Fact Sheet

U.S. DEPARTMENT OF ENERGY | Legacy Management

Piqua, Ohio, Decommissioned Reactor Site

A D&D site

This fact sheet provides information about the **Piqua site**. Long-term stewardship responsibilities for this site are managed by the **U.S. Department of Energy Office of Legacy Management** under the **Defense Decontamination and Decommissioning Program**.

Site Information and History

The Piqua, Ohio, Decommissioned Reactor Site is located in southwestern Ohio in the city of Piqua on the east bank of the Great Miami River, about 30 miles north of Dayton. The site is approximately 900 feet southeast of the Piqua municipal power station and 150 feet north of the city waste water treatment plant. A limestone quarry frames the north and east sides of the reactor site. The decommissioned reactor is about 120 feet from the Great Miami River.

The first 45.5-megawatt, organically cooled and moderated, thermal reactor was built by the U.S. Atomic Energy Commission (AEC) — predecessor agency to the U.S. Department of Energy (DOE) — as a demonstration project. The prototype used a commercially available mixture of aromatic hydrocarbons called terphenyls to cool the reactor. The 27-foot-tall vessel was made of low-carbon steel and its 7.6-foot-diameter interior had an average wall thickness of 2 inches. The reactor produced 150,000 pounds per hour of 550°F superheated steam, at a pressure of 450 pounds per square inch. The steam was pumped through footbridge pipes across the Great Miami River to turbo generators in the Piqua municipal power plant to augment the city's power supply.

Beginning in 1963, AEC contracted the city of Piqua to operate and maintain the facility. The reactor was shut down in 1966 because of economic and technical considerations. AEC terminated its contract with the city of Piqua in 1967 and dismantling and decommissioning activities began that year. Decommissioning was completed in 1969 and the reactor vessel was entombed on-site.

Construction of water retarding dams and basins in 1921 greatly reduced river flooding throughout the Great Miami River Basin. One of the dams, constructed 4 miles upstream of Piqua, was designed to work with levees and river channel improvements to permit a maximum river flow of 80,000 cubic feet per second at the site. Since the dams were constructed, the highest river flow at Piqua was 22,000 cubic feet per second in 1929 and 1933. The river elevation during that flow was about 9 feet below the main floor level of the reactor building. The flow data was collected at the U.S. Geological Survey station 03262500 in Piqua. Between 2013 and 2016, flow in the Great Miami River at Piqua ranged between 753.8 to 1,152 cubic feet per second.

Facility Decommissioning

Between 1967 and 1969, AEC removed the reactor fuel, coolant, and most of the radioactive materials from the site. Contaminated piping and equipment inside the reactor building were removed or decontaminated. The reactor vessel, concrete biological shield (bioshield), and nonremovable parts of the vessel were left in place. Contamination remaining in the reactor is mainly from activation products — materials that were once stable but became radioactive due to operations — in the reactor core.

Facility structures currently consist of the reactor building and a connected auxiliary building. The belowground portion of the reactor building is an upright steel, cylindrical structure that contains the reactor vessel, steam-generating equipment, and other parts of the heat transfer system.

The reactor vessel is entirely belowground and surrounded by an 8-foot-thick concrete bioshield. Approximately 2 feet of the interior of the bioshield is contaminated with activation products. However, the fuel (enriched uranium) has been removed from the core area of the reactor, and since the facility was designed to contain radioactivity from an operating reactor, the bioshield is capable of containing the activation products during the radioactive decay process.

To prevent surface water seepage, the main floor of the reactor building was covered by a waterproof material and a layer of concrete to make the areas containing radioactive materials inaccessible to people. Two sealed metal boxes that contain detailed information about the structure and contents of the reactor complex (i.e., “time capsules”) were installed, one beneath the concrete that covers the reactor vessel and the other was placed aboveground, inside a building interior wall. The content of this aboveground time capsule was removed in 2019 and placed into the Piqua record managed by LM.

Facility Demolition

In December 2021, DOE finalized its decision to demolish the buildings at the site via an Environmental Assessment/Finding of No Significant Impact. DOE completed demolition in 2023, leaving the low-level radioactive waste entombment belowground in a protected state.

Phase 4 required elevated torch cutting the dome’s steel skin, then “peeling” it away before demolishing the concrete reactor building from the top down.

The entombment sits below grade, fully enclosed in a 10-feet-thick concrete barrier. The surface includes a vegetation barrier and loose stone cover, known as riprap, secured by heavy-duty jersey barriers. The city can use the surrounding parking lot as a laydown area.

The city of Piqua has resumed use of the property for industrial and commercial purposes in accordance with the existing DOE lease and contract. Institutional controls will remain in place to ensure long-term protectiveness of the entombment, and LM will maintain the site's long-term stewardship.

Regulatory Setting

The Piqua site is managed under the DOE Office of Legacy Management (LM) Defense Decontamination and Decommissioning Program under the authority of the Atomic Energy Act of 1954, as amended. During decommissioning in the late 1960's, AEC estimated that the entombed radiological materials would reach unrestricted release criteria under Title 10 *Code of Federal Regulations*, (CFR), Part 20, "Standards for Protection Against Radiation" in the year 2106. DOE is responsible for long-term custody and stewardship of the entombed radiological materials on-site. In accordance with the Piqua Long-Term Surveillance and Maintenance (LTSM) Plan, DOE performs annual site inspections and conducts radiological surveys per 10 CFR 20 and 10 CFR 835, "Occupational Radiation Protection," to ensure that the entombment remains protective of human health and the environment.

The site is owned by DOE and has been leased to the city of Piqua at no cost from 1969 to present. The city currently uses the property as an industrial laydown yard, and instructional controls are in place to ensure no disturbance of the on-site entombment. When the entombed radiological materials achieve unrestricted release criteria, site ownership will revert back to the city of Piqua.

Legacy Management Activities

LM manages the Piqua Decommissioned Reactor Site according to a site-specific LTSM Plan to ensure that LM continues periodic on-site entombment inspections following the demolition project to ensure the site remains in a protective state.

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 **Piqua, Ohio, Decommissioned Reactor Site** are available on the LM website at **www.energy.gov/lm/piqua-ohio-decommissioned-reactor-site**

For more information about LM activities at the **Piqua, Ohio, Decommissioned Reactor Site**, contact:

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