

Appendix D

Cultural Resources Documentation

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Department of Energy
Washington, DC 20585

November 30, 2017

Ohio Historic Preservation Office
Attn: Barbara A. Powers, Department Head
Inventory & Registration
800 E. 17th Avenue
Columbus, OH 43211-2497

Dear Ms. Powers:

Subject: Section 110 Evaluation of the Historic Significance of the Decommissioned Piqua Nuclear Reactor Building, Piqua, Ohio

As you are aware, the U.S. Department of Energy (DOE) Office of Legacy Management (LM) is required to evaluate LM-owned or controlled property to determine if it qualifies for listing on the National Register of Historic Places (NRHP). At our request, our Legacy Management Services (LMS) contractor has completed the enclosed historic building survey of the decommissioned Piqua Nuclear Reactor Building at the Piqua, Ohio, Decommissioned Reactor Site.

The enclosed historic building survey was conducted on the Piqua Decommissioned Reactor Building. Onsite surveys and local archival research were conducted on January 23–27, 2017. The purpose of this study was to develop a determination of eligibility for inclusion in the NRHP for this potentially significant historic building.

The historic building survey and background research resulted in the recommended determination that the Piqua Decommissioned Reactor Building is eligible for inclusion in the National Register of Historic Places under Criterion A for its association with important aspects of American history and under Criterion C for its architectural and engineering qualities. It is further recommended that a historic district is not present at this location.

It is our determination that the decommissioned Piqua Nuclear Reactor Building is eligible for listing on the NRHP as described in the attached historic building survey. We are providing this determination and a copy of the historic building survey for your review and comment. Please let us know if you agree or disagree with our determination at your earliest convenience.



Barbara A. Powers
Page 2

Please contact me at (513) 648-3340 if you have any questions or need additional information.
Please address correspondence to:

U.S. Department of Energy
Office of Legacy Management
10995 Hamilton-Cleves Hwy
Harrison, OH 45030

Sincerely,



Brian Zimmerman
Piqua Site Manager
DOE-LM-20.2

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LMS/PIQ/S15832

**Historic Building Survey
Piqua, Ohio,
Decommissioned Reactor Building**

August 2017

Work performed under DOE contract number DE-LM0000421
for the U.S. Department of Energy Office of Legacy Management.

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Historic Building Survey Piqua, Ohio, Decommissioned Reactor Building

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Document Number: LMS/PIQ/S15832**

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August 2017

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Abstract

A historic building survey was conducted on the Piqua Decommissioned Reactor Building located in Piqua, Ohio. Onsite surveys and local archival research were conducted on January 23–27, 2017. The purpose of this study was to develop a determination of eligibility for inclusion in the National Register of Historic Places for this potentially significant historic building.

The historic building survey and background research resulted in the recommended determination that the Piqua Decommissioned Reactor Building is eligible for inclusion in the National Register of Historic Places under Criterion A of 36 Code of Federal Register (CFR) 60.4 for its association with important aspects of American history and under Criterion C for its architectural and engineering qualities. It is further recommended that a historic district is not present at this location.

This determination is a recommendation only because it has been generated by Navarro Research and Engineering, Inc., a non-federal entity. Therefore, this recommendation determination is not binding upon either the U.S. Department of Energy Office of Legacy Management or upon the Ohio State Historic Preservation Officer.

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Acknowledgments

This study could not have been completed without substantial assistance from individuals familiar with important aspects of the Piqua Decommissioned Reactor Building or nuclear power demonstrations in Ohio.

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Bob Bowman, City of Piqua Power

Roger P. Hartley, Miami County Historical and Genealogical Society

Cynthia Holtzapple, City of Piqua

Shane Johnson, City of Piqua

Michele Miller, Navarro Research and Engineering, Inc.

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Appendix A Ohio Inventory Forms
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Abbreviations

ACHP	Advisory Council on Historic Preservation
AEC	U.S. Atomic Energy Commission
DOE	U.S. Department of Energy
LM	Office of Legacy Management
Navarro	Navarro Research and Engineering, Inc.
NETF	Nuclear Engineering Test Facility
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
OMR	Organic Moderated Reactor
OMRE	Organic Moderated Reactor Experiment
PRDP	Power Reactor Demonstration Program
SHPO	State Historic Preservation Officer
THPO	Tribal Historic Preservation Officer

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1.0 Introduction

The Department of Energy (DOE) Office of Legacy Management (LM) requested the services of Navarro Research and Engineering, Inc. (Navarro) to assess the status of the Piqua, Ohio, Decommissioned Reactor Building for its eligibility to be listed on the National Register of Historic Places (NRHP). The assessment is intended to facilitate compliance with Sections 106 and 110 of the National Historic Preservation Act (NHPA) of 1966. The overall objective of this study was to provide recommendations and documentation to support a determination of eligibility in terms of NRHP criteria.

This report presents the result of the evaluation of the Decommissioned Piqua Reactor Building for historic significance. The report is organized topically. Chapter 1.0 provides an overview of the project and its scope. Chapter 2.0 provides an overview of the methodological approach used to evaluate the building for historic significance. Chapter 3.0 provides a contextual history of the specific themes that are relevant to the role of the Piqua Reactor Building in the broad pattern of American history. Chapter 4.0 presents historic and current photographs of the Decommissioned Piqua Reactor Building. Chapter 5.0 provides recommendations regarding the historic significance of the Decommissioned Piqua Reactor Building. Chapter 6.0 provides a list of cited and uncited works used in the preparation of this technical report. Appendix A provides Ohio Historic Inventory forms for the Decommissioned Piqua Reactor Building. Appendix B provides copies of correspondence between LM and the Ohio State Historic Preservation Officer (SHPO) regarding the historic significance of the Decommissioned Piqua Reactor Building.

1.1 Legislative Requirements

The NHPA requires federal agencies to identify historic property under their ownership or control, to manage them appropriately when they are identified, and to nominate them for inclusion on the NRHP.

The SHPO aids LM in the process of identifying historic property for each state in which the property is located and being evaluated. Similarly, the Tribal Historic Preservation Officer (THPO) participates in this process within the external boundaries of a tribal reservation, when applicable. The Advisory Council on Historic Preservation (ACHP) provides training and oversight on the treatment of historic property throughout the nation. The ACHP promulgated “Protection of Historic Properties,” Title 36 *Code of Federal Regulations* Part 800 (36 CFR 800) that defines the process by which historic property is identified, how effects to historic property are determined, and how adverse effects are resolved. This is commonly called the Section 106 process.

Significant cultural resources, either prehistoric or historic in age, are referred to as historic properties when they merit listing on the NRHP. The definition of historic property is found at 36 CFR 800.16(l)(1), which states, “Historic property means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria.” 36 CFR 16 (l)(2) states, “The term eligible for inclusion in the National Register includes both properties formally determined as

such in accordance with regulations of the Secretary of the Interior and all other properties that meet the National Register criteria.” Historic properties are subject to protection by the federal agency that owns or controls them. Federal agencies that seek to alter historic property as part of an undertaking that is federally funded or permitted may do so once the Section 106 process has been completed.

The National Park Service guidelines have been followed during this evaluation. Specifically, the term “building” is used to describe the Piqua Reactor Building because buildings are created to shelter human activity (e.g., auxiliary building, containment dome) whereas structures are created for purposes other than human shelter (e.g., aircraft, runways, communication towers). The term “facility” is synonymous with building in this technical report.

1.2 Property Description

The Decommissioned Piqua Reactor Building 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 (Figure 1 and Figure 2). The facility is approximately 900 feet southeast of the Piqua municipal power station and 150 feet north of the city sewage treatment plant. A limestone quarry frames the north and east sides of the reactor facility. The decommissioned reactor is about 120 feet from the Great Miami River (DOE 2016).

The decommissioned reactor building is complex, which is typical for nuclear reactors. It consists of a combined building with two very different portions: the containment dome structure and the support building. The containment dome structure physically isolates and provides secure space for the reactor, the reactor cooling system, and the associated support equipment (tanks, pipes, boiler). The support building originally housed the control room, offices, tanks for coolant, filters, and waste tanks; however, some of this equipment was removed during deactivation. The two portions are joined by multiple systems (e.g., electrical, coolant) and by a hallway that provided access between the two portions. To provide for containment, this connection hallway is secured by massive steel doors.

This 45.5-megawatt, organically cooled and moderated thermal reactor was built by the U.S. Atomic Energy Commission (AEC)—predecessor agency to 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 to turbogenerators in the Piqua municipal power plant to augment the city’s power supply, through footbridge pipes across the Great Miami River (DOE 2016).

DOE holds title to the Piqua Site which is comprised of land, facilities and the buried low-level radioactive waste materials. The 1968 agreement between the City of Piqua and AEC (now DOE), leases the Site to the City at no cost. The agency retains responsibility for long-term custody and care of the waste materials entombed within the reactor core to ensure protection of human health and the environment; whereas the City maintains the land and the facilities as part of their lease arrangement.

The lease agreement permits DOE to have ready access to the Piqua Site so annual site inspections and radiological surveys can be conducted, and forbids any activity on the property that could cause the concrete and steel structure that encapsulates the low-level radioactive waste materials to be disturbed in any way. The Piqua Site ownership will be turned over to the City of Piqua when radioactive waste in the entombed reactor meets 10 CFR 20 levels for unrestricted use in its current undisturbed configuration, estimated to occur in 2106.

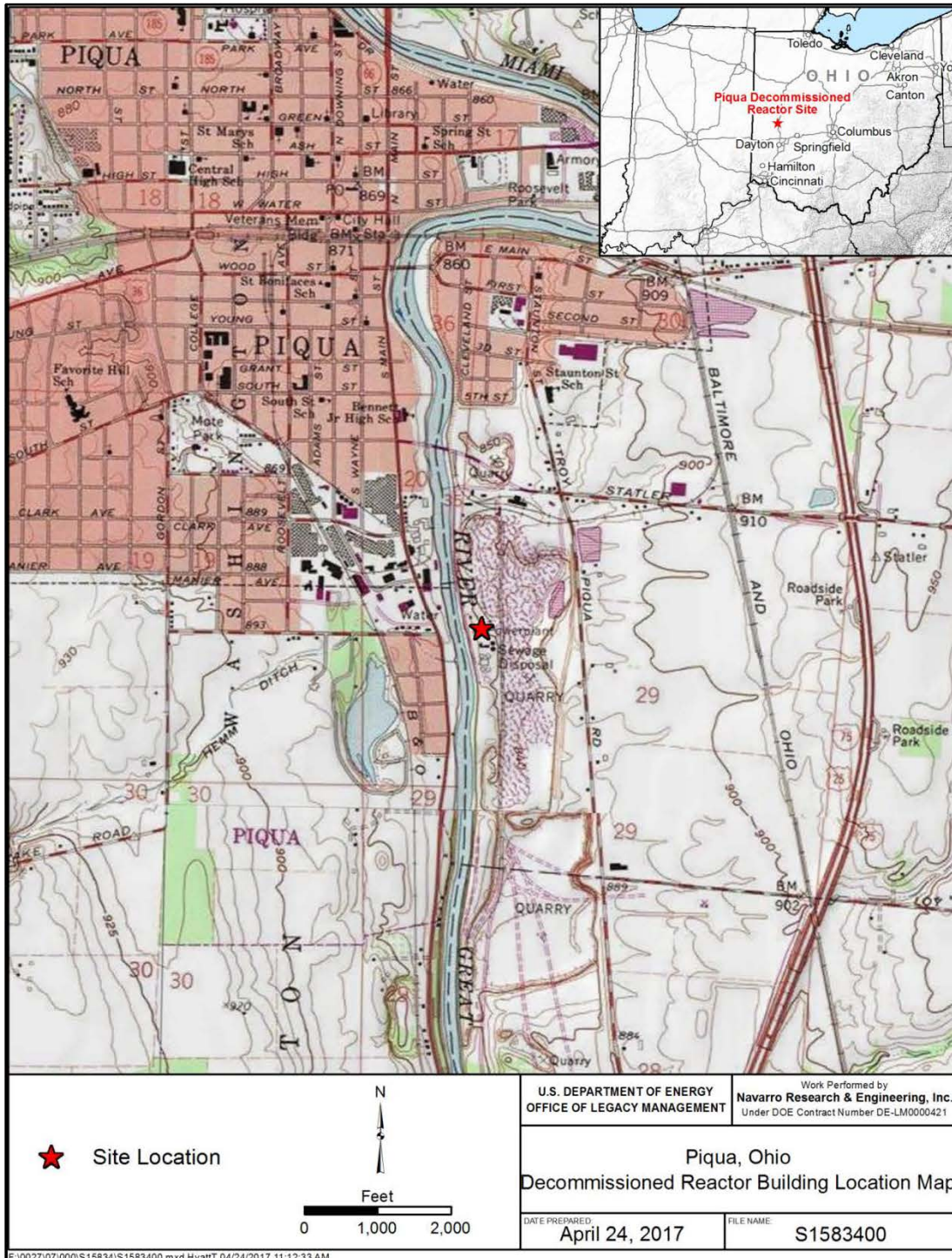


Figure 1. Piqua, Ohio, Decommissioned Reactor Building Location Map.

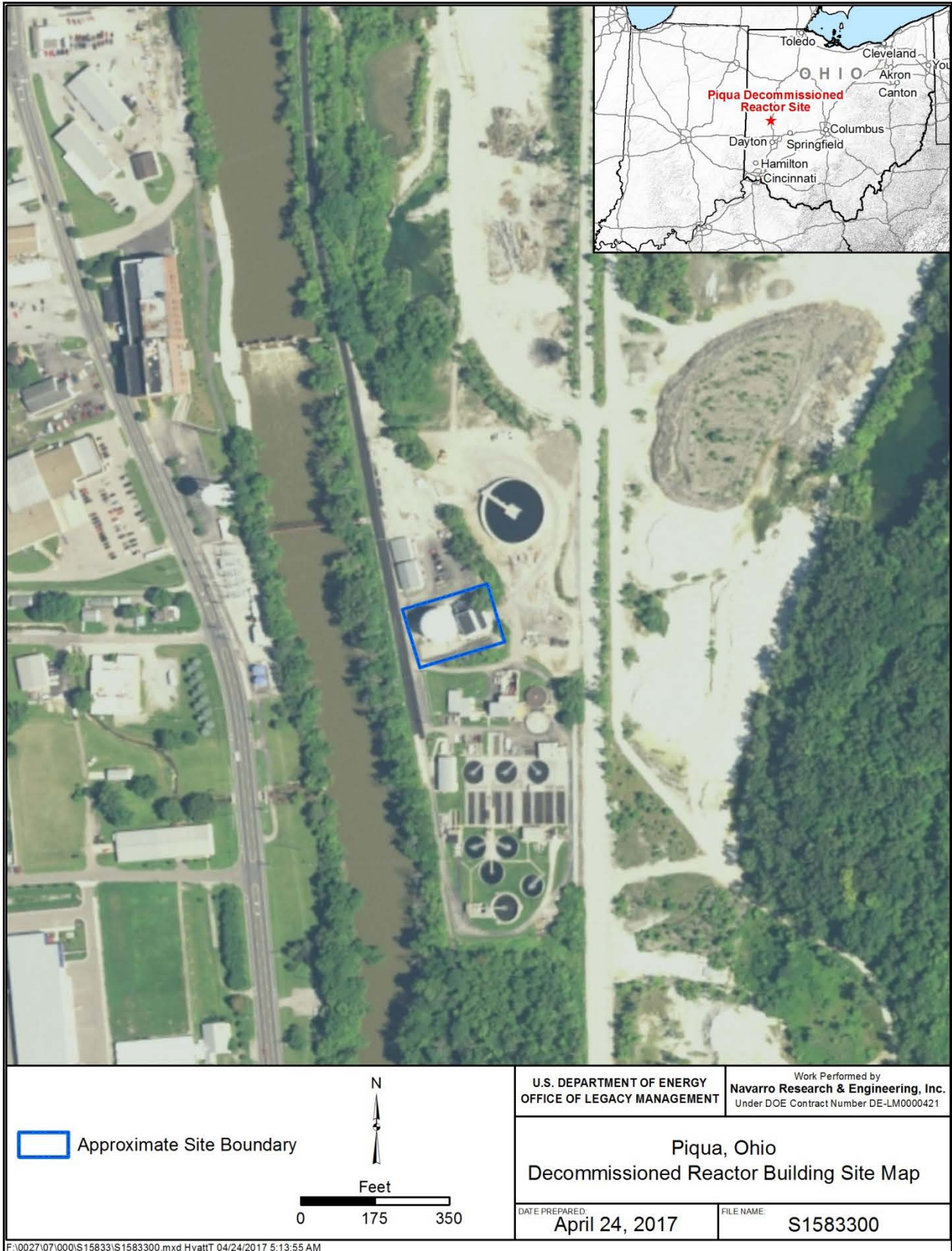


Figure 2. Piqua, Ohio, Decommissioned Reactor Building Site Map.

Between 1967 and 1969, AEC removed the reactor fuel rods, coolant, and most of the radioactive materials from the facility. 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 in the reactor core. The Decommissioned Piqua Reactor Building consists of the concrete and steel reactor containment dome and a connected auxiliary building. Found within the belowground portion of the reactor containment dome is an upright steel, cylindrical structure that contains the reactor vessel, steam-generating equipment, and other parts of the heat transfer system (DOE 2016). The removal of the fuel rods and the necessary support and control systems has rendered this complex inoperable.

The City of Piqua uses the support building for offices, meeting rooms, and storage. The city uses a portion of the reactor containment structure for storage. Two sealed metal boxes that contain detailed information about the contents of the reactor complex (i.e., “time capsules”) were installed, one beneath the concrete that covers the reactor vessel and the other on a wall inside the reactor building. When radioactivity in the reactor decays to safe levels, information obtained from the time capsules will provide records for access to and complete disposal of the reactor vessel (DOE 2016).

The reactor vessel is entirely below ground 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 because 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. The main floor of the reactor building was covered by a waterproof material to prevent surface water seepage followed by a layer of concrete to make the areas containing radioactive materials inaccessible to people.

More than 99% of the radioactive waste material entombed at the facility in 1969 is in the below ground portion of the reactor complex. The Piqua Site ownership will be turned over to the City of Piqua when radioactive waste in the entombed reactor meets 10 CFR 20 levels for unrestricted use in its current undisturbed configuration. This is estimated to occur in 2106.

2.0 Methods

A historic building survey was conducted of the Decommissioned Piqua Reactor Building. Onsite surveys and local archival research were conducted on January 23–27, 2017. The Principal Investigator for this historic building survey was Joseph R. Trnka, AICP, CEP. Mr. Trnka meets the qualifications published at 36 CFR Part 61 for both Architectural Historian and Historian. He has researched and written approximately 60 similar studies nationwide, including three in Ohio (Air Force Plant 85, Columbus; Gentile Air Force Station, Kettering; and Newark Air Force Base, Newark). Mr. Trnka specializes in the historic evaluation of scientific and highly technical properties, military and government properties, and property associated with the Cold War.

