survey of the site to verify that remedial action had removed contaminants to acceptable levels. In 1987, NRC concurred with AMAX's request to release the area outside the disposal cell for unrestricted use. In November 1987, AMAX requested that the U.S. Department of Energy (DOE) assume title and custody of the site. On July 8, 1993, a general warranty deed transferred the disposal cell and an access road easement from AMAX to DOE. DOE formally assumed ownership of the site on March 4, 1994.

Unconfined groundwater is present at depths of 50 to 75 feet below ground surface at the site. The alluvium bedrock contact is about 100 feet below ground surface. Six monitoring wells are present around the perimeter of the disposal cell. AMAX installed monitoring wells 1 through 4 in 1980 and 1982, although detailed information about the installation and



Conceptual Cross Section of the Disposal Cell at the Parkersburg Site.

completion depths of those wells is not known. DOE installed two additional wells in 1994 as part of additional site characterization before assuming ownership of the site. Monitoring wells 5 and 6 were installed inside the site perimeter north of the disposal cell to verify that encapsulated materials and historical activities had not affected alluvial groundwater. The two DOE wells are currently sampled every 10 years for 13 metals, seven major cations and anions, and five radionuclides. Concentrations are compared against U.S. Environmental Protection Agency Primary Drinking Water Standards as a best management practice to note any water quality changes over time. The most recent groundwater sampling results (2013) indicated that no site-related contaminants have been detected in the groundwater monitoring wells. A nitrate/nitrite water quality exceedance measured in 2013 was attributed to adjacent property improvements and the use of fertilizers rather than cell performance. The next sampling event is scheduled for 2023. Groundwater modeling predictions for the site identified three potential time-of-travel scenarios for a contaminant to be detected in a site monitoring well. The worst-case modeling scenarios assumed that the disposal cell cover allowed precipitation to infiltrate and saturate the buried waste, resulting in the formation of a contaminant plume. The modeling then estimated the length of time it would take for the contaminant plume to travel through unsaturated alluvium to reach the water table and then through the saturated alluvium to reach the down gradient wells. The three time periods are based on site geology and the model predicted time of travel for the contaminants under the worst-case modeling assumptions. The first period (1997-2002) has passed and no contaminant has been detected in the groundwater monitoring wells. The next time period (identified as 2017 to 2022) will be verified with sampling planned in 2023. Water levels are obtained from all six monitoring wells every 10 years.

Regulatory Setting

Subtitle D, Section 151(c) of the Nuclear Waste Policy Act of 1982 (Title 42 *United States Code* [USC], Section 101719[c]) contains provisions for transferring privately owned disposal sites to the federal government if the site activities were conducted for the benefit of the government. The transfer may take place once the site owner obtains concurrence from NRC that the site has been remediated to levels sufficient to protect human health and the environment and the site licensee makes a one-time payment to the U.S. Department of the Treasury to defray the cost of future site inspections and maintenance. Remediation standards are set forth in Title 10 *Code of Federal Regulations* (CFR), Part 20, "Standards for Protection against Radiation." Radon emission standards are specified in 40 CFR 61, Subpart Q, "National Emission Standards for Radon Emissions from Department of Energy Facilities." Groundwater quality must comply with standards of the Safe Drinking Water Act (42 USC 300f, et seq.) and the State of West Virginia.

Disposal Cell

Radioactive soils and other debris were moved from contaminated areas of the AMAX property and placed in a central location at the site. Part of the existing grade included concrete pads and footings of two buildings that L.B. Foster Company had started to build. During construction of the disposal cell, AMAX made an effort to place the most contaminated radioactive and pyrophoric material on the concrete pads. The resulting grass-covered, gently sloping surface of the disposal cell rises to a maximum of about 9 feet above grade.

Contaminated soils and debris were placed on grade and compacted by D-8 bulldozers and tandem truck wheels. An inorganic clayey soil was spread over the contaminated material and compacted to a dense 6-inch-thick layer using a flat drum vibrator roller. A low-permeability clay cap layer 12 inches thick was constructed over the clayey soil layer to inhibit infiltration of precipitation. A 30-inch-thick layer of topsoil was placed over the clay cap to protect it from weathering and erosion and to provide a soil base for growth of grass cover. The final 6 inches of topsoil was not compacted to allow for seeding of grass. A mixture of grasses was seeded into the topsoil. The topsoil layer was constructed to allow surface drainage in all directions off the

cell. The final surface grade was between 1 and 5 percent over areas where the contaminated material was placed. To protect the disposal cell from horizontal movement of water infiltrating from the surface, a barrier trench 2 feet wide by 7 feet deep was dug around the perimeter of the cell and backfilled with compacted clay.

Legacy Management Activities

The DOE Office of Legacy Management (LM) manages the disposal site according to a site-specific Long-Term Surveillance Plan to ensure that the disposal cell continues to prevent release of contaminants to the environment. Under provisions of this plan, LM conducts annual inspections of the site to evaluate the condition of surface features, performs site maintenance as necessary, and monitors groundwater to verify the continued integrity of the cell. The encapsulated materials will remain potentially hazardous for thousands of years. LM's responsibility for the safety and integrity of the Parkersburg disposal site will last indefinitely.

CONTACT INFORMATION

IN CASE OF AN EMERGENCY AT THE SITE, CONTACT 911

LM TOLL-FREE EMERGENCY HOTLINE: (877) 695-5322

Site-specific documents related to the **Parkersburg, West Virginia, Disposal Site** are available on the LM website at **www.energy.gov/lm/parkersburg-west-virginia-disposal-site**

For more information about LM activities at the **Parkersburg, West Virginia, Disposal Site**, contact:

U.S. Department of Energy
Office of Legacy Management
2597 Legacy Way
Grand Junction, CO 81503

Email:
public.affairs@lm.doe.gov

DOE Office of Legacy Management
(970) 248-6070

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