U.S. DEPARTMENT OF ENERGY | Legacy Management

Maxey Flats, Kentucky, Disposal Site

FACT SHEET

This fact sheet provides information about the Maxey Flats, Kentucky, Disposal Site.

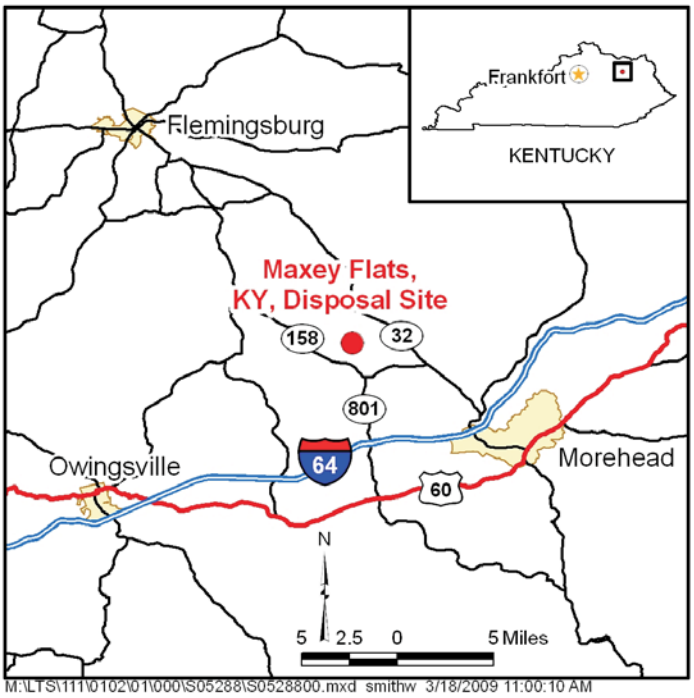
Site Description and History

The Maxey Flats Site is an inactive, low-level radioactive waste disposal site located in eastern Kentucky about 10 miles northwest of Morehead, Kentucky. The property encompasses approximately 770 acres, including a buffer zone of approximately 440 acres. The site is located in the Knobs physiographic region, which is characterized by hills and relatively flat-topped ridges. The disposal cell is located on a spur of Maxey Flats, one of the larger flat-topped ridges in the region. The site is bounded by steep slopes on the west, east, and south and is approximately 350 feet above the adjacent valleys.

The Commonwealth of Kentucky owns the disposal site and surrounding buffer zone. The land surrounding the site is primarily mixed woodlands and open farmland. The area is sparsely populated and mostly undeveloped. The few residences in the area have a public water supply system.

In 1963 the Commonwealth of Kentucky issued a license to Nuclear Engineering Company, Inc. to bury low-level radioactive waste at Maxey Flats. From May 1963 to December 1977, radioactive waste was disposed of in 46 large, unlined trenches up to 680 feet long, 70 feet wide, and 30 feet deep that covered approximately 27 acres of land within a 45-acre fenced portion of the site. Concrete containment structures known as “hot wells” were used for the burial of small-volume wastes with higher radioactivity. Most of the hot wells were 10 to 15 feet deep, coated with steel pipe or tile, and capped with a large slab of concrete. The trench wastes were deposited in both solid and solidified-liquid form. Some wastes arrived at the site in containers such as drums, wooden crates, and concrete or cardboard boxes. Other wastes were disposed of loosely. The trenches were backfilled with 3 to 10 feet of soil to serve as a protective cover. After 1977, six additional trenches were excavated for the disposal of waste material generated on site.

Environmental monitoring beginning in the early 1970s confirmed that radionuclides were leaching from the buried materials and migrating through the shallow groundwater. In December 1977, the Commonwealth of Kentucky directed Nuclear Engineering to cease the



Location of the Maxey Flats Disposal Site

receipt and burial of radioactive wastes. About 4.5 million cubic feet of waste was buried in the trenches during the facility's years of operation. Activity from by-product material (i.e., material that became radioactive by neutron activation in nuclear reactors) buried at the site was estimated to be at least 2.8 million curies.

Nuclear Engineering Company's license to receive low-level waste was terminated in 1979, and operational responsibilities for the site were transferred to the Commonwealth of Kentucky. Private companies, such as Westinghouse Electric Corporation, were hired as the site custodians with responsibility to stabilize and maintain the site. Stabilization and maintenance activities included installing a temporary cover over approximately 27 acres of trench area, establishing surface water controls, and monitoring both subsidence and waste containment.

In 1986, the U.S. Environmental Protection Agency (EPA) placed the Maxey Flats facility on the National Priorities List, which comprises a list of hazardous waste sites to be addressed under the Comprehensive

Environmental Response, Compensation, and Liability Act (CERCLA, also known as Superfund). EPA notified 832 parties who had generated or transported radioactive waste that was received at the Maxey Flats facility that they were potentially liable for site cleanup. The parties, known as Potentially Responsible Parties (PRPs), included private companies, hospitals, research institutions and laboratories, the U.S. Department of Defense, the U.S. Department of Energy (DOE), and the Commonwealth of Kentucky.