The purpose of this study was to develop a determination of eligibility for this potentially significant historic building. The evaluation of the Decommissioned Piqua Reactor Building for eligibility for inclusion in the NRHP included both historic research and onsite examination of the facility.

Broadly, the goals of the site visit and research were to establish sufficient information to support an assessment of significance in accordance with National Register eligibility criteria and criteria considerations (36 CFR 60.4). The text of 36 CFR 60.4 states:

National Register Criteria for Evaluation. The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and

- (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or
- (b) that are associated with the lives of persons significant in our past; or
- (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- (d) that have yielded, or may be likely to yield, information important in prehistory or history.

Criteria Considerations. Ordinarily cemeteries, birthplaces, or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years shall not be considered eligible for the National Register. However, such properties will qualify if they are integral parts of districts that do meet the criteria of if they fall within the following categories:

- (a) A religious property deriving primary significance from architectural or artistic distinction or historical importance; or
- (b) A building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or
- (c) A birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building directly associated with his productive life.
- (d) A cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events; or
- (e) A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived; or
- (f) A property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own exceptional significance; or
- (g) A property achieving significance within the past 50 years if it is of exceptional importance.

The research quickly focused on the potential for the Decommissioned Piqua Reactor Building to exhibit historic significance under Criteria A and C. None of the Criteria Considerations were determined to be applicable in this evaluation.

The majority of the archival research was conducted at the Piqua Public Library, which maintains an extensive collection of materials related to the Decommissioned Piqua Reactor Building. Additional historic research on the context of domestic civilian nuclear power development was conducted online.

3.0 Historic Background

The following section presents an overview of the relevant historic contexts. These historic contexts provide a framework for understanding the historic significance of the Piqua reactor by establishing it in the larger historic context of civilian nuclear power.

A review of the NRHP shows that there are 45 properties and districts in Miami County that are listed on the NRHP. This includes four individually listed buildings and one listed district in Piqua. The listed properties in Piqua include a mansion, hotel, high school, and a downtown district. While not listed on the NRHP, the Piqua Municipal Power Plant, which was erected in 1947, is also considered to be historic. This coal-fired power plant, which is no longer in operation, was the subject of an illustrated public history booklet that was prepared in 1998. The booklet is available on file at the Piqua Public Library (Piqua 1998).

3.1 Historic Context—Early Development of Civilian Nuclear Power

The Piqua nuclear reactor was constructed during the early period of nuclear reactor design and construction in the United States. The following historic context of the development of civilian nuclear power is summarized from a 1975 study prepared by W. Allen titled *Nuclear Reactors for Generating Electricity: U.S. Development from 1946 to 1963*. Allen's work is incorporated by reference and is available online at: <https://www.rand.org/content/dam/rand/pubs/reports/2007/R2116.pdf>.

The Atomic Energy Act of 1946 transferred the responsibility of atomic energy development to the newly created AEC. Prior to 1946, all types of atomic energy development were strictly in the hands of the military. Not only was the technology highly technical, it was also highly classified. During the 1940s, AEC took a variety of approaches to the design of nuclear reactors, including basic nuclear physics research, testing of material durability in an environment of high temperature and radiation, engineering reactor components for reliability, and the construction and operation of various reactor designs.

Given the experimental nature of reactors at the time, a multifaceted approach was taken with a number of different design technologies being studied. These included experimental breeder reactors; pressurized water reactors; boiling water reactors; organic cooled and moderated reactors; graphite moderated, sodium-cooled reactors; homogenous reactors; gas-cooled, graphite-moderated reactors; and high-temperature, gas-cooled reactors. Reactors cooled by water included both light water (ordinary water or H₂O) reactors and heavy water (deuterium oxide or D₂O) reactors. Light water reactors, which operated under pressure to prevent the

coolant from boiling away, were the best studied of the various reactor designs being considered at the time. Light water reactors ended up being the dominant design adopted in the United States.

President Dwight D. Eisenhower was an early driver for the use of atomic energy for civilian, peaceful purposes. His “Atoms for Peace” initiative prompted the development of a diverse number of small nuclear reactors that could be built domestically or overseas. These small nuclear reactors were envisioned to use nuclear fuel that had a very low level of enrichment, which was thought to be both safer and less likely to be diverted to an illicit nuclear weapons program. The small reactors were envisioned to provide steam to existing electric generation turbines, which would allow them to replace existing coal-fired steam plants both domestically and overseas. One of the key considerations was that the nuclear-generated steam had to be cost competitive with coal-generated steam. However, coal-generated steam was the lowest cost energy system at the time, which made being cost competitive very challenging for small reactors.

The first nuclear reactor in the United States to provide power to an electric generation turbine was the Shippingport, Pennsylvania, pressurized water reactor.¹ The Shippingport reactor benefited greatly from research and development that had already been conducted by the U.S. Navy to provide nuclear power for both submarines and aircraft carriers. The Navy had already launched and operated the nuclear-powered USS Nautilus in 1954. The initial reactor at Shippingport originated from a canceled nuclear-powered aircraft carrier. The Shippingport reactor achieved criticality on December 2, 1957, and generated its first electrical power on December 18 of that same year. Ultimately consisting of three reactor cores, Shippingport generated electricity until October 1, 1982, when the plant was decommissioned and the facility was cleaned up and released for unrestricted use.

In 1955, AEC announced the first round of the Power Reactor Demonstration Program (PRDP) to stimulate the design, construction, and operation of experimental nuclear reactors for electricity generation. The first round generated four reactor design proposals. These included a proposal by the Yankee Atomic Electric Company to construct a pressurized water reactor that was substantially larger and different in design from the Shippingport pressurized water reactor then under construction. The Nuclear Power Group proposed constructing a boiling water reactor. The Consumer’s Public Power District of Nebraska proposed constructing a 75-megawatt sodium-cooled, graphite-moderated reactor. The Power Reactor Development Company proposed building a fast breeder reactor using liquid sodium as the coolant.

Construction on the Yankee Atomic reactor, a 175-megawatt pressurized water reactor, began in Rowe, Massachusetts, in 1958. Completed in 1960, it began commercial operation in 1961. Yankee Rowe, as it was called, suffered from fairly normal problems associated with the integration of nuclear-generated steam into a traditional generation plant. Once the start-up difficulties were resolved, the plant yielded a fairly good operational record and provided electric

¹The world’s first grid-connected nuclear reactor was the Obninsk Nuclear Power Plant in the Kaluga Oblast of the Russian Soviet Federated Socialist Republic, Union of Soviet Socialist Republics. Construction of this graphite-moderated, water-cooled reactor began in 1951. Criticality was achieved on May 6, 1954, and the first grid connection was made on June 27, 1954. It was removed from the grid in 1959 and used thereafter both experimentally and to prepare radioactive isotopes. It was shut down on April 29, 2002, and decommissioned.

power for decades. Yankee Rowe was shut down in 1992 when it was no longer economically viable and was fully decommissioned by 2007.

The Nuclear Power Group design resulted in the 200-megawatt Dresden, Illinois, boiling water reactor that became known as Dresden 1. Constructed in Grundy County as the first privately financed nuclear power plant in the United States, Dresden 1 began operation in 1959 and began providing electricity in 1960. This reactor also experienced fairly typical engineering and operational difficulties, which were resolved such that the design was considered to be successful. The Dresden power plant demonstrated the feasibility of the boiling water design and provided electric power for decades. Dresden 1 was retired in 1978. Dresden 2 and 3, which began operation in 1970, remain in service.

The Consumer's Public Power District design was far more ambitious than either the Yankee pressurized water reactor or the Dresden boiling water reactor. Consumer's selected design was a 75-megawatt, graphite-moderated, sodium-cooled reactor that was based in large part upon an experimental design that was still in construction when Consumer's design was approved. Consumer's was not able to take advantage of years' worth of experience from previous work because of the type of reactor design and encountered substantial difficulties during design, construction, and operation. Construction began in 1959 in Hallam, Nebraska, and the reactor achieved criticality in 1962. Within a year or two, this reactor experienced a failure of the sodium containment system that protected the graphite moderator. Even before the Hallam reactor was completed, Consumer's expressed the opinion that the design would have operating costs that would prevent it from operating successfully over the long term. The plant operated until 1964. AEC abandoned plans to develop the sodium graphite concept any further. The Hallam reactor was decommissioned by 1969.

The Power Reactor Development Company's proposal resulted in the construction of the Fermi fast breeder reactor. Reactor construction started on August 4, 1956, and reached initial criticality on August 23, 1963. The fast breeder reactor suffered a partial fuel meltdown in 1966; no nuclear materials were released. The fast breeder reactor was repaired and placed back into service by 1970; however, it continued to experience engineering difficulties. The Fermi fast breeder reactor was shut down in 1972.

In September 1955, AEC announced the second round of the PRDP. AEC received seven proposals by their February 1, 1956, deadline. The goal was to construct demonstration reactors, not experimental reactors, which meant that the reactor designs were to be sufficiently technically mature to test operational reliability in commercial operation.

The seven reactor designs proposed consisted of a closed-cycle boiling water reactor; an organic cooled and moderated reactor; a sodium-cooled, heavy-water moderated reactor; an aqueous homogenous reactor; a closed-cycle, gas-cooled reactor; a liquid metal fuel reactor; and a pressurized water research reactor. Only the first two design proposals advanced through negotiations and were constructed.

The Rural Cooperative Power Association constructed a closed-cycle boiling water reactor outside of Elk River, Minnesota. The Elk River reactor design was complicated by the inclusion of a heat exchanger that was expected to provide steam without the consequent radiation of previous boiling water designs. Construction was scheduled to begin in the spring of 1958 with

operation expected to begin in early 1960. Unfortunately, the Elk River reactor construction was complicated by the selection of a firm without prior experience in reactor design and construction. The resulting technical problems delayed operation until 1962; full-power operation was delayed until 1964. The Elk River reactor operated until 1968. It was decommissioned in 1968 and dismantled in the early 1970s.

The only other reactor design from the second round of the PRDP that was constructed and operated was the organic moderated and cooled reactor constructed at Piqua, Ohio. The history of the Piqua reactor is described in detail in the following subsection, History of the Piqua Organic Moderated Nuclear Reactor.

3.2 History of the Piqua Organic Moderated Nuclear Reactor

The City of Piqua's proposal for a municipal nuclear power plant in Piqua was reported in the March 23, 1956, edition of a local newspaper, the *Piqua Daily Call*. John P. Gallagher, the municipal utilities director, was responding to a request by AEC. A year later, the August 24 edition reported that the AEC appropriation bill passed by Congress included \$11,465,000 earmarked for Piqua. This included \$7,965,000 for construction of the plant and \$3,500,000 for research.

The contractor slated to design and build the Piqua organic moderated reactor (OMR) was Atomics International, a division of North American Aviation Inc., located in Canoga Park, California. In their 1956 paper, titled "Organic Moderated Reactor Electric Power Plant," Atomics International described the advantages of the OMR design over water-moderated reactors. These included small size, good nuclear characteristics without the need for a pressurized primary coolant circuit, and no uranium-coolant reaction hazards. Also, they wrote that the OMR was safer than water-cooled systems because there were no chemical incompatibilities between the coolant and the fuel and none of the usual corrosion problems associated with water systems. They stressed that the organic coolant would act as a governor on the reactor because it had a negative temperature coefficient, giving the reactor an inherent tendency to resist increases in temperature and power levels. Atomics International identified the problem of a small amount of the organic coolant/moderator decomposing in the high-temperature, high-radiation environment of the reactor core. They indicated that this problem had been solved by the incorporation of a purification system in the heat transfer circuit and adding a small amount of makeup fluid to the system continuously to replace the decomposed polymer that was removed (Atomics International 1956).

The Piqua OMR was a design proposal based on the Organic Moderated Reactor Experiment (OMRE), which was constructed at the National Reactor Testing Station in Idaho (Atomics International undated). The Piqua proposal was based on the successful completion and operation of the OMRE and on successful completion of a separate research and development program to develop reliable fuel elements. Both AEC and the design and construction contractor, Atomics International, agreed that the Piqua OMR ought to follow the successful operation of the OMRE. The major technical obstacle was that the decomposition of organic materials in the coolant/moderator resulted in particles in the organic coolant/moderator fluid. These particles then stuck to the inside of the reactor and fouled the heat transfer system. This was also anticipated to lead to higher operating costs due to the need to replace coolant/reactor material unless a solution to the particle generation could be found. An additional

challenge was that the OMRE was not designed to generate electricity. The Piqua OMR would need to address the engineering challenges associated with integrating the OMR with a power generation system.

The OMRE went critical in September 1957. Technical feasibility of the OMRE design was demonstrated after a year of operation. Once a number of OMRE technical uncertainties associated with organic moderation had been resolved, AEC moved forward with the Piqua OMR.

Atomics International agreed to design and build the reactor for a fixed price. The OMR had a rated heat output of 45,500 kilowatts, of which 12,500 kilowatts were used to provide steam for the turbine-generator with the remaining steam sold to other industrial consumers. The OMR consisted of a reactor, heat-transfer system, steam system, and steam pipes to connect the reactor to a turbine generator already in operation at Piqua Power on the other side of the Great Miami River. The existing turbine generator, built to operate off of a coal-fired boiler, was modified to run off steam from either the OMR or from a coal-fired boiler. Construction of the plant began in 1959 and was completed in November 1961. Initial criticality was not achieved until July 1963, almost 2 years behind schedule.

The OMR reactor (Figure 3 and Figure 4) was described by Atomics International as being heterogeneous, with 138 fuel elements and 10 control rods immersed in the coolant/moderator fluid and contained in a thin-walled core tank. The fuel elements and the control rods formed a right cylinder approximately 4.5 feet in diameter and 6.5 feet in length. An iron reflector-thermal shield, about 6 inches thick, enclosed the core tank. The entire assembly is contained in a steel reactor tank. The fuel elements were suspended from the top grid plate and enclosed in steel boxes that extended through the bottom of the core tank. The control rod drive mechanisms were located below the core with the control rod thimbles extending upward through the core into the region above the top thermal shield. The control rod thimbles were surrounded by iron sleeves above the top thermal shield to prevent radiation streaming (Atomics International 1956).

The coolant flowed into the top plenum between the core and the top thermal shield. It then flowed downward through the fuel elements and around the control rod thimbles into the bottom plenum. The fuel elements were individually orificed to produce a maximum bulk outlet temperature. A portion of the coolant flowed through holes in the top grid plate to cool the steel boxes and the external areas of the fuel elements. From the bottom plenum, the coolant flows upward through the bottom thermal shield and around the outside of the core cooling the side thermal shield to the outlet pipe. A steel shell connected to the upper and lower grid plates at the periphery of the core separated the upward and downward coolant passes. The reactor fuel consisted of uranium enriched in uranium-235 by 1.8%. The fuel was intended to provide 2 years of service before requiring replacement (Atomics International 1956).

The OMR was integrated into the city's electrical distribution system to provide useful operating information about fuel reliability and organic material decomposition. During its operational years, the OMR provided sufficient steam to generate approximately 20% of Piqua's total electricity at the nearby Piqua Power Plant.

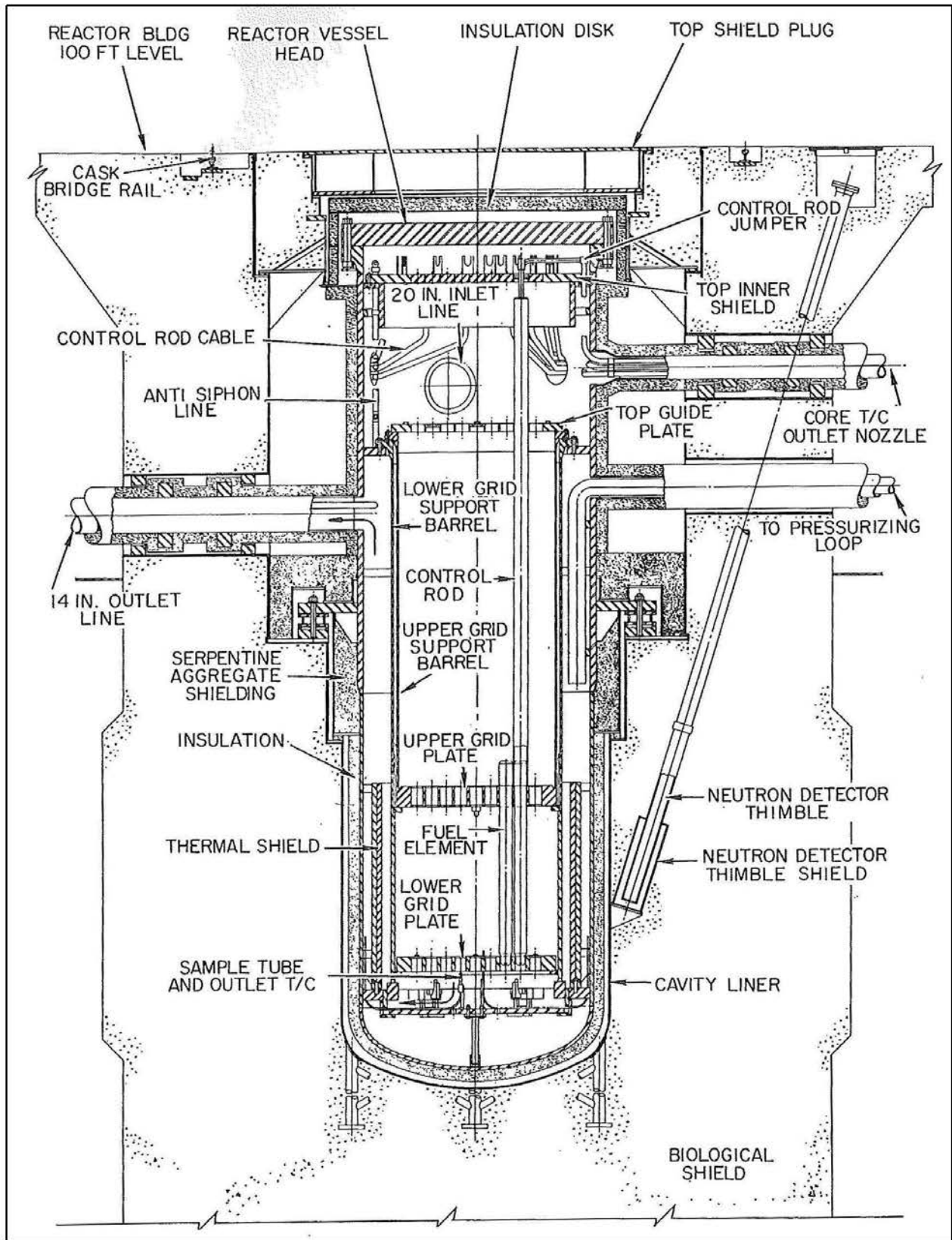


Figure 3. Reactor Vessel Assembly.

Source, "Design of Small Central Station Organic Reactor Power Plants,"
by Atomics International (no date).

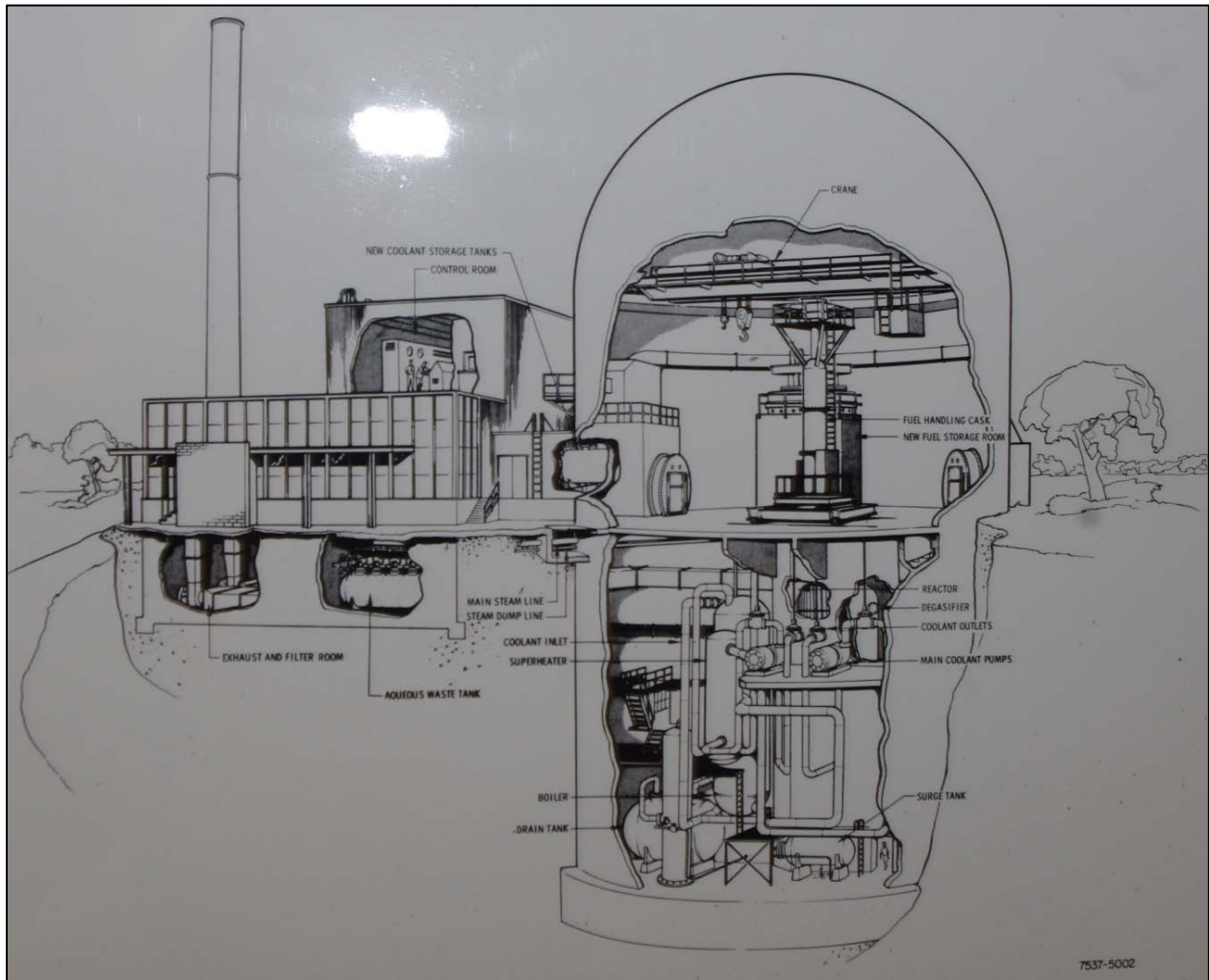


Figure 4. Schematic Drawing of the Piqua Reactor Building.
Photograph by J. Trnka, January 2017.

By early 1963, AEC had evaluated its organic reactor performance and concluded that organic moderated reactors would not be sufficiently competitive with light water reactors to warrant their further support. The outcome of the second round of the PRDP demonstrated that promoting many different types of reactor design resulted in numerous project failures. This was because many of the designs being developed were immature; not yet ready for commercial development. When these designs were coupled with small public utilities that were not able to absorb excess costs, there was a lack of sufficient funding to pay for the research and development necessary for the designs to mature.

3.3 Nuclear Power in Ohio

The first nuclear reactor to begin construction in Ohio was the Nuclear Engineering Test Facility (NETF) at Wright-Patterson Air Force Base in Dayton. Construction of the NETF, a 10-megawatt, light water-cooled test reactor, began in 1956 and was completed in 1960. When completed, the NETF was the Air Force's only research reactor and the seventh largest of its kind in the nation. The NETF's internal facilities were completed in 1965 and its first nuclear

chain reaction was achieved in April of that same year. The NETF was operated by the Air Force Institute of Technology and conducted missions on behalf of that organization as well as other U.S. Department of Defense agencies and civilian institutions. A variety of projects were conducted at the NETF, including biomedical studies and research on solid-state electronics. The reactor was operated for the last time on June 12, 1970, and decommissioned in June 1971 (U.S. Air Force 1995).

3.4 Previous Historic Evaluations of the Piqua Nuclear Reactor

In 1978, R.K. Reed submitted an Ohio Historic Inventory Form for the “Former Piqua Atomic Power Plant.” The completed form, on file with the Ohio State Historic Preservation Office at the Ohio Historical Center in Columbus, provided a brief description and history of the nuclear reactor. At that time, the question “Is it Eligible” was asked in block 12 of the inventory form. The response given was “yes.” The form provided the recommendation that the nuclear reactor was eligible for listing on the NRHP as an individual property with no potential to contribute to a larger historic district.

In 1989, D. Durst completed an Ohio Historic Inventory Form for the “Piqua Nuclear Power Facility” as part of a graduate studies course at The Ohio State University in Columbus. Mr. Durst is still in practice in Ohio as an architect and architectural historian. The form had been revised subsequent to the 1978 inventory and the question in block 12 now read “N. R. Potential?” Mr. Durst answered yes to this question and indicated that there was no potential for a larger historic district.

Both evaluations indicated that the nuclear reactor was likely considered eligible for listing on the NRHP. However, neither evaluation included a formal determination of eligibility or a response from the Ohio SHPO. Thus, while the potential was known, the process had not been followed to completion and the nuclear reactor remained potentially eligible for listing on the NRHP.

4.0 Historic and Current Building Photographs

The following section provides historic and current photographs of the Piqua Reactor Building. The historic photographs were provided by the Piqua Library (Figure 5 through Figure 15). The current photographs (Figure 16 through Figure 29) were taken by J. Trnka in January of 2017.

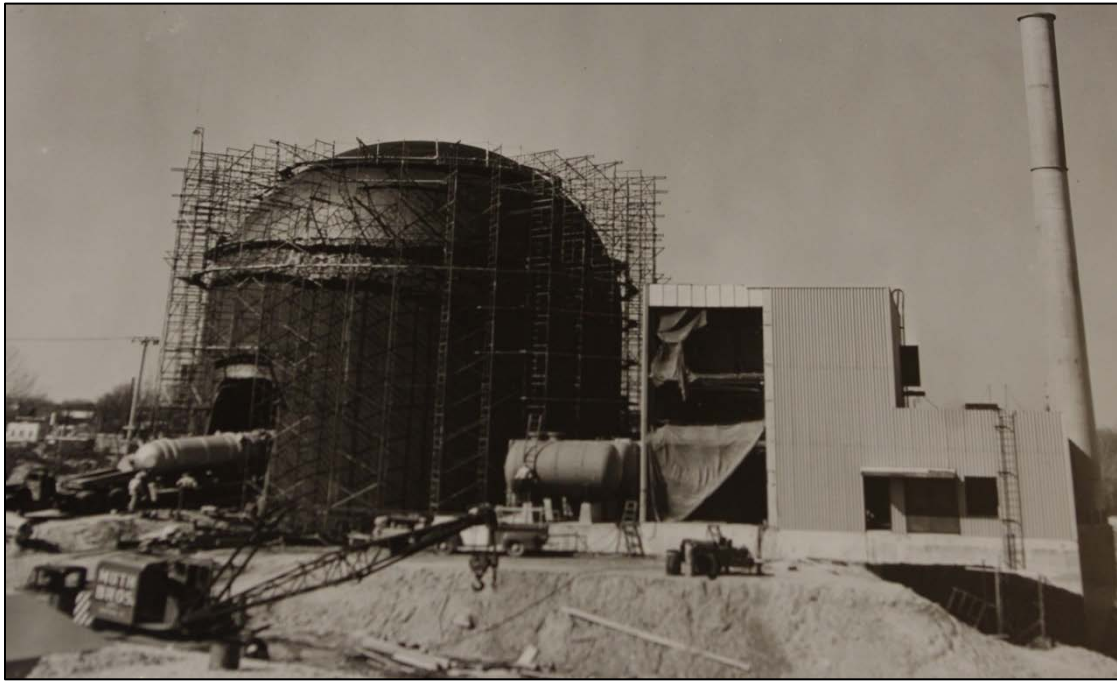


Figure 5. Construction of the Piqua Reactor Building, Looking North, Circa 1960.

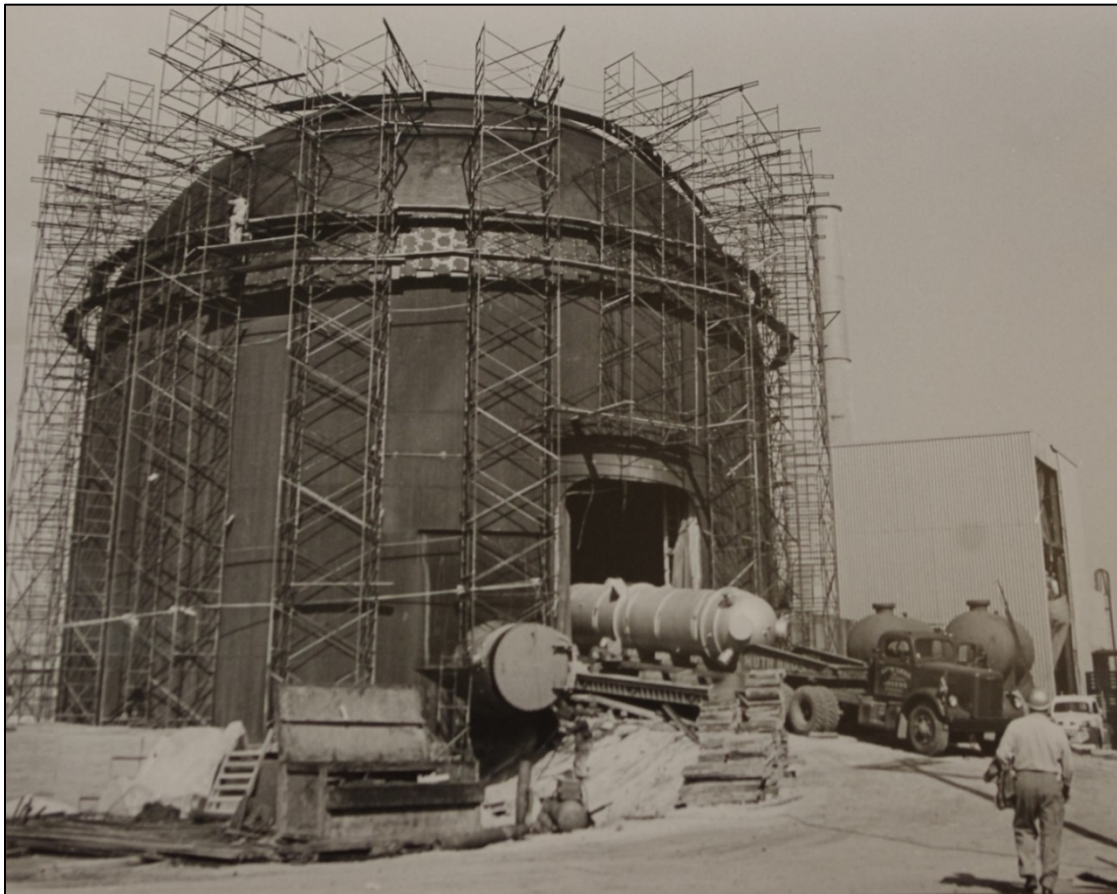


Figure 6. Construction of the Piqua Reactor Building, Looking Northeast, Circa 1960.



Figure 7. Delivery of the Reactor Vessel.

The reactor vessel was so massive that it required three heavy-duty trucks to haul it to the construction site, circa 1960.

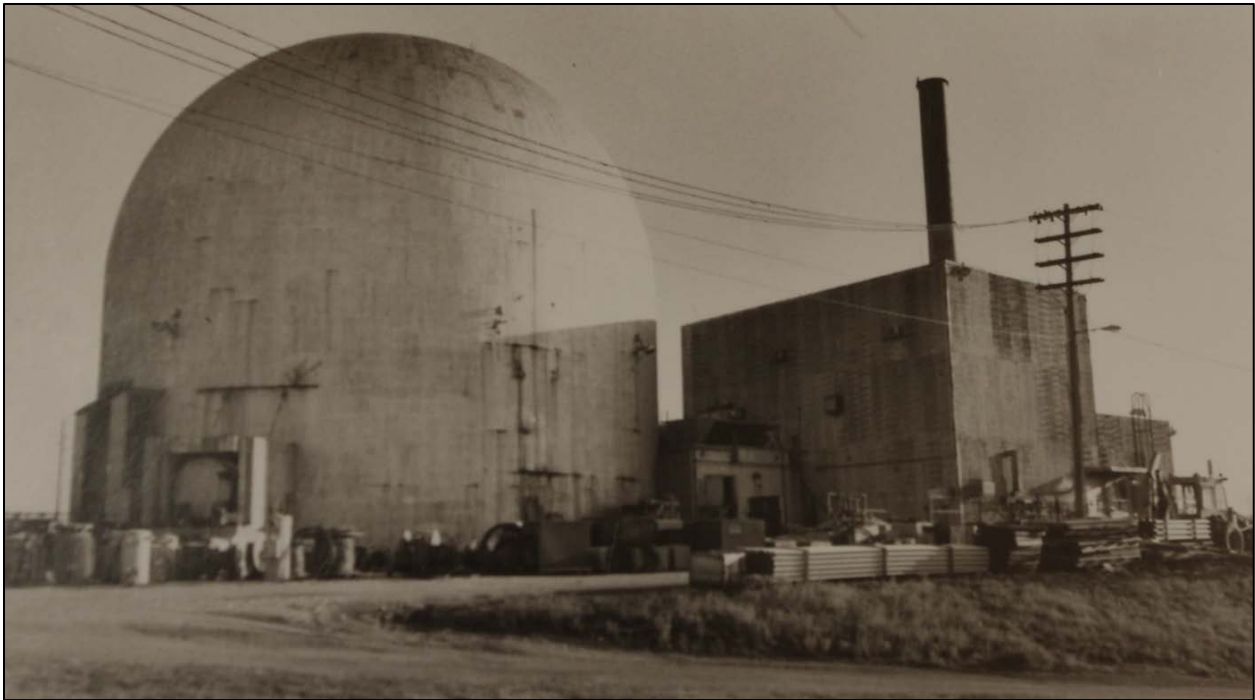


Figure 8. Newly Completed Piqua Reactor Building, Circa 1961.



Figure 9. Piqua Reactor Building Control Room, Circa 1962.

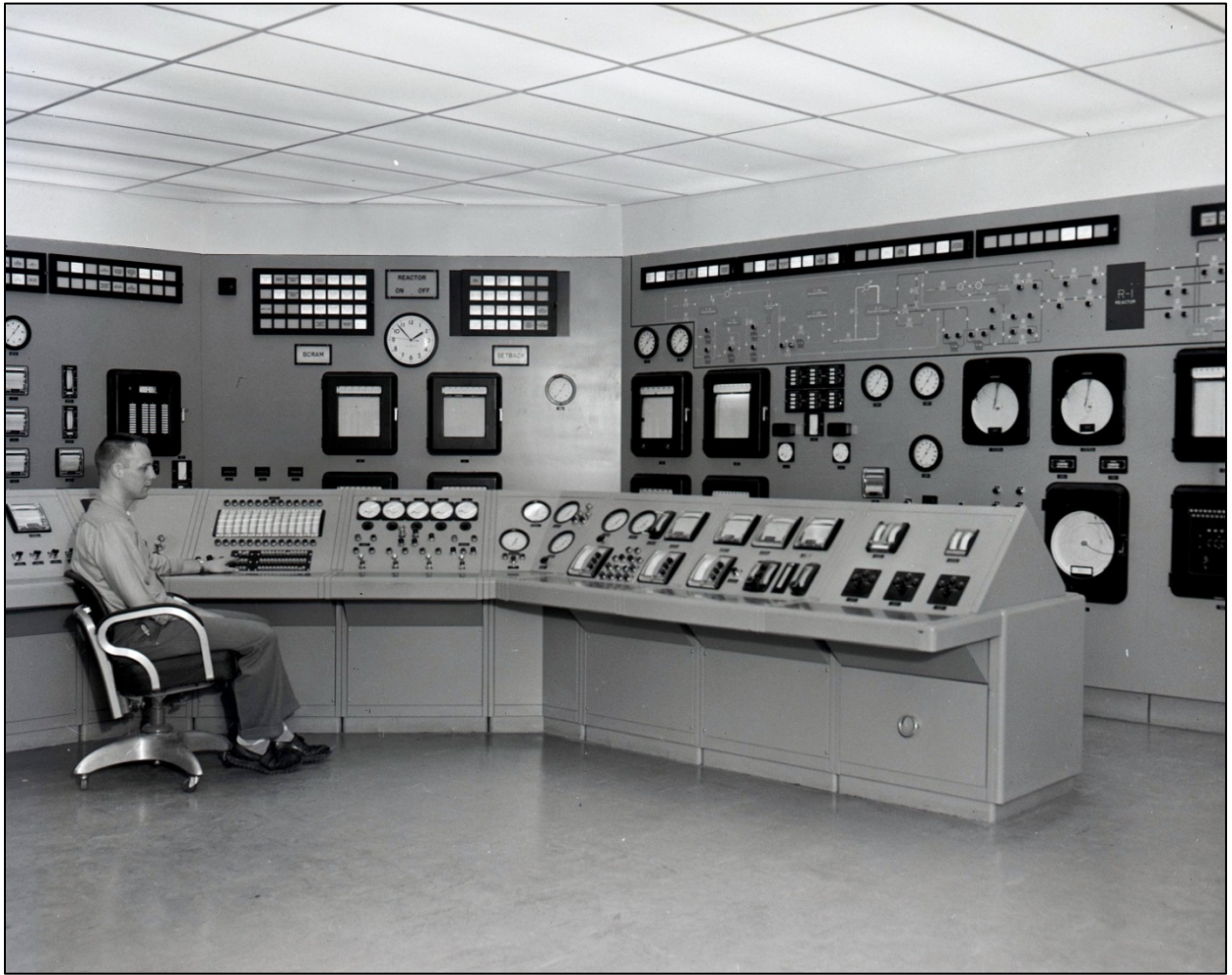


Figure 10. Piqua Reactor Building Control Room, Circa 1962.