2002 aerial view of the Maxey Flats Disposal Site. The geomembrane interim cover and East Detention Basin are under construction.

In March 1987, 82 PRPs signed an Administrative Order by Consent to begin preparation of a Remedial Investigation/ Feasibility Study, which included a complete evaluation of site hydrogeology, current site conditions, a risk assessment, and alternatives for remedial action. In 1991 EPA issued a Record of Decision for the Maxey Flats Site and announced that the remedy selected was natural stabilization. This remedy would allow the materials in the trenches to subside naturally to a stable condition, after which a permanent, engineered cap would be placed over the entire area of buried contaminants. The main objectives of the remedy were to prevent or mitigate the release of hazardous contaminants to surface water, groundwater, and surrounding sediments and to reduce the risk to human health posed by site contaminants.

The remedy was divided into four phases: the Initial Closure Period (22 months), the Interim Maintenance Period (35–100 years), the Final Closure Period (10 months), and the Custodial Maintenance Period (in perpetuity).

The Initial Closure Period consisted of (1) removing leachate from the trenches, mixing it with cement, then transferring the mixture to earth-mounded concrete bunkers where it solidified, (2) demolishing site buildings and disposing of them on site, (3) constructing an interim geomembrane cap, (4) constructing engineered drainage features to direct runoff and minimize infiltration of rainwater, and (5) monitoring groundwater and surface water, monitoring subsidence in the trench areas, and performing site maintenance. The Initial Closure Period was completed in May 2003.

The 1991 Record of Decision identified 12 radionuclides and 11 non-radionuclides as indicator contaminants in groundwater, surface water, and soils at the site. Tritium is the most abundant and the most mobile of the indicator contaminants and was selected as the primary contaminant of concern. Following an evaluation of historical data, post–Record of Decision data, site hydrogeology, and realistic exposure pathways, investigators concluded that compliance testing and environmental monitoring should focus on migration of tritium through water. EPA and the Commonwealth of Kentucky agreed that other contaminants would not be analyzed in water samples unless any annual average concentration of tritium exceeds 50 percent of the screening level during the previous 5 years.

The Interim Maintenance Period has been ongoing since 2003. The primary objective of this period is to allow the trenches to stabilize by natural subsidence. Additional activities include subsidence monitoring; environmental monitoring; maintenance, repair, or replacement of the interim geomembrane cover, as needed; evaluation of erosion; maintenance of site drainage; and general site maintenance.

The end of the Interim Maintenance Period and the beginning of the Final Closure Period is defined as the time when subsidence of the trenches has nearly ceased and final cap installation can begin. When the final cap is completed and EPA issues a certification of completion, the remedy will be complete, and long-term maintenance will begin under the Custodial Maintenance Period. Although natural stabilization was estimated to require between 35 and 100 years, evaluations by EPA and the Commonwealth of Kentucky indicate that subsidence has been significantly lower than originally estimated. EPA and the Commonwealth will confer to determine when the Final Closure Period should begin.

Regulatory Setting

The National Oil and Hazardous Substances Pollution Contingency Plan (known as the National Contingency Plan, codified at Title 40 *Code of Federal Regulations* Part 300 [40 CFR 300]) is EPA's implementing regulations under CERCLA. The National Contingency Plan directs that remedial actions resulting in any hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure be reviewed every five years to ensure protection of human health and the environment. EPA conducted its second five-year review at the Maxey Flats Site in September 2007 and concluded that the selected remedy is expected to be protective of human health and the environment at the conclusion of the remedial action, and in the interim, exposure pathways that could result in unacceptable risks are being controlled.

Other federal regulations that apply to the Maxey Flats Site include Occupational Safety and Health Standards at 29 CFR 1910, National Emission Standards for Hazardous Air Pollutants at 40 CFR 61, and Resource Conservation and Recovery Act Hazardous Waste Management Standards at 40 CFR 268.

Commonwealth of Kentucky standards that apply to the site include Title 401 Kentucky Administrative Regulations Chapter 5 (401 KAR 5), “Water Quality”; 401 KAR 34, “Standards for Owners and Operators of Hazardous Waste Storage, Treatment and Disposal Facilities”; 401 KAR 63, “General Standards of Performance”; and 902 KAR 100, “Radiology.”

Legacy Management Activities

DOE's Office of Legacy Management manages records pertaining to the Maxey Flats Disposal Site.

Contacts

Documents related to the Maxey Flats Disposal Site are available on the DOE Legacy Management website at http://www.LM.doe.gov/land/sites/ky/maxey/maxey.htm.

For more information about legacy management activities at the Maxey Flats Disposal Site, contact

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