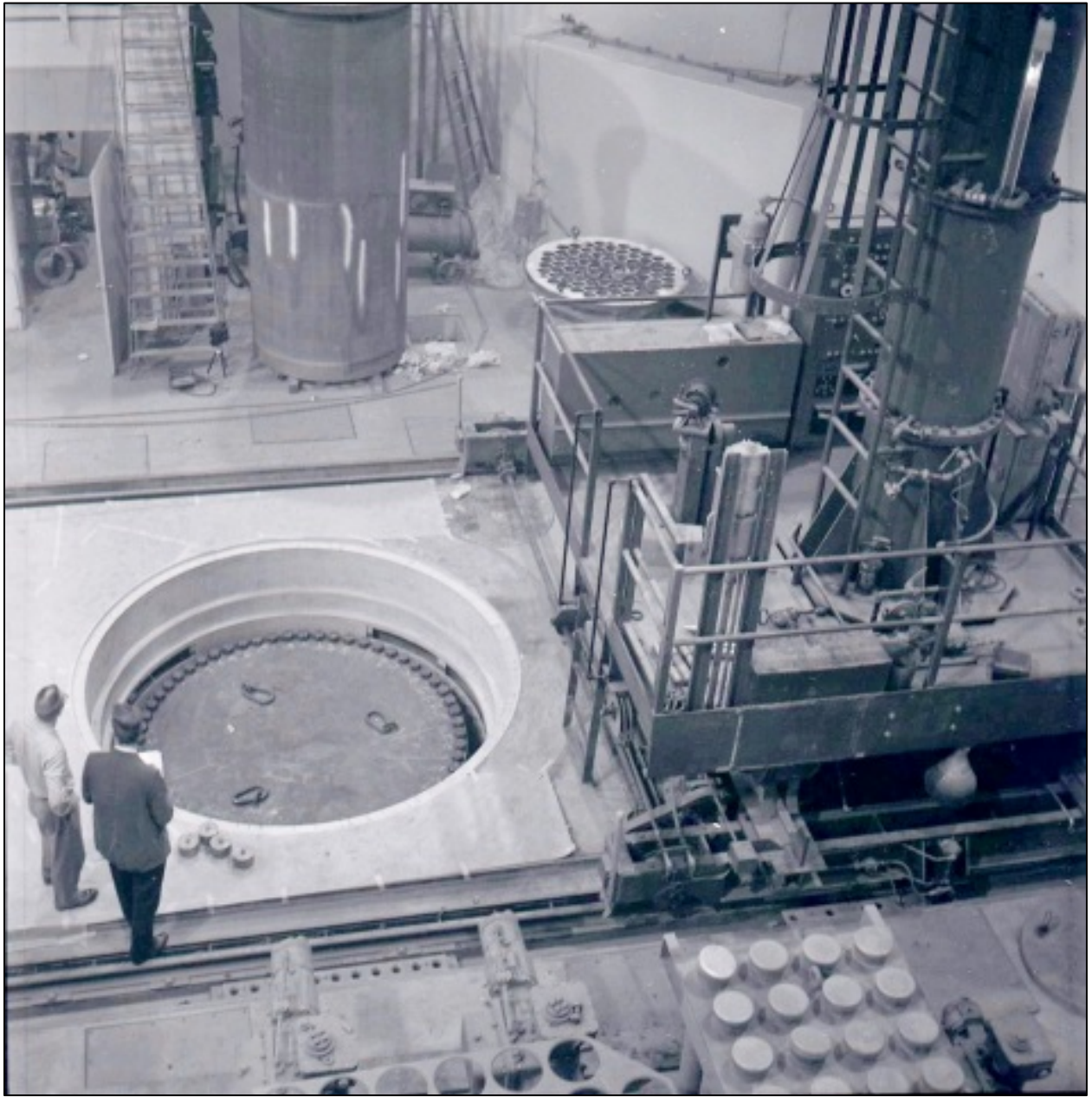


Figure 11. Piqua Reactor Building Interior Detail Photograph.
The reactor lid and fueling equipment are clearly depicted, circa 1962.



*Figure 12. Piqua Reactor Building, Interior Detail Photograph.
A fuel rod is being inserted, circa 1962.*



Figure 13. Piqua Reactor Building Looking Southeast, Circa 1962.



Figure 14. Color Photograph of the Newly Completed Piqua Reactor Building, Circa 1963.



Figure 15. Piqua Reactor Building, Current View, Looking South.
The front of the one-story administrative portion is clad in blue panels, the three-story control portion is clad in gray panels, and the reactor containment dome is steel-clad concrete.



Figure 16. Piqua Reactor Building, Current View, Looking Southwest.



Figure 17. Piqua Reactor Building, Current View, Looking West.



Figure 18. Piqua Reactor Building, Current View, Looking Northeast.



Figure 19. Piqua Reactor Building, Current View, Looking Northeast.
The truck access door was cut into the reactor containment dome as part of the reactor deactivation process. The reactor containment dome now provides storage space.



Figure 20. Piqua Reactor Building, Current View, Looking East.



Figure 21. Piqua Reactor Building, Current View.

Detail of the egress hatch that provided emergency exit out of the reactor containment dome. Note the concrete block to the left (north) of the emergency exit. The concrete block could be moved to block the exit hatch closed.



Figure 22. Piqua Reactor Building, Detail View of the Reactor Containment Dome.

The dome is concrete clad in steel. The original insulation covering the dome was removed after the reactor was deactivated.



Figure 23. Piqua Decommissioned Reactor Building, Detail View of the Control Room.
The partition wall is temporary and can be removed.

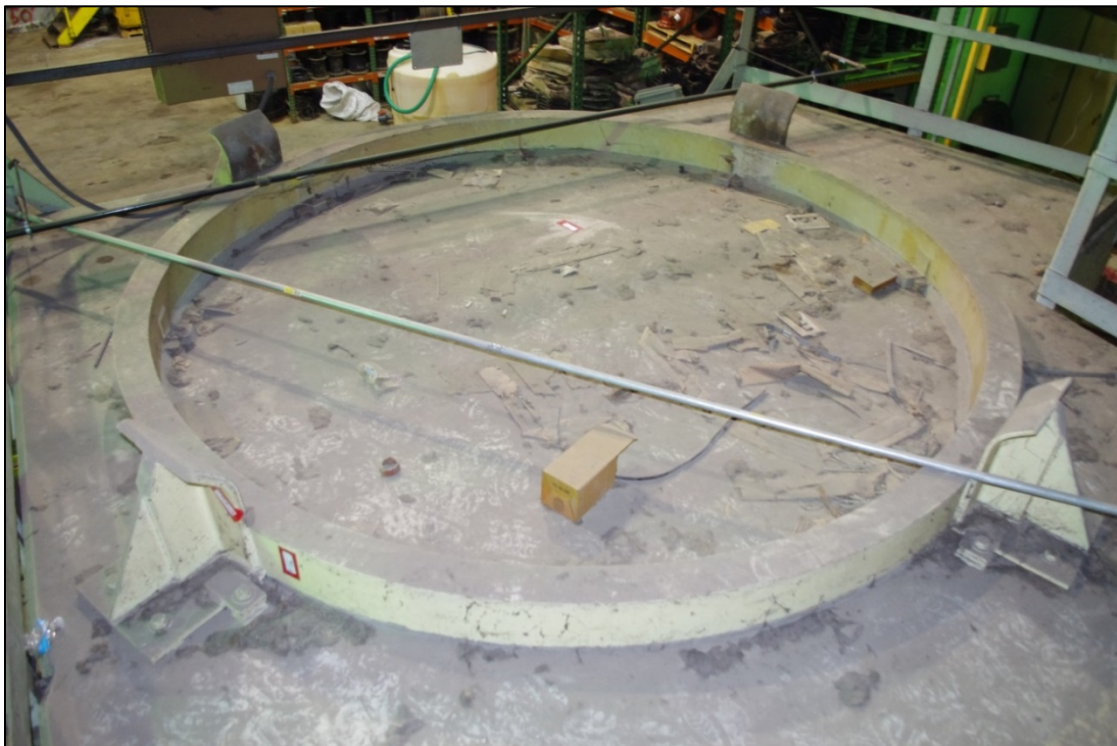


Figure 24. Piqua Reactor Building, Detail View Inside the Reactor Containment Dome.
This ring was used to hold the reactor cover when it was removed to allow fueling or defueling of the reactor core.



Figure 25. Piqua Reactor Building, Detail View Inside the Concrete Reactor Containment Dome. The reactor was covered by a waterproof membrane and an additional layer of cement after it was defueled during reactor decommissioning.

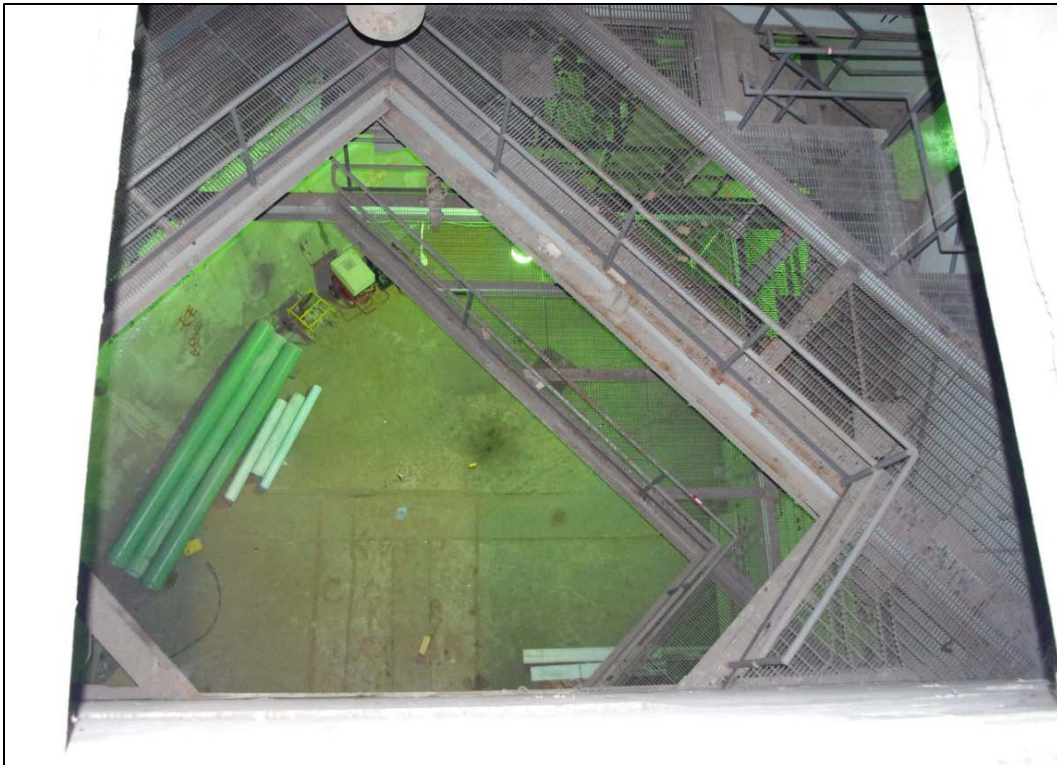


Figure 26. Piqua Reactor Building, Detail Inside the Concrete Containment Dome. The height of the interior space is well illustrated.



Figure 27. Piqua Reactor Building, Door Detail.

This is the passage between the administrative portion of the building and the concrete reactor containment dome.



Figure 28. Piqua Reactor Building, Detail Photograph of Wall Art.
This likely dates to the operational dates of the reactor.



Figure 29. Piqua Reactor Building, Detail of Placard.
This is one of three identical placards that provide legacy information about the reactor vessel that is entombed inside the concrete containment dome.

5.0 Conclusions and Recommendations

The historic building survey and background research resulted in the recommended determination that the Piqua Reactor Building is eligible for inclusion in the NRHP under Criterion A for its association with important aspects of American history and under Criterion C for its architectural and engineering qualities. It is further recommended that a historic district is not present at this location.

It is important to note that the existing Piqua Reactor Building maintains substantial integrity to its original construction and operational period. The recommended period of historic significance for the Piqua Reactor Building begins with initiation of construction in 1959 and ends in 1969 when the reactor was defueled and entombed in concrete. There are seven aspects of integrity that are vital for a historic property’s ability to convey its historic significance to the public (National Park Service 1991). The aspects of integrity for the Piqua Reactor Building are summarized in Table 1 below.

Table 1. Aspects of Integrity of the Piqua Reactor Building

Aspect	Rating	Notes
Location	Intact	The property remains in its original location.
Design	High	The property retains a significant portion of its original design.
Materials	Medium-High	The property retains a significant portion of its original materials. Of note, the original insulating cover on the reactor containment dome has been removed.
Workmanship	High	The property retains significant quality of workmanship that is consistent with its historic period (1959–1969).
Setting	Medium	The property retains a substantial amount of its original setting. The surrounding land use has changed modestly. The limestone quarry remains in operation to the east. The wastewater treatment plant, which has been modified somewhat, remains in operation to the south. The river remains unchanged to the west. The Piqua Power Building remains to the northwest. While the power building interior has been altered substantially due to the removal of the turbogenerators, the exterior remains essentially intact.
Feeling	High	The feeling of the area remains largely intact with only minor changes to the surrounding industrial land uses that were active during the period of historic significance (1959–1969).
Association	High	The association between the Piqua Reactor Building and the surrounding industrial buildings remains largely intact.

It is recommended that LM provide a copy of this technical report along with their formal determination of eligibility to the Ohio SHPO in accordance with the applicable Section 106 regulations found in 36 CFR 800. LM is required by the Section 106 process to provide the Ohio SHPO with a 30-day opportunity to review and comment upon LM’s formal finding regarding eligibility and this technical report.

Should an agreement be reached between LM and the Ohio SHPO that the Piqua Reactor Building is eligible for listing on the NRHP, then the property would continue to be managed as

historic property, including having its information updated in the Cultural Resources Management Plan maintained by LM. As a historic property, the Piqua Reactor Building should also be nominated for listing on the NRHP in accordance with Section 110 of the NHPA.

Should a disagreement arise between LM and the Ohio SHPO regarding the formal determination of eligibility, then the opinion of the Keeper of the National Register should be solicited regarding the property's eligibility for listing on the NRHP. The Piqua Reactor Building should be managed as a historic property until the disagreement is resolved.

Should both parties agree that the Piqua Reactor Building is not eligible for listing, then no further work would be required. In this case, the property would not need to be managed as a historic property.

This determination is only a recommendation because it has been generated by a non-federal entity. As such, this recommendation determination cannot be considered to be binding upon either LM or upon the Ohio SHPO.

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36 CFR Part 800. "Protection of Historic Properties," *Code of Federal Regulations*.

Appendix A
Ohio Inventory Forms

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Appendix B

Correspondence

To be inserted after submittal to Ohio SHPO and upon receipt of the SHPO response letter

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January 30, 2018

In reply please reference
2017-MIA-40527

Mr. Brian Zimmerman, Piqua Site Manager
U.S. Department of Energy
Office of Legacy Management
10995 Hamilton-Cleves Hwy.
Harrison, OH 45030

Re: Repairs and Rehabilitation at the Decommissioned Piqua Nuclear Reactor Building
Piqua, Miami County, Ohio

Dear Mr. Zimmerman,

This letter is in response to correspondence from your office received December 1, 2017 regarding two project review requests for activities at the Decommissioned Piqua Nuclear Reactor Building. You also requested SHPO comments concerning a formal determination of eligibility for this facility that may be submitted by the Department of Energy (DOE). Comments from the Ohio State Historic Preservation Office (SHPO) are offered pursuant to provisions of the National Historic Preservation Act of 1966, as amended, and implementing regulations at 36 CFR 800.

It is our understanding that for the purposes of the current review, DOE is treating this facility as eligible for the National Register of Historic Places, pending a formal Determination of Eligibility that may occur in the future. We agree with this approach and offer our comments accordingly. Our response addresses project activities for asbestos and lead-based paint abatement activities, as well as safety-related repairs to the fire suppression system and loading dock.

Asbestos and lead-based paint abatement involves removal and replacement of the materials made of or coated with asbestos and/or lead-based paint. The areas where materials were removed will be repaired with new material that is generally similar in appearance to the removed material. The repairs to the water line serving the fire suppression system will make the system operable again by replacing a short section of pipe that is not considered to be a character defining feature. The repairs to the loading dock involve repair and/or replacement of a concrete dock in an area where heavy use is expected. We agree that the proposed repairs generally meet the Standards for Rehabilitation, as they have been interpreted for properties that draw their primary significance from scientific research. Therefore, we also concur with your determination of no adverse effect for these repair projects.

We have reviewed the eligibility evaluation prepared for the facility and tend to agree that the Piqua Nuclear Reactor Facility should be considered an important example of the application of nuclear fission for local electricity production. For the purposes of future reviews at this site, we agree that

Mr. Brian Zimmerman
January 30, 2018
Page 2

the facility is eligible for inclusion in the National Register of Historic Places under Criterion A for its association with early pilot programs associated with the development of nuclear power and Criterion C as an example of a reactor demonstrating a local scaled model for an “Organic Moderated Reactor”.

We understand that it is likely that a formal Determination of Eligibility will be submitted to the Keeper of the National Register after it has been prepared. We think that it would be helpful if some additional details were included in that document which more clearly identify and compare key features of the reactor building and the support building as they existed historically and continue to exist today. (That information would also support the review of future maintenance activities that might be necessary as the building continues to be used by the City of Piqua.) We also recommend that a more detailed assessment of integrity for key features of the facility should be added, since the supporting analysis for consideration of integrity under Criterion C is not as well supported in the report as in the detailed historic context information that is offered in support of Criterion A. The loss of control features within the support building also needs more explanation- are any character-defining features related to that building’s function still intact?

Finally, the eligibility evaluation states that no historic district is present at the site, but it also describes the setting as being critical both to the selection of the site and its historic use. Please clarify if there are additional features in proximity to the facility which still exist and relate to its historic use. Additional information that better describes the integration of systems between the facility and other infrastructure would be helpful in support of a boundary description and justification statement.

We appreciate your consideration of historic properties in agency planning. Any questions concerning this letter should be addressed to Lisa Adkins or David Snyder at (614) 298-2000. Please be advised that this a Section 106 decision and that this review decision may not extend to other SHPO programs.

Sincerely,



Lisa Adkins, Architecture Reviews Mgr.
Dept. of Resource Protection & Review

RPR Sernos: 1071442, 1071443 and 1071444

OHIO HISTORY CONNECTION

800 E. 17th Ave., Columbus, OH 43211-2474 • 614.297.2300 • ohiohistory.org

Department of Energy

Washington, DC 20585

Mr. Dave Snyder, Archaeology Reviews Manager
Ohio State Historic Preservation Office
800 E. 17th Avenue
Columbus, OH 43211-2497

Subject: Section 110 Evaluation: Phase I Archaeological Survey for the Former Piqua Nuclear Power Facility (Piqua, Ohio, Decommissioned Reactor Site), Piqua, Miami County, Ohio (2017-MIA-40527)

Dear Mr. Snyder:

As discussed with your office on August 13, 2018, the U.S. Department of Energy (DOE) Office of Legacy Management (LM) is currently evaluating a proposal to demolish the former Piqua Nuclear Power Facility, now referred to as the Piqua, Ohio, Decommissioned Reactor Site, in Piqua, Ohio. On January 30, 2018, your office agreed with LM's determination that the building is eligible for listing on the National Register of Historic Places under Criterion A for its association with important aspects of American history and under Criterion C for its architectural and engineering qualities.

The archaeological area of potential effects (APE) for the proposed demolition is approximately 0.457 acre of land, currently held in title by DOE. LM has completed the enclosed Phase I Archaeological Survey for the Piqua Reactor Site, Miami County, Ohio, to identify archaeological resources that may be impacted by the proposed demolition. This archaeological survey was performed by the U.S. Army Corps of Engineers, Louisville District under an interagency agreement with DOE and is in compliance with Sections 106 and 110 of the National Historic Preservation Act of 1966 (as amended). The work conducted follows the professional standards and guidelines in the Secretary of the Interior Standards and Guidelines for Archaeology and Historic Preservation and the Ohio Historical Society's Archaeology Guidelines.

The results of the archaeological survey revealed no evidence of intact soils at the Piqua site. The report did not identify any significant prehistoric or historic archaeological resources within the APE and recommends that no further archaeological work be conducted at this location. In accordance with Title 36 Code of Federal Regulations Section 800.4(d)(1), LM has determined no archaeological resources that merit consideration as historic property are present at this location. A copy of the draft report is enclosed for your review and comment at your earliest convenience.

As part of the planning process, LM consulted the Tribal Directory Assessment Tool website maintained by the U.S. Department of Housing and Urban Development. This online tool indicated that members of the enclosed list have an interest in Miami County, Ohio. Pursuant to your recommendation, these tribal members are also being provided with a copy of the enclosed archaeological survey for their review and comment.

Dave Snyder

-2-

April 8, 2019

Please contact me at (513) 648-3340 or Brian.Zimmerman@lm.doe.gov, if you have any questions.
Please send any correspondence to:

U.S. Department of Energy
Office of Legacy Management
10995 Hamilton-Cleves Hwy.
Harrison, OH 45030

Sincerely,

 BRIAN ZIMMERMAN
2019.04.05 15:36:40
-04'00'

Brian Zimmerman
Piqua Site Manager

Enclosures

cc w/o enclosures:

L. Adkins, OH SHPO
P. Benson, DOE-LM (e)
G. Hooten, DOE-LM (e)
D. McNeil, DOE-LM (e)
T. Ribeiro, DOE-LM (e)
Y. Deyo, Navarro (e)
S. Marutzky, Navarro (e)
M. Miller, Navarro (e)
N. Olin, Navarro (e)
S. Osborn, Navarro (e)
J. Tmka, Navarro (e)

cc w/enclosures:

DOE Read File
File: PIQ 0100.02 (records)

LM22\PIQ\2019.04.02 PIQ Sec 110 Eval Archaeological Survey (OH SHPO)





**US Army Corps
of Engineers**

Louisville District

**PHASE I ARCHAEOLOGICAL SURVEY FOR THE PIQUA
REACTOR SITE, MIAMI COUNTY, OHIO**

Report authored by:

Jared Barrett

Jared Barrett

Archaeologist, MA, RPA

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Abstract

The following report describes the results of the Phase I archaeological survey for the proposed demolition of the Piqua, Ohio, Decommissioned Reactor Site (Piqua site) in Miami County, Ohio. Construction of the reactor was completed in 1961 and the facility operated from 1963 to 1965 but was shut down in 1966 due to technical and economic considerations. Decommissioning began in 1967 and was complete in 1969. High-level waste was removed and disposed of offsite, and low-level radioactive waste was entombed onsite in concrete.

Currently, the U.S. Department of Energy (DOE) and City of Piqua (City) have a long-term lease agreement that leases the site to the city at no cost, and a real estate deed was filed with Miami County that states that ownership of the site will automatically revert back to the City when the radiological materials entombed onsite meet Title 10 *Code Federal Regulations* Section 20 levels for unrestricted release through natural decay processes, which is estimated to occur in the year 2106. According to the contract, the City is responsible for non-nuclear facility maintenance and upkeep of the facilities onsite including the administration building and reactor facility, including maintaining a cathodic protection system and water-level alarm for a sump pump. The DOE Office of Legacy Management (LM) is responsible for the long-term stewardship of the Piqua, Ohio, Decommissioned Reactor Site (Piqua site). LM holds the title to the facility and 0.457 acre of land and is responsible for ensuring the protectiveness of the radiological materials entombed onsite.

In April 2018, the City informed LM that it is no longer interested in using the Piqua site for any operations. After studying several alternatives for the Piqua site, LM has decided on full demolition of the Piqua site while maintaining protectiveness of the entombed radiological materials. The archaeological area of potential effects (APE) for the demolition of the Piqua site will consist of the 0.457 acres of land currently held in title by LM. This archaeological survey is in compliance with Section 106 and 110 of the National Historic Preservation Act of 1966 (as amended). The work conducted follows the professional standards and guidelines in the Secretary of the Interior Standards and Guidelines for Archaeology and Historic Preservation (Secretary of the Interior 1983) and the Ohio Historical Society's *Archaeology Guidelines* (Ohio Historic Preservation Office 1994). The survey was performed by personnel from the United States Army Corps of Engineers-Louisville District (USACE). The historic structure survey and history of the Piqua site is discussed in a separate report.

Results of the archaeological survey revealed no evidence of intact soils at the Piqua site and did not identify any significant prehistoric or historic archaeological resources within the APE. Therefore, no further work is recommended in regards to archaeological resources for the demolition of the Piqua site.

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Introduction

The following report describes the results of the Phase I archaeological survey for the proposed demolition of the Piqua, Ohio, Decommissioned Reactor Site (Piqua site) in Miami County, Ohio. Construction of the reactor was completed in 1961 and the facility operated from 1963 to 1965 but was shut down in 1966 due to technical and economic considerations. Decommissioning began in 1967 and was complete in 1969. High-level waste was removed and disposed of offsite, and low-level radioactive waste was entombed onsite in concrete.

In 1968, Atomic Energy Commission (AEC), a predecessor agency to the U.S. Department of Energy (DOE), and the City of Piqua (City) signed Contract No. AT(11-1)-1798 that identified the roles and responsibilities of each party following decommissioning of the reactor. This contract provided that the City of Piqua would convey title to the federal government of that portion of the leased land on which the reactor building was erected, and the government would thereafter lease the premises back to the City. In 1969, AEC and the City of Piqua signed a long-term lease agreement that leases the site to the city at no cost, and a real estate deed was filed with Miami County that states that ownership of the site will automatically revert back to the City when the radiological materials entombed onsite meet Title 10 *Code Federal Regulations* Section 20 levels for unrestricted release through natural decay processes, which is estimated to occur in the year 2106. According to the contract, the City is responsible for non-nuclear facility maintenance and upkeep of the facilities onsite including the administration building and reactor facility, including maintaining a cathodic protection system and water-level alarm for a sump pump. The DOE Office of Legacy Management (LM) is responsible for the long-term stewardship of the Piqua, Ohio, Decommissioned Reactor Site (Piqua site). LM holds the title to the facility and 0.457 acre of land and is responsible for ensuring the protectiveness of the radiological materials entombed onsite.

In April 2018, the City informed LM that it is no longer interested in using the Piqua site for any operations. After studying several alternatives for the Piqua site, LM has decided on full demolition of the Piqua site while maintaining protectiveness of the entombed radiological materials. The archaeological area of potential effects (APE) for the demolition of the Piqua site will consist of the 0.457 acres of land currently held in title by LM. This archaeological survey is in compliance with Section 106 and 110 of the National Historic Preservation Act of 1966 (as amended). The work conducted follows the professional standards and guidelines in the Secretary of the Interior Standards and Guidelines for Archaeology and Historic Preservation (Secretary of the Interior 1983) and the Ohio Historical Society's *Archaeology Guidelines* (Ohio Historic Preservation Office 1994). The survey was performed by personnel from the United States Army Corps of Engineers-Louisville District (USACE). The historic structure survey and history of the Piqua site is discussed in a separate report.

The primary objective of this survey was to identify any prehistoric and historic archaeological sites that could be eligible for the National Register of Historic Places (NRHP). This objective was met through a literature review and records search to identify any known archaeological resources and a field survey to locate any previously unknown archaeological sites in the APE. Fieldwork was conducted on September 20, 2018 by USACE archaeologist Jared Barrett.

Figure 3: Overview of the APE at its southwest corner, facing northeast.



Figure 4: View of eastern boundary of the APE showing depth of existing facilities, facing northwest.



Figure 5: View of northern edge of the APE, facing east.



Figure 6: View of the northwestern corner of the APE, facing southwest.



Figure 7: View showing leveled, graded area along southern edge of the APE and sloped terrain immediately to the south, facing north.



Physiography

The APE lies within the Till Plains section of the Central Lowland physiographic province. The Till Plains is characterized by areas of low relief on broad till plains whose undulating surfaces are poorly drained (Brockman 1998). The bedrock underlying the APE consists of Silurian shale and limestone of the Richmond and Maysville group. Ordovician shale sand dolomite underline the Silurian beds, and occasionally crop out (Garner et al. 1978). The Ordovician Period began around 500 million years ago which caused the Ohio landscape to be formed by the receding glacial formations. These sedimentary deposits have been covered by Wisconsin age glacial drift which includes sand and gravel, lake deposits, and till-clay and pebble mixture.

Soils

The soils encountered within and adjacent to the APE consist of Cut and Fill Land as described in the 1978 Miami County, Ohio soil survey (Lehman and Bottrell 1978). The current USDA web soil viewer describes the soils within the area of the APE as Udorthents (USDA WSS 2019). Udorthent soils are typically wet substratum that consist of areas of disturbed soils where the upper soil materials have been removed, filled, or graded. They are moderately well drained, gravelly and sandy soil areas located within areas of glacial fluvial deposits. From these soil descriptions, it appears that no intact soils exist within or adjacent to the APE.

Climate

The climate of Miami County is of the continental type, which can fluctuate between the seasons. Summers are usually warm and humid, whereas winters are usually cold. The average temperature for Miami County is 52 degrees Fahrenheit with the average annual high temperature being 61.1 degrees Fahrenheit and the average annual low temperature being 42.8 degrees Fahrenheit. The average precipitation in the area is 41.09 inches and average snowfall is 25 inches (US Climate Data 2018).

Flora and Fauna

This information has been extracted/adapted from (Lewthwaite *et al* 1997), to provide a background setting for the flora and fauna of the APE.

Late Pleistocene and Holocene environmental profiles for the Ohio region are of a general nature and apply to a large section of Eastern North America. Pollen profiles for areas in Indiana, Ohio, Pennsylvania and New England indicate a relatively consistent climatic sequence across the northeast (Bergman & Rue 1990). This sequence originated around 15,000 BC with a moist cool climate. Between 9000 and 7000 BC a warming trend started, lasting until 2000 BC. This warming trend initiated the northern advance of deciduous forests (Bergman & Rue 1990). Around 1000 BC the forests were dominated by the Oak-Chestnut climax forest that are still prevalent in the eastern woodlands today (Bergman & Rue 1990).

Pleistocene fauna were significantly different from modern fauna. The area surrounding the APE supported species such as ground sloths, mammoth (*Mammuthus jeffersoni*), mastodon (*Mammut americanus*), and musk ox (*Ovibos muschatos*), as well as wapiti (*Cervus sp.*), caribou (*Ragnifer sp.*), moose (*Alces sp.*), wolf (*Canis lupus*), and black bear (*Ursus americanus*) (Ball 1985; Bergman & Rue 1990). With the retreat of the glaciers, the Pleistocene megafauna in the area disappeared, with species such as the mastodon and mammoth becoming extinct, and the moose and wapiti migrating northward. Post-glacial animal species were probably similar to modern types; the major differences being with population size and range (Ball 1985).

Cultural Setting

Archaeologists have developed a general chronology for the Eastern United States that provides a useful framework for organizing and describing archaeological data (Dragoo 1977; Griffin 1967; Jennings 1974 and Keeney 2002). The cultural-historical sequence developed for the region is generally divided into the following chronological periods: Paleo-Indian (12,800-8000 BC), Early Archaic (8000-6000 BC), Middle Archaic (6000-3000 BC), Late Archaic (3000-600 BC), Early Woodland (600-200 BC), Middle Woodland (200 BC- AD 500), Late Woodland (AD 500- 1000), Fort Ancient (AD 1000-1750), and European contact and settlement covering more than 14,000 years of human adaptation and re-adaptation to a changing environment.

The prehistoric cultural sequence in Ohio reflects a general trend toward increasing socio-cultural and technological complexity beginning with small mobile bands during the Paleo-Indian period that later developed into more sedentary, complex societies. The subsistence activities of the

earliest New World societies focused on hunting and gathering wild plant and animal foods. By late prehistoric times, however, agricultural economies based on three major tropical cultigens- corn, beans, and squash- were characteristic of many societies in the eastern United States. Increases in the size and density of the human population and trends toward increasing sedentism were also evident and reached their highest levels during the Fort Ancient period. In all, these cultural trends are marked by stylistic differences in artifacts and correspond to major technological innovations or important shifts in adaptational patterns (Ford 1977). However, there was considerable regional variation in the timing and extent to which these trends were expressed.

Literature Review and Records Check

A background check was conducted within a one mile radius of the APE. Four different sources of information were used: the NRHP, Ohio History Connection Online Mapping System, USACE Geographic Information System (GIS), historic maps, and previous cultural resources reports. The site file search of the GIS and Ohio online database allowed the use of topographic maps, previous investigations, and archaeological sites to collect information about previous archaeological surveys carried out near the APE. Review of historic maps including the 1961 East Piqua, Ohio topographic map and a map made of Miami County, Ohio in 1858 shows how the area has remained relatively urban in nature from the 1850s up into the present day (Figures 8 and 9).

Reviews of the previous archaeological surveys carried out near the APE were used to provide background information regarding the Piqua site. The NRHP was used to collect information on NRHP eligible or listed archaeological sites within a one mile radius of the APE. The background check and literature review found that no archaeological sites listed in the NRHP will be impacted by the project.

A search of the Ohio History Connection Online Mapping System on September 19, 2018 found that no archaeological sites have been previously recorded within the APE and eight sites have been previously recorded within a one mile radius of the APE. See Table 1 for a list of archaeological sites recorded within a 1 mile radius of the APE. All of the sites listed in Table 1 are located outside the APE and will not be impacted by the proposed undertaking. The records search also found that no archaeological surveys have been conducted within the APE. Three archaeological surveys have been previously conducted within a one mile radius of the APE and are described in further detail in the following sections.

Table 1: Previously recorded sites within a one mile radius of the APE.

Site Number	Cultural Affiliations	Site Type	Direction and Distance to APE
33MI56	Late Archaic and Early Woodland / Historic	Open habitation	1 mile northeast of APE
33MI94	Undetermined prehistoric	Open habitation	0.80 miles southwest of APE
33MI95	Undetermined prehistoric	Open habitation	0.95 miles southwest of APE
33MI96	Early Archaic	Open habitation	0.81 miles southwest of APE
33MI97	Undetermined prehistoric	Open habitation	0.78 miles southwest of APE
33MI98	Undetermined prehistoric	Open habitation	0.86 miles southwest of APE
33MI99	Undetermined prehistoric	Open habitation	0.68 miles south of APE
33MI100	Undetermined prehistoric	Open habitation	0.61 miles south of APE

Figure 8: Excerpt of the 1961 East Piqua, Ohio topographic map showing the location of the APE.

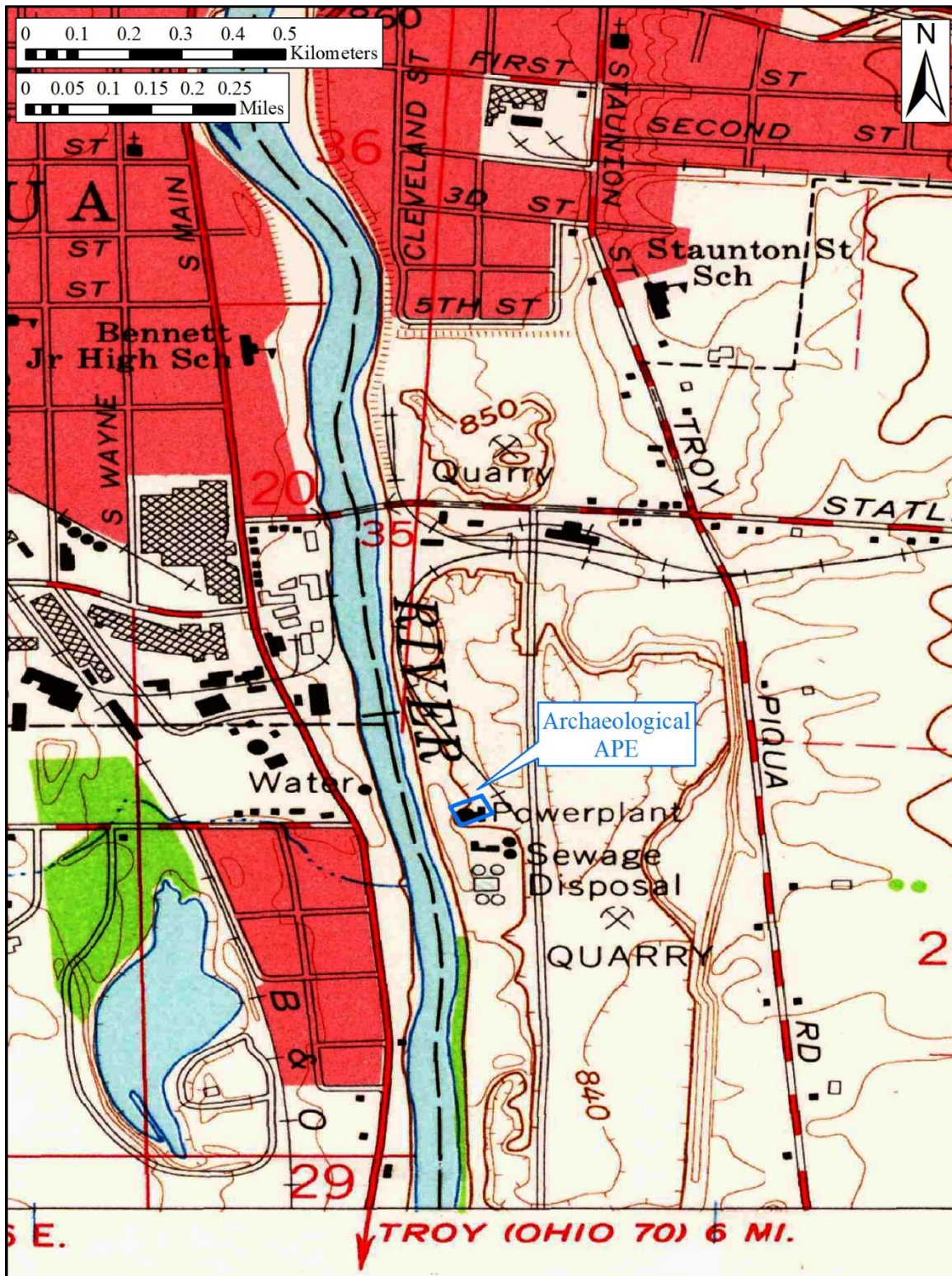
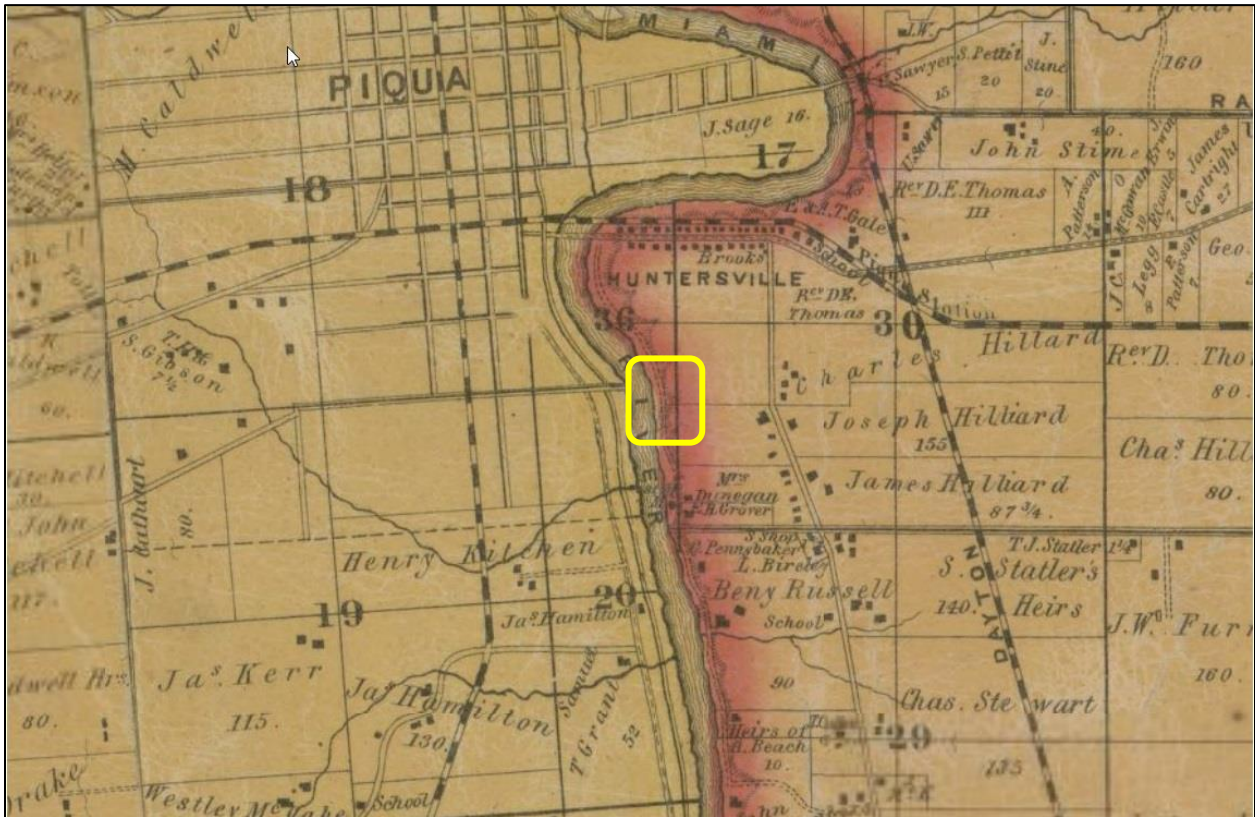


Figure 9: Excerpt of Miami County, Ohio map from 1858 showing general location of the APE (in yellow) (Matthews 1858).



In 1979, Claude F. White and Associates conducted an archaeological impact assessment of the construction of sanitary interceptor sewers in the City of Piqua in Miami County, Ohio (White 1979). The sewer project included three areas of construction: East Piqua Intercepting Sewer, Looney Road Branch Intercepting Sewer, and Miami River Intercepting Sewer and Rush Creek Branch Intercepting Sewer. Their assessment identified three archaeological sites (33MI56–58) but stated none of these three sites will be impacted by the construction of the sanitary interceptor sewers. White recommended the project could continue without any further archaeological investigations. None of the site recorded by White are located within the APE.

In 1987, staff archaeologists with the ASC Group, Inc. (ASC) conducted a Phase I and II cultural resources survey of the proposed Piqua Industrial Park in Miami County, Ohio (McDaniel and Skinner 1987). The project consisted of the proposed 140 acre Piqua Industrial Park. The survey identified five prehistoric find spots and two lithic scatters (33MI94–100) archaeological sites. All but 33MI96 were made up of open habitation sites with an unknown prehistoric cultural affiliation. 33MI96 consisted of an isolated find of an Early Archaic projectile point. ASC Group recommended the project could continue without any further cultural resources investigations. None of the sites recorded by ASC are located within the APE.

In March 2015, staff archaeologists with the Ohio Valley Archaeology, Inc. (OVAI) conducted a Phase I cultural resources survey for a proposed central water tower and Drake Road water main extension project in Miami County, Ohio (Biehl and Davis 2015). The project area surveyed by OVAI measured 7.4 acres and consisted of a proposed access road, waterline easement, and tower compound. OVAI did not identify any archaeological sites within the water tower and water main extension project area. OVAI recommended the project could continue without any further archaeological investigations.

Field Methods

The goal of the Phase I archaeological survey was to identify all archaeological sites within the APE, and to evaluate the resources for inclusion in the NRHP. The specific methods used to conduct the survey are outlined below.

The survey closely followed all guidelines for Phase I archaeological investigations as defined in the *Archaeology Guidelines* issued by the Ohio Historic Preservation Office (1994). The survey consisted of systematic pedestrian examination of all areas of prior disturbance and exposed ground surfaces within the APE. Due to the prior, documented disturbances associated with the construction of the reactor within the APE, no shovel tests were excavated. Developed or disturbed areas within the APE were visually inspected and recorded, but not shovel tested.

Survey Results

The APE was subjected to pedestrian survey and visual examination of all disturbed and exposed soils on September 20, 2018 by USACE archaeologist Jared Barrett (see Figure 2; Figure 10). Visual examination of the previously disturbed areas within the APE did not identify any archaeological sites. The entire APE is located within the footprint of the Piqua site and no shovel tests were excavated due to the previous construction of the reactor and associated facilities (see Figure 4; Figures 11 and 12). No archaeological sites were identified during the visual examination of the APE.

Conclusions and Recommendations

A Phase I archaeological survey of the proposed Piqua site in Miami County, Ohio revealed no evidence of significant prehistoric or historic archaeological sites. The entire APE consists of the previously disturbed footprint of the Piqua Reactor. The entire area has been previously disturbed from the construction of the reactor and associated facilities. Given the negative results of this investigation, no further archaeological studies are recommended for the APE.

Figure 10: Aerial view showing the APE, areas visually scanned, and prior disturbance at the Piqua site.



Figure 11: View of eastern edge of APE showing depth of existing facilities, gravel and rock fill, and slope of fill, facing south.



Figure 12: View of southern edge of APE showing asphalt parking area and slope, facing east.



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In reply refer to:
2017-MIA-40527

May 24, 2019

Brian Zimmerman
U.S. Department of Energy
Legacy Management
10995 Hamilton-Cleves Hwy.
Harrison, OH 45030
Email: Brian.Zimmerman@lm.doe.gov

RE: Phase I Section 110 Evaluation: Phase I Archaeological Survey for the Former Piqua Nuclear Power Facility (Piqua, Ohio, Decommissioned Reactor Site), Piqua, Miami County, Ohio

Dear Mr. Zimmerman:

In lieu of my assuming Dr. Dave Snyder's role as project reviews manager for archaeology for this project on behalf of the Ohio State Historic Preservation Office (SHPO), this letter is in response to *the Phase I Archaeological Survey for the Piqua Reactor Site, Miami County* by Jared Barrett, US Army Corps of Engineers, Louisville District, Louisville, Kentucky, which was received by the State Historic Preservation Office on April 15, 2019. The comments of the State Historic Preservation Office are made in accordance with the provisions of Section 106 and 110 of the National Historic Preservation Act of 1966, as amended, and the associated regulations at 16 U.S.C. 470.

This project involves the proposed demolition of the Piqua, Ohio Decommissioned Reactor Site, in the City of Piqua, Miami County, Ohio. Construction of the reactor was completed in 1961 and the facility operated from 1963-1965. The facility was closed in 1966. In 1968, the Atomic Energy Commission (AEC) signed Contract No. AT(11-1)-1798 with the City of Piqua so that it would convey title to the federal government that portion of the leased land on which the reactor building was erected, and the government would thereafter lease the premises back to the City. In 1969, AEC and the City of Piqua signed a long-term lease agreement that leases the site to the city at no cost, and the real estate deed filed with Miami County states that ownership of the site will automatically revert back to the City when the radiological materials entombed on site meet *Title 10 Code Federal Regulations Section 20* levels which is estimated to occur in the year 2106. According to the 1969 agreement, the City is responsible for non-nuclear facility maintenance and upkeep of facilities on site, while the Department of Energy (DOE) Office of Legacy Management (LM) is responsible for the long-term stewardship of the Piqua Ohio Decommissioned Reactor Site (Piqua site). LM holds title to the facility and 0.457 acre of land and is responsible for ensuring the protectiveness of the radiological materials entombed onsite.

In April 2018, the City informed LM that it is no longer interested in using the Piqua site for any operations. As a result of studying several alternatives, LM is now evaluating a proposal to demolish the Piqua site while maintaining protectiveness of the entombed radiological materials.

A Phase I archaeological survey was conducted by Jared Barrett, MA, RPA, archaeologist for the US Army Corps of Engineers, Louisville District on September 20, 2018. The objective of this survey was to identify any prehistoric and historic archaeological sites that could be eligible for the National Register of Historic Places (NRHP), as was met through a literature review and records search, systematic pedestrian and visual examination of all areas of prior disturbances and exposed soils within the 0.457 acre of land. Due to prior documented disturbances within the area of potential effect (APE), no shovel tests were excavated. As a result, no archaeological sites were identified within the APE, and given the negative results of this investigation, no further archaeological studies were recommended.

Based on the information provided, and in accordance with title 36 Code of Federal Regulations Section 800.4(d) (1), it is my opinion that no archaeological resources that merit consideration as historic properties are present at this location. Therefore, no further coordination is required with our office for the project unless the scope of work changes or archaeological remains are discovered during the course of the project.

Please be advised that this is a Section 110 decision. This review decision may not extend to other SHPO programs. If you have any questions concerning this review, please contact me at 614-298-2049 or by email at jschweikart@ohiohistory.org. Thank you for your cooperation.

If you have any questions, please contact me at jschweikart@ohiohistory.org.

Sincerely,

A handwritten signature in black ink, appearing to read "John F. Schweikart". The signature is fluid and cursive, with the first name "John" and last name "Schweikart" clearly distinguishable.

John F. Schweikart, Archaeology CBDB Reviews Manager
State Historic Preservation Office



Department of Energy
Washington, DC 20585

April 8, 2019

Ms. Deborah Dotson, President
Delaware Nation, Oklahoma
PO Box 825
Anadarko, OK 73005

Subject: Section 110 Evaluation: Phase I Archaeological Survey for the Former Piqua Nuclear Power Facility (Piqua, Ohio, Decommissioned Reactor Site), Piqua, Miami County, Ohio (2017-MIA-40527)

Dear Ms. Dotson:

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) is contacting you with regards to the proposed demolition of the former Piqua Nuclear Power Facility (PNPF), now referred to as the Piqua, Ohio, Decommissioned Reactor Site, located in Piqua, Miami County, Ohio. Your tribe was identified by the Tribal Directory Assessment Tool website maintained by the U.S. Department of Housing and Urban Development as having an active interest in Miami County, Ohio.

The PNPF was an experimental reactor built in the 1960s by the U.S. Atomic Energy Commission (AEC), a predecessor agency to DOE, under round two of AEC's Power Demonstration Reactor Program. Beginning in 1963, the City of Piqua operated and maintained the facility under contract to the AEC. The pilot reactor, a 45.5-megawatt, organically cooled, and thermally moderated reactor, operated from 1963 to 1965, but was shut down in January 1966. From 1967 to 1969, AEC decommissioned the reactor and removed the reactor fuel, coolant, and most of the radioactive materials from the site. Piping and equipment inside the reactor containing low-level radiological material was entombed onsite. LM currently manages the Piqua site, which has been under lease to the city since 1969. The enclosed Historic Building Survey, Piqua, Ohio, Decommissioned Reactor Building, August 2017 provides a thorough history of the site. On January 30, 2018, the Ohio State Historic Preservation Officer (SHPO) agreed with LM's determination that the building is eligible for listing on the National Register of Historic Places under Criterion A for its association with important aspects of American history and under Criterion C for its architectural and engineering qualities.

The archaeological area of potential effects (APE) for the proposed demolition is approximately 0.457 acre of land, currently held in title by DOE. LM has completed the enclosed Phase I Archaeological Survey for the Piqua Reactor Site, Miami County, Ohio, to identify archaeological resources that may be impacted by the proposed demolition. This archaeological survey was performed by the U.S. Army Corps of Engineers, Louisville District under an interagency agreement with DOE and is in compliance with Sections 106 and 110 of the National Historic Preservation Act of 1966 (as amended). The work conducted follows the professional standards and guidelines in the Secretary of the Interior Standards and Guidelines for Archaeology and Historic Preservation and the Ohio Historical Society's Archaeology Guidelines.




The results of the archaeological survey revealed no evidence of intact soils at the Piqua site. The report did not identify any significant prehistoric or historic archaeological resources within the APE and recommends that no further archaeological work be conducted at this location. In accordance with Title 36 Code of Federal Regulations Section 800.4(d)(1), LM has determined no archaeological resources that merit consideration as historic property are present at this location. A copy of the draft report is enclosed for your review and comment. We are also soliciting the opinion of the Ohio SHPO on the findings of the enclosed archaeological survey.

Please contact me at (513) 648-3340 or Brian.Zimmerman@lm.doe.gov, if you have any questions. Please send any correspondence to:

U.S. Department of Energy
Office of Legacy Management
10995 Hamilton-Cleves Hwy.
Harrison, OH 45030

Sincerely,

 BRIAN ZIMMERMAN
2019.04.05 15:54:43
-04'00'

Brian Zimmerman
Piqua Site Manager

Enclosures

cc w/enclosures:

K. Penrod, Delaware Nation
DOE Read File
File: PIQ 0100.02 (records)

cc w/o enclosures:

L. Adkins, OH SHPO
D. Snyder, OH SHPO
P. Benson, DOE-LM (e)
G. Hooten, DOE-LM (e)
D. McNeil, DOE-LM (e)
T. Ribeiro, DOE-LM (e)
Y. Deyo, Navarro (e)
S. Marutzky, Navarro (e)
M. Miller, Navarro (e)
N. Olin, Navarro (e)
S. Osborn, Navarro (e)
J. Trnka, Navarro (e)



Department of Energy
Washington, DC 20585

April 8, 2019

Mr. William Fisher, Chief
Seneca-Cayuga Nation
PO Box 453220
Grove, OK 74345-3220

Subject: Section 110 Evaluation: Phase I Archaeological Survey for the Former Piqua Nuclear Power Facility (Piqua, Ohio, Decommissioned Reactor Site), Piqua, Miami County, Ohio (2017-MIA-40527)

Dear Mr. Fisher:

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) is contacting you with regards to the proposed demolition of the former Piqua Nuclear Power Facility (PNPF), now referred to as the Piqua, Ohio, Decommissioned Reactor Site, located in Piqua, Miami County, Ohio. Your tribe was identified by the Tribal Directory Assessment Tool website maintained by the U.S. Department of Housing and Urban Development as having an active interest in Miami County, Ohio.

The PNPF was an experimental reactor built in the 1960s by the U.S. Atomic Energy Commission (AEC), a predecessor agency to DOE, under round two of AEC's Power Demonstration Reactor Program. Beginning in 1963, the City of Piqua operated and maintained the facility under contract to the AEC. The pilot reactor, a 45.5-megawatt, organically cooled, and thermally moderated reactor, operated from 1963 to 1965, but was shut down in January 1966. From 1967 to 1969, AEC decommissioned the reactor and removed the reactor fuel, coolant, and most of the radioactive materials from the site. Piping and equipment inside the reactor containing low-level radiological material was entombed onsite. LM currently manages the Piqua site, which has been under lease to the city since 1969. The enclosed Historic Building Survey, Piqua, Ohio, Decommissioned Reactor Building, August 2017 provides a thorough history of the site. On January 30, 2018, the Ohio State Historic Preservation Officer (SHPO) agreed with LM's determination that the building is eligible for listing on the National Register of Historic Places under Criterion A for its association with important aspects of American history and under Criterion C for its architectural and engineering qualities.

The archaeological area of potential effects (APE) for the proposed demolition is approximately 0.457 acre of land, currently held in title by DOE. LM has completed the enclosed Phase I Archaeological Survey for the Piqua Reactor Site, Miami County, Ohio, to identify archaeological resources that may be impacted by the proposed demolition. This archaeological survey was performed by the U.S. Army Corps of Engineers, Louisville District under an interagency agreement with DOE and is in compliance with Sections 106 and 110 of the National Historic Preservation Act of 1966 (as amended). The work conducted follows the professional standards and guidelines in the Secretary of the Interior Standards and Guidelines for Archaeology and Historic Preservation and the Ohio Historical Society's Archaeology Guidelines.



April 8, 2019

The results of the archaeological survey revealed no evidence of intact soils at the Piqua site. The report did not identify any significant prehistoric or historic archaeological resources within the APE and recommends that no further archaeological work be conducted at this location. In accordance with Title 36 Code of Federal Regulations Section 800.4(d)(1), LM has determined no archaeological resources that merit consideration as historic property are present at this location. A copy of the draft report is enclosed for your review and comment. We are also soliciting the opinion of the Ohio SHPO on the findings of the enclosed archaeological survey.

Please contact me at (513) 648-3340 or Brian.Zimmerman@lm.doe.gov, if you have any questions. Please send any correspondence to:

U.S. Department of Energy
Office of Legacy Management
10995 Hamilton-Cleves Hwy.
Harrison, OH 45030

Sincerely,



BRIAN ZIMMERMAN

2019.04.05 15:52:12

-04'00'

Brian Zimmerman
Piqua Site Manager

Enclosures

cc w/enclosures:

W. Tarrant, Seneca-Cayuga Nation
DOE Read File
File: PIQ 0100.02 (records)

cc w/o enclosures:

L. Adkins, OH SHPO
D. Snyder, OH SHPO
P. Benson, DOE-LM (e)
G. Hooten, DOE-LM (e)
D. McNeil, DOE-LM (e)
T. Ribeiro, DOE-LM (e)
Y. Deyo, Navarro (e)
S. Marutzky, Navarro (e)
M. Miller, Navarro (e)
N. Olin, Navarro (e)
S. Osborn, Navarro (e)
J. Trnka, Navarro (e)



Department of Energy

Washington, DC 20585

April 8, 2019

Mr. Douglas Lankford, Chief
Miami Tribe of Oklahoma
PO Box 1326
Miami, OK 74355

Subject: Section 110 Evaluation: Phase I Archaeological Survey for the Former Piqua Nuclear Power Facility (Piqua, Ohio, Decommissioned Reactor Site), Piqua, Miami County, Ohio (2017-MIA-40527)

Dear Mr. Lankford:

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) is contacting you with regards to the proposed demolition of the former Piqua Nuclear Power Facility (PNPF), now referred to as the Piqua, Ohio, Decommissioned Reactor Site, located in Piqua, Miami County, Ohio. Your tribe was identified by the Tribal Directory Assessment Tool website maintained by the U.S. Department of Housing and Urban Development as having an active interest in Miami County, Ohio.

The PNPF was an experimental reactor built in the 1960s by the U.S. Atomic Energy Commission (AEC), a predecessor agency to DOE, under round two of AEC's Power Demonstration Reactor Program. Beginning in 1963, the City of Piqua operated and maintained the facility under contract to the AEC. The pilot reactor, a 45.5-megawatt, organically cooled, and thermally moderated reactor, operated from 1963 to 1965, but was shut down in January 1966. From 1967 to 1969, AEC decommissioned the reactor and removed the reactor fuel, coolant, and most of the radioactive materials from the site. Piping and equipment inside the reactor containing low-level radiological material was entombed onsite. LM currently manages the Piqua site, which has been under lease to the city since 1969. The enclosed Historic Building Survey, Piqua, Ohio, Decommissioned Reactor Building, August 2017 provides a thorough history of the site. On January 30, 2018, the Ohio State Historic Preservation Officer (SHPO) agreed with LM's determination that the building is eligible for listing on the National Register of Historic Places under Criterion A for its association with important aspects of American history and under Criterion C for its architectural and engineering qualities.

The archaeological area of potential effects (APE) for the proposed demolition is approximately 0.457 acre of land, currently held in title by DOE. LM has completed the enclosed Phase I Archaeological Survey for the Piqua Reactor Site, Miami County, Ohio, to identify archaeological resources that may be impacted by the proposed demolition. This archaeological survey was performed by the U.S. Army Corps of Engineers, Louisville District under an interagency agreement with DOE and is in compliance with Sections 106 and 110 of the National Historic Preservation Act of 1966 (as amended). The work conducted follows the professional standards and guidelines in the Secretary of the Interior Standards and Guidelines for Archaeology and Historic Preservation and the Ohio Historical Society's Archaeology Guidelines.




The results of the archaeological survey revealed no evidence of intact soils at the Piqua site. The report did not identify any significant prehistoric or historic archaeological resources within the APE and recommends that no further archaeological work be conducted at this location. In accordance with Title 36 Code of Federal Regulations Section 800.4(d)(1), LM has determined no archaeological resources that merit consideration as historic property are present at this location. A copy of the draft report is enclosed for your review and comment. We are also soliciting the opinion of the Ohio SHPO on the findings of the enclosed archaeological survey.

Please contact me at (513) 648-3340 or Brian.Zimmerman@lm.doe.gov, if you have any questions. Please send any correspondence to:

U.S. Department of Energy
Office of Legacy Management
10995 Hamilton-Cleves Hwy.
Harrison, OH 45030

Sincerely,

 BRIAN ZIMMERMAN
2019.04.05 15:55:31
-04'00'

Brian Zimmerman
Piqua Site Manager

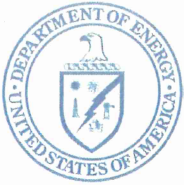
Enclosures

cc w/enclosures:

- D. Hunter, Miami Tribe
- DOE Read File
- File: PIQ 0100.02 (records)

cc w/o enclosures:

- L. Adkins, OH SHPO
- D. Snyder, OH SHPO
- P. Benson, DOE-LM (e)
- G. Hooten, DOE-LM (e)
- D. McNeil, DOE-LM (e)
- T. Ribeiro, DOE-LM (e)
- Y. Deyo, Navarro (e)
- S. Marutzky, Navarro (e)
- M. Miller, Navarro (e)
- N. Olin, Navarro (e)
- S. Osborn, Navarro (e)
- J. Trnka, Navarro (e)



Department of Energy
Washington, DC 20585

April 8, 2019

Ms. Glenna Wallace, Chief
Eastern Shawnee Tribe of Oklahoma
PO Box 350
Seneca, MO 64865

Subject: Section 110 Evaluation: Phase I Archaeological Survey for the Former Piqua Nuclear Power Facility (Piqua, Ohio, Decommissioned Reactor Site), Piqua, Miami County, Ohio (2017-MIA-40527)

Dear Ms. Wallace:

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) is contacting you with regards to the proposed demolition of the former Piqua Nuclear Power Facility (PNPF), now referred to as the Piqua, Ohio, Decommissioned Reactor Site, located in Piqua, Miami County, Ohio. Your tribe was identified by the Tribal Directory Assessment Tool website maintained by the U.S. Department of Housing and Urban Development as having an active interest in Miami County, Ohio.

The PNPF was an experimental reactor built in the 1960s by the U.S. Atomic Energy Commission (AEC), a predecessor agency to DOE, under round two of AEC's Power Demonstration Reactor Program. Beginning in 1963, the City of Piqua operated and maintained the facility under contract to the AEC. The pilot reactor, a 45.5-megawatt, organically cooled, and thermally moderated reactor, operated from 1963 to 1965, but was shut down in January 1966. From 1967 to 1969, AEC decommissioned the reactor and removed the reactor fuel, coolant, and most of the radioactive materials from the site. Piping and equipment inside the reactor containing low-level radiological material was entombed onsite. LM currently manages the Piqua site, which has been under lease to the city since 1969. The enclosed Historic Building Survey, Piqua, Ohio, Decommissioned Reactor Building, August 2017 provides a thorough history of the site. On January 30, 2018, the Ohio State Historic Preservation Officer (SHPO) agreed with LM's determination that the building is eligible for listing on the National Register of Historic Places under Criterion A for its association with important aspects of American history and under Criterion C for its architectural and engineering qualities.

The archaeological area of potential effects (APE) for the proposed demolition is approximately 0.457 acre of land, currently held in title by DOE. LM has completed the enclosed Phase I Archaeological Survey for the Piqua Reactor Site, Miami County, Ohio, to identify archaeological resources that may be impacted by the proposed demolition. This archaeological survey was performed by the U.S. Army Corps of Engineers, Louisville District under an interagency agreement with DOE and is in compliance with Sections 106 and 110 of the National Historic Preservation Act of 1966 (as amended). The work conducted follows the professional standards and guidelines in the Secretary of the Interior Standards and Guidelines for Archaeology and Historic Preservation and the Ohio Historical Society's Archaeology Guidelines.



April 8, 2019

The results of the archaeological survey revealed no evidence of intact soils at the Piqua site. The report did not identify any significant prehistoric or historic archaeological resources within the APE and recommends that no further archaeological work be conducted at this location. In accordance with Title 36 Code of Federal Regulations Section 800.4(d)(1), LM has determined no archaeological resources that merit consideration as historic property are present at this location. A copy of the draft report is enclosed for your review and comment. We are also soliciting the opinion of the Ohio SHPO on the findings of the enclosed archaeological survey.

Please contact me at (513) 648-3340 or Brian.Zimmerman@lm.doe.gov, if you have any questions. Please send any correspondence to:

U.S. Department of Energy
Office of Legacy Management
10995 Hamilton-Cleves Hwy.
Harrison, OH 45030

Sincerely,



BRIAN ZIMMERMAN

2019.04.05 15:53:38

-04'00'

Brian Zimmerman
Piqua Site Manager

Enclosures

cc w/enclosures:

R. Dushane, Eastern Shawnee Tribe
DOE Read File
File: PIQ 0100.02 (records)

cc w/o enclosures:

L. Adkins, OH SHPO
D. Snyder, OH SHPO
P. Benson, DOE-LM (e)
G. Hooten, DOE-LM (e)
D. McNeil, DOE-LM (e)
T. Ribeiro, DOE-LM (e)
Y. Deyo, Navarro (e)
S. Marutzky, Navarro (e)
M. Miller, Navarro (e)
N. Olin, Navarro (e)
S. Osborn, Navarro (e)
J. Trnka, Navarro (e)

May 6, 2019

Brian Zimmerman
Piqua Site Manager
U.S. Department of Energy
Office of Legacy Management
10995 Hamilton-Cleves Hwy.
Harrison, OH 45030

Re: Piqua, Ohio Decommissioned Reactor Site – Comments of the Miami Tribe of Oklahoma

Dear Mr. Zimmerman:

Aya, kikwehsitoole – I show you respect. My name is Diane Hunter, and I am the Tribal Historic Preservation Officer for the Federally Recognized Miami Tribe of Oklahoma. In this capacity, I am the Miami Tribe's point of contact for all Section 106 issues.

The Miami Tribe offers no objection to the above-mentioned project at this time, as we are not currently aware of existing documentation directly linking a specific Miami cultural or historic site to the project site. However, as this site is within the aboriginal homelands of the Miami Tribe, if any human remains or Native American cultural items falling under the Native American Graves Protection and Repatriation Act (NAGPRA) or archaeological evidence is discovered during any phase of this project, the Miami Tribe requests immediate consultation with the entity of jurisdiction for the location of discovery. In such a case, please contact me at 918-541-8966 or by email at dhunter@miamination.com to initiate consultation.

The Miami Tribe accepts the invitation to serve as a consulting party to the proposed project. In my capacity as Tribal Historic Preservation Officer I am the point of contact for consultation.

Respectfully,



Diane Hunter
Tribal Historic Preservation Officer

Advisory Council on Historic Preservation
Electronic Section 106 Documentation Submittal System (e106) Form
MS Word format

Send to: *e106@achp.gov*

Please review the instructions at www.achp.gov/e106-email-form prior to completing this form. Questions about whether to use the e106 form should be directed to the assigned ACHP staff member in the Office of Federal Agency Programs.

I. Basic information

1. Purpose of notification. Indicate whether this documentation is to:

- Notify the ACHP of a finding that an undertaking may adversely affect historic properties
- Invite the ACHP to participate in a Section 106 consultation
- Propose to develop a project Programmatic Agreement (project PA) for complex or multiple undertakings in accordance with 36 C.F.R. 800.14(b)(3)
- Supply additional documentation for a case already entered into the ACHP record system
- File an executed MOA or PA with the ACHP in accordance with 800.6(b)(iv) (where the ACHP did not participate in consultation)
- Other, please describe
[Click here to enter text.](#)

2. ACHP Project Number (If the ACHP was previously notified of the undertaking and an ACHP Project Number has been provided, enter project number here and skip to Item 7 below): [Click here to enter text.](#)

3. Name of federal agency (If multiple agencies, list them all and indicate whether one is the lead agency):

U.S. Department of Energy (DOE) Office of Legacy Management (LM)

4. Name of undertaking/project (Include project/permit/application number if applicable):

Proposed demolition of the buildings at the Piqua, Ohio, Decommissioned Reactor Site

5. Location of undertaking (Indicate city(s), county(s), state(s), land ownership, and whether it would occur on or affect historic properties located on tribal lands):

The undertaking involves the proposed demolition of the decommissioned Piqua Reactor Building in Piqua, Miami County, Ohio. The property is on the east bank of the Great Miami River about 30 miles north of Dayton (see Figure 1 and Figure 2 in the enclosed historic property survey). No tribal land is within or near the area of potential effect (APE).

6. Name and title of federal agency official and contact person for this undertaking, including email address and phone number:

Brian Zimmerman
U.S. Department of Energy
Office of Legacy Management
10995 Hamilton-Cleves Hwy
Harrison, OH 45030
Brian.Zimmerman@lm.doe.gov
(513) 648-3340

II. Information on the Undertaking*

7. Describe the undertaking and nature of federal involvement (if multiple federal agencies are involved, specify involvement of each):

The undertaking involves the removal of the aboveground portion of the decommissioned Reactor Building; the subterranean reactor portion would remain in place. This amount of demolition would have an adverse effect on most aspects of integrity that are important at this location. Of the seven alternatives considered (including divestiture from federal ownership), most would also have resulted in an adverse effect, albeit to a lesser degree than the complete demolition of the aboveground portion of the building that is proposed.

8. Describe the Area of Potential Effects (APE):

The APE consists of the entire 0.457 acre of land at 101 Bridge Street in Piqua, Ohio, that is held in title by LM. No National Historic Landmarks or tribal land are found within or adjacent to the APE.

The decommissioned Reactor Building is approximately 900 feet southeast of the Piqua municipal power station and 150 feet north of the City-owned sewage treatment plant. A limestone quarry frames the north and east sides of the Reactor Building, which is about 120 feet from the Great Miami River.

9. Describe steps taken to identify historic properties:

LM conducted a historic building survey of the decommissioned Piqua Reactor Building in 2017 and determined that the building was eligible for listing on the National Register of Historic Places under Criterion A for its association with important aspects of American history and under Criterion C for its architectural and engineering qualities. The Ohio State Historic Preservation Officer (SHPO) agreed with this determination on January 30, 2018. Subsequently, LM worked with the U.S. Army Corps of Engineers to determine that there was no potential for the presence of archaeological resources at the site because the entire parcel of land had been extensively and deeply disturbed during construction of the reactor complex between 1959 and 1961. The archaeological memorandum was reviewed by the Ohio SHPO, the Delaware Nation, the Eastern Shawnee Tribe of Oklahoma, the Miami Tribe of Oklahoma, and the Seneca-Cayuga Nation; the only tribal response received was from the Miami Tribe of Oklahoma. The results of the report and the consultation confirmed the determination that there are no archaeological resources at this location that merit consideration as historic property.

10. Describe the historic property (or properties) and any National Historic Landmarks within the APE (or attach documentation or provide specific link to this information):

The APE is largely occupied by the decommissioned Reactor Building, which has two different portions: the containment dome structure and the support building, hereafter called the Auxiliary Building. The containment dome structure physically isolates and provides secure space for the reactor, the reactor cooling system, and the associated support equipment (tanks, pipes, boiler). The Auxiliary Building originally housed the control room, offices, coolant tanks, filters, and waste tanks; some of this equipment was removed during deactivation. The two portions are joined by multiple systems (e.g., electrical, coolant) and by a hallway that provided access between them. To provide for containment, this connection hallway is secured by massive steel doors.

The reactor vessel is entirely belowground and surrounded by an 8-foot-thick concrete biological shield, hereafter called the bioshield. Approximately 2 feet of the bioshield interior is contaminated with activation products. However, the fuel (enriched uranium) has been removed from the core area of the reactor, and because 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. The main floor of the Reactor Building was covered by a waterproof material to prevent surface water seepage, followed by a layer of concrete to make the areas containing radioactive materials inaccessible to people.

This 45.5-megawatt, organically cooled and moderated thermal reactor was built by the U.S. Atomic Energy Commission (AEC)—the predecessor agency to 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 turbogenerators in the Piqua municipal power plant to augment the City's power supply.

Between 1967 and 1969, AEC removed the reactor fuel rods, coolant, and most of the radioactive materials from the facility. Contaminated piping and equipment inside the Reactor Building were removed or decontaminated. The reactor vessel, concrete 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 in the reactor core. The decommissioned Reactor Building consists of the concrete and steel reactor containment dome and a connected Auxiliary Building. Found within the belowground portion of the reactor containment dome is an upright steel, cylindrical structure that contains the reactor vessel, steam-generating equipment, and other parts of the heat transfer system. Removal of the fuel rods and the necessary support and control systems has rendered this complex inoperable.

More than 99% of the radioactive waste material entombed at the facility in 1969 is in the belowground portion of the Reactor Building. Ownership of the site will be transferred to the City of Piqua when radioactive waste in the entombed reactor meets levels set by Title 10 *Code of Federal Regulations* Section 20 (10 CFR 20) for unrestricted use in its current undisturbed configuration. This is estimated to occur in 2106.

11. Describe the undertaking's effects on historic properties:

The proposed action would have an adverse effect on historic property due to the demolition of the aboveground portion of the historic decommissioned Reactor Building.

12. Explain how this undertaking would adversely affect historic properties (include information on any conditions or future actions known to date to avoid, minimize, or mitigate adverse effects):

As documented in the enclosed analysis of alternatives, multiple actions were reviewed as part of the evaluation of this undertaking. The alternatives included full demolition of the aboveground portion of the decommissioned Reactor Building, which would be an adverse effect. Also considered was divestiture from federal ownership and partial demolition; both of these were also determined to be adverse effects. Conditions have been included in the draft Memorandum of Agreement that would minimize and mitigate the anticipated adverse effects of demolition, should that alternative be selected.

13. Provide copies or summaries of the views provided to date by any consulting parties, Indian tribes or Native Hawai’ian organizations, or the public, including any correspondence from the SHPO and/or THPO.

Responses received during the Section 106 process are included.

III. Additional Information

14. Please indicate the status of any consultation that has occurred to date, including whether there are any unresolved concerns or issues the ACHP should know about in deciding whether to participate in consultation. Providing a list of consulting parties, including email addresses and phone numbers if known, can facilitate the ACHP’s review response.

Consultation has been extensive and ongoing since 2018.

Consulting Parties		
Party	Contact Information	Remaining Concerns
Ohio SHPO	Diana Welling, Department Head & Deputy State Historic Preservation Officer for Resource Protection & Review Ohio History Connection 800 East 17th Street Columbus, OH 43211 614-298-2000 dwelling@ohiohistory.org	None known
City of Piqua	Gary Huff, City Manager City of Piqua 201 W Water Street Piqua OH 45356 937-778-2051 ghuff@piquaoh.org	None known
Piqua Library	Jim Oda, Library Director City of Piqua 201 W Water Street Piqua OH 45356 937-778-2051 ghuff@piquaoh.org	None known

Party	Contact Information	Remaining Concerns
Delaware Nation, Oklahoma	Deborah Dotson, President PO Box 825 Anadarko, OK 73005	None known
	Kimberly Penrod, Director of Cultural Resources and Section 106 PO Box 825 Anadarko, OK 73005	None known
Eastern Shawnee Tribe of Oklahoma	Robin Dushane, THPO PO Box 350 Seneca, MO 64865	None known
	Glenna Wallace, Chief PO Box 350 Seneca, MO 64865	None known
Miami Tribe of Oklahoma	Douglas Lankford, Chief PO Box 1326 Miami, OK 74355	None known
	Diane Hunter, THPO PO Box 1326 Miami, OK 74355	None known
Seneca-Cayuga Nation	William Tarrant, THPO PO Box 45322 Grove, OK 74345	None known
	William Fisher, Chief PO Box 45322 Grove, OK 74345	None known
Heritage Ohio	Frank Quinn 846 1/2 E Main Street Columbus, OH 43205	None known

15. Does your agency have a website or website link where the interested public can find out about this project and/or provide comments? Please provide relevant links:

The draft EA will be available for public review on the DOE website at www.energy.gov/nepa/office-nepa-policy-and-compliance and on the LM website at www.energy.gov/. [direct link TBD]

16. Is this undertaking considered a “major” or “covered” project listed on the Federal Infrastructure Projects Permitting Dashboard? If so, please provide the link:

No. This project is not a project that is listed on the Federal Infrastructure Projects Permitting Dashboard.

The following are attached to this form (check all that apply):

- Section 106 consultation correspondence
- Maps, photographs, drawings, and/or plans
- Additional historic property information
- Consulting party list with known contact information
- Other: [Click here to enter text.](#)

**List of Supporting Documents
Office of Legacy Management
Piqua, Ohio, Decommissioned Reactor Building
Demolition Memorandum of Agreement Review**

October 19, 2020

Archaeology:

1. Phase I Archaeological Survey for the Piqua Reactor Site, Miami County, Ohio
2. Section 110 letter to Ohio SHPO (Snyder)
3. Section 110 letter to Delaware Nation of Oklahoma (Dotson)
4. Section 110 letter to Seneca-Cayuga Nation (Fisher)
5. Section 110 letter to Miami Tribe of Oklahoma (Lankford)
6. Section 110 letter to Eastern Shawnee Tribe of Oklahoma (Wallace)
7. Response letter from Ohio SHPO (Snyder), 24 May 2019
8. Response letter from Miami Tribe (Hunter), May 6, 2019
9. Email dated 06 Feb 2020, from Brian Zimmerman (LM); Miami Tribe Response

Architectural History:

10. Historic Building Survey, Piqua, Ohio, Decommissioned Reactor Building
11. Ohio Inventory Forms, Decommissioned Reactor Building
12. Section 110 letter to Ohio SHPO regarding LM determination of eligibility of Piqua, Ohio, Decommissioned Reactor Building
13. Section 110 response letter from Ohio SHPO regarding LM determination of eligibility.

Section 106/NEPA Consultation Correspondence:

14. Piqua Consultation Meeting Minutes, 11 December 2019
15. Piqua EA Alternatives Under Consideration
16. Letter of Support for Demolition Alternative, City of Piqua, OH, 4 January 2019

Memorandum of Agreement (MOA):

17. Draft MOA, March 2020
18. Draft MOA, SHPO Comments, 08 May 2020
19. Draft MOA, Version 2, July 2020
20. Draft MOA, Version 2, SHPO Comments, 5 Aug 2020
21. Draft Final MOA, 15 Sep 2020, Consulting Party Review Copy
22. Draft Final MOA, SHPO Comments, 19 Oct 2020

Schedules:

23. Legacy Management Section 106/NEPA high level integrated schedule, July 2020

Reference/Emails:

24. Piqua Decommissioned Reactor Building Site Map
25. 24 Sep 2018, Tribal Directory Assessment Information for Piqua, Ohio
26. 12 Aug 2020, Brian Zimmerman (LM) to Consulting Parties
27. 5 May 2020, Brian Zimmerman (LM) to Ohio SHPO



November 13, 2020

Brian Zimmerman
U.S. Department of Energy
Office of Legacy Management
10995 Hamilton-Cleves Hwy
Harrison, OH 45030

Ref: *Demolition of the Decommissioned Piqua Reactor Building
Piqua, Miami County, Ohio*

Dear Mr. Zimmerman:

The Advisory Council on Historic Preservation (ACHP) has received your notification and supporting documentation regarding the adverse effects of the referenced undertaking on a property or properties listed or eligible for listing in the National Register of Historic Places. Based upon the information provided, we have concluded that Appendix A, *Criteria for Council Involvement in Reviewing Individual Section 106 Cases*, of our regulations, "Protection of Historic Properties" (36 CFR Part 800), does not apply to this undertaking. Accordingly, we do not believe that our participation in the consultation to resolve adverse effects is needed. However, if we receive a request for participation from the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer (THPO), affected Indian tribe, a consulting party, or other party, we may reconsider this decision. Additionally, should circumstances change, and it is determined that our participation is needed to conclude the consultation process, please notify us.

Pursuant to 36 CFR §800.6(b)(1)(iv), you will need to file the final Memorandum of Agreement (MOA), developed in consultation with the Ohio State Historic Preservation Office (SHPO), and any other consulting parties, and related documentation with the ACHP at the conclusion of the consultation process. The filing of the MOA, and supporting documentation with the ACHP is required in order to complete the requirements of Section 106 of the National Historic Preservation Act.

Thank you for providing us with the notification of adverse effect. If you have any questions or require further assistance, please contact Mr. Christopher Wilson at 202-517-0229 or via e-mail at cwilson@achp.gov.

Sincerely,

Artisha Thompson
Historic Preservation Technician
Office of Federal Agency Programs

**MEMORANDUM OF AGREEMENT
BETWEEN
U.S. DEPARTMENT OF ENERGY OFFICE OF LEGACY MANAGEMENT
AND THE
OHIO STATE HISTORIC PRESERVATION OFFICE
REGARDING THE DEMOLITION OF THE DECOMMISSIONED REACTOR SITE
LOCATED AT 101 BRIDGE STREET, PIQUA, MIAMI COUNTY, OHIO**

WHEREAS, the U.S. Department of Energy (DOE), Office of Legacy Management (LM) is evaluating a number of alternatives for the former Piqua Nuclear Power Facility (PNPF), now known as the Decommissioned Reactor Site (site), in Piqua, Miami County, Ohio; (Undertaking); and

WHEREAS, LM has defined the undertaking's Area of Potential Effect (APE) as the entire 0.457 acre parcel which is located at 101 Bridge Street in Piqua, Miami County, Ohio (Appendix A), held in title by the United States of America and managed by LM; and

WHEREAS, LM has consulted with the Ohio State Historic Preservation Office (SHPO), pursuant to Title 36 *Code of Federal Regulations* Section 800 (36 CFR 800), the regulations implementing Section 106 of the National Historic Preservation Act (Title 54 *United States Code* Section 306108 [54 USC 306018]); and

WHEREAS, LM has determined that the PNPF (Ohio Historic Inventory Ref. 2017-MIA-40527), is eligible for listing in the National Register of Historic Places (NRHP) under Criterion A for its association with important aspects of American history and under Criterion C for its architectural and engineering qualities. SHPO concurred with the determination of eligibility on January 30, 2018; and

WHEREAS, LM has completed a Phase I Archaeological Survey of the APE and determined that no archaeological sites exist that would merit consideration as a historic property. The SHPO and the Delaware Nation of Oklahoma, the Eastern Shawnee Tribe of Oklahoma, the Miami Tribe of Oklahoma, and the Seneca-Cayuga Nation are identified as having an active interest in Miami County, Ohio. All parties either concurred or did not object to the survey's findings that no archaeological sites exist at this location that would merit consideration as historic property; and

WHEREAS, LM has determined that the majority of the alternatives being considered will have an adverse effect on the reactor building and auxiliary building, if selected. If an alternative is selected that does not have an adverse effect on the PNPF, this Memorandum of Agreement would be inapplicable; and

WHEREAS, LM has consulted with the City of Piqua regarding the effects of the undertaking on historic properties and has invited the City to sign this Memorandum of Agreement (MOA) as a concurring party; and

WHEREAS, LM is conducting the public involvement process for this undertaking through their National Environmental Policy Act public review process as an Environmental Assessment; and

WHEREAS, in accordance with 36 CFR 800.6(a)(1), LM has notified the Advisory Council on Historic Preservation (ACHP) of its adverse effect determination with specified documentation,

and the ACHP has chosen *not* to participate in the consultation pursuant to 36 CFR 800.6(a)(1)(iii); and

NOW, THEREFORE, LM and the SHPO agree that the undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect of the undertaking on historic properties.

STIPULATIONS

LM shall ensure that the following measures are carried out:

I. RECORDATION

LM shall retain a qualified historic preservation consultant (i.e., preservation professional) meeting the Secretary of the Interior's Professional Qualifications in History and/or Architectural History in accordance with 36 CFR 61 to complete a Historic American Buildings Survey (HABS) recordation of the PNPf in accordance with National Park Service (NPS) guidelines and specifications. The historic preservation consultant shall obtain all necessary information to complete the HABS recording prior to any irreversible physical alteration of the historic property. LM shall coordinate with the preservation professional, the NPS, and the SHPO as needed to ensure that the HABS recordation package meets the regulations described in Volume 68 *Federal Register* pages 43159–43162 (68 FR 43159–43162) in the NPS's, "Guidelines for Architectural and Engineering Documentation." NPS HABS staff have primary review and approval authority for the recordation package.

After resolving all comments and receiving approval from NPS HABS staff, the preservation professional shall submit the final HABS recordation package within 2 years of the execution of this MOA to LM for formal submittal to the NPS.

II. DIORAMA EXHIBIT

LM shall collaborate with the SHPO and City of Piqua to design and construct an exhibit that documents the history of the PNPf. The exhibit shall include a museum diorama of the combined reactor and administration building. The diorama shall be no larger than 5 feet by 5 feet and portable, with a case, that is professionally prepared to provide an accurate 3-dimensional (3D) rendering of the historic property to approximate scale. This diorama would be an aerial view of the exterior of the PNPf when it was in operation.

The diorama shall take advantage of traditional model-making as well as 3D printing, as appropriate, in order to create a realistic replication of the reactor and administration building. The diorama will be designed and prepared by a professional firm using the existing building drawings and photographs. The display is expected to also include an audio and visual component that will describe the operations of the facility. The diorama exhibit is also expected to provide display space that would allow Piqua Public Library staff to be able to display and interchange site artifacts at their discretion. The cost for the diorama exhibit is expected not to exceed \$100,000. A conceptual and final design will be shared with the City of Piqua and SHPO for review and comment within 6 months and 1 year, respectively, of the execution of this MOA. The City of Piqua shall concur on the final exhibit design before construction can begin. The exhibit shall be constructed and given to the City of Piqua for their use, for example, in the Piqua Public Library, within 2 years of the execution of this MOA.

III. ARCHITECTURAL SALVAGE

Prior to demolition, LM shall collaborate with the City of Piqua and the SHPO to identify historical artifacts from the site that will be retained from the site. Such material may include, but is not limited to, framed and unframed photographs and drawings, signs, artwork painted on the walls, or other unique historic objects or pieces of equipment (e.g., the control room operating panel). LM shall remove these objects prior to demolition of the site, determine that they are free of contamination and pursue disposition in accordance with DOE policies and procedures. Dispositioned salvaged artifacts shall be given to the City of Piqua for use as historical memorabilia within 2 years of the execution of this MOA.

IV. INTERPRETIVE SIGNAGE

LM shall collaborate with the City of Piqua and SHPO to design and construct an interpretive sign that is anticipated to cost approximately \$25,000. The sign will tell the history of the PNPFF using a combination of photographs, drawings, and narrative. The free-standing sign shall be approximately 4 feet wide by 3 feet high, full color, and made of weatherproof construction suitable for erection outdoors. A draft design of the interpretative sign shall be shared with the City and SHPO for review and comment within 1 year of the execution of this MOA. Upon resolution of comments, this interpretive sign shall be designed, fabricated, and given to the City of Piqua within 2 years of the execution of this MOA. LM is advised that the City of Piqua intends to install the sign adjacent to the city-owned public bicycle/pedestrian trail on the west side of the Great Miami River across from the Piqua Wastewater Treatment Plant.

LM also shall collaborate with the City of Piqua on the application process and design for the city to obtain an Ohio Historical Marker at a publicly accessible location proximate to the location of the decommissioned Piqua reactor building. The city, as the local sponsor would submit an application for a marker to Ohio History's Local History Services with LM support as needed. LM will reimburse the city for the cost of marker production and marker installation. The Ohio Historical Marker program runs on an annual July-June cycle; applications are due in the Local History Services office every year by July 1. Once an application has been accepted into the program, Local History Services confirms the historical significance of the subject, ensures the marker text is historically accurate, and collaborates with the local sponsor to finalize the text as it will appear on the marker. The anticipated cost is estimated to be less than \$25,000.

V. SCHEDULE FOR STIPULATIONS

The schedule for stipulations I-IV described above shall be amended upon DOE notification to consulting parties followed by written concurrence of the SHPO.

VI. DURATION

This MOA will expire if its terms are not carried out within 5 years from the date of its execution. Prior to such time, LM may consult with the other signatories to reconsider the terms of the MOA and amend it in accordance with Stipulation VIII, "Dispute Resolution," below.

VII. MONITORING AND REPORTING

Each year following the execution of this MOA until it expires, all terms and conditions have been completed, or it is terminated, LM shall provide all parties to this MOA a summary report detailing work undertaken pursuant to its terms. Such report shall include any scheduling changes proposed, any problems encountered, and any disputes and objections received in LM's efforts to carry out the terms of this MOA.

VIII. DISPUTE RESOLUTION

Should any signatory to this MOA object at any time to any actions proposed or the manner in which the terms of this MOA are implemented, LM shall consult with such party to resolve the objection. If LM determines that such objection cannot be resolved, LM will:

- A. Forward all documentation relevant to the dispute, including LM's proposed resolution, to the ACHP. The ACHP shall provide SHPO with its advice on the resolution of the objection within 30 days of receiving adequate documentation. Prior to reaching a final decision on the dispute, LM shall prepare a written response that takes into account any timely advice or comments regarding the dispute from the ACHP, signatories, and concurring parties and provide them with a copy of this written response. LM will then proceed according to its final decision.
- B. If the ACHP does not provide its advice regarding the dispute within the 30-day time period, LM may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, LM shall prepare a written response that takes into account any timely comments regarding the dispute from the signatories and concurring parties to the MOA and provide them and the ACHP with a copy of such written response.
- C. LM's responsibility to carry out all other actions subject to the terms of this MOA that are not the subject of the dispute remains unchanged.

IX. AMENDMENTS

This MOA may be amended when such an amendment is agreed to in writing by all signatories. The amendment will be effective on the date a copy signed by all of the signatories is filed by LM with the ACHP.

X. FUNDING

It is LM's expectation that all commitments established pursuant to this MOA will be funded. Any requirement for the payment or obligation of funds arising in connection with this MOA shall be subject to the availability of appropriated funds. No provision herein shall be interpreted to require obligation or payment of funds in violation of the Antideficiency Act at 31 USC 1341, nor interpreted that Congress will at a later date appropriate funds sufficient to satisfy any commitment of this MOA.

XI. TERMINATION

If any signatory to this MOA determines that its terms will not or cannot be carried out, that party shall immediately consult with the other signatories to attempt to develop an amendment

per Stipulation VIII, "Dispute Resolution," above. If within 30 days (or another time period agreed to by all signatories) an amendment cannot be reached, any signatory may terminate the MOA upon written notification to the other signatories.

Once the MOA is terminated, and prior to work continuing on the undertaking, LM must either (a) execute an MOA pursuant to 36 CFR 800.6, or (b) request, take into account, and respond to the comments of the ACHP under 36 CFR 800.7. LM shall notify the signatories as to the course of action it will pursue.

Execution of this MOA by LM and the SHPO and implementation of its terms is evidence that LM has taken into account the effects of this undertaking on historic properties and afforded the ACHP an opportunity to comment.

SIGNATORIES:

U.S. Department of Energy Office of Legacy Management

Jay D. Glascock Digitally signed by Jay D. Glascock
Date: 2021.10.26 14:44:37 -06'00'

Name: Jay Glascock, Deputy Director, LM Office of Site Operations Date:

Contact:
11035 Dover Street, Suite 600
Westminster, CO 80021
Jay.Glascock@lm.doe.gov
(303) 410-4822

**Ohio History Connection
State Historic Preservation Office**

Diana Welling

Digitally signed by Diana Welling
DN: cn=Diana Welling, o=Ohio History
Connection, ou=State Historic Preservation
Office, email=dwelling@ohiohistory.org, c=US
Date: 2021.11.02 10:47:06 -0400

11/2/2021

Name:

Date:

Diana Welling

Department Head & Deputy State Historic Preservation Officer for
Resource Protection & Review

Contact:

800 East 17th Street

Columbus, OH 43211

614-298-2000

dwelling@ohiohistory.org

CONCURRING PARTIES:

City of Piqua

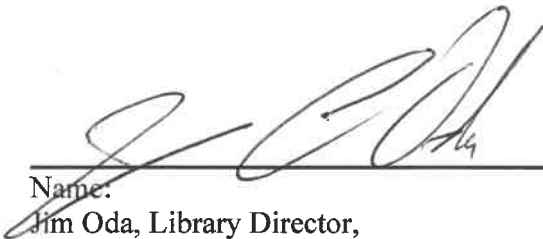


11/09/2021

Name:
Paul Oberdorfer, City Manager

Date:

Contact:
City of Piqua
201 W. Water Street
Piqua, OH 45356
937-778-2051
poberdorfer@piquaoh.org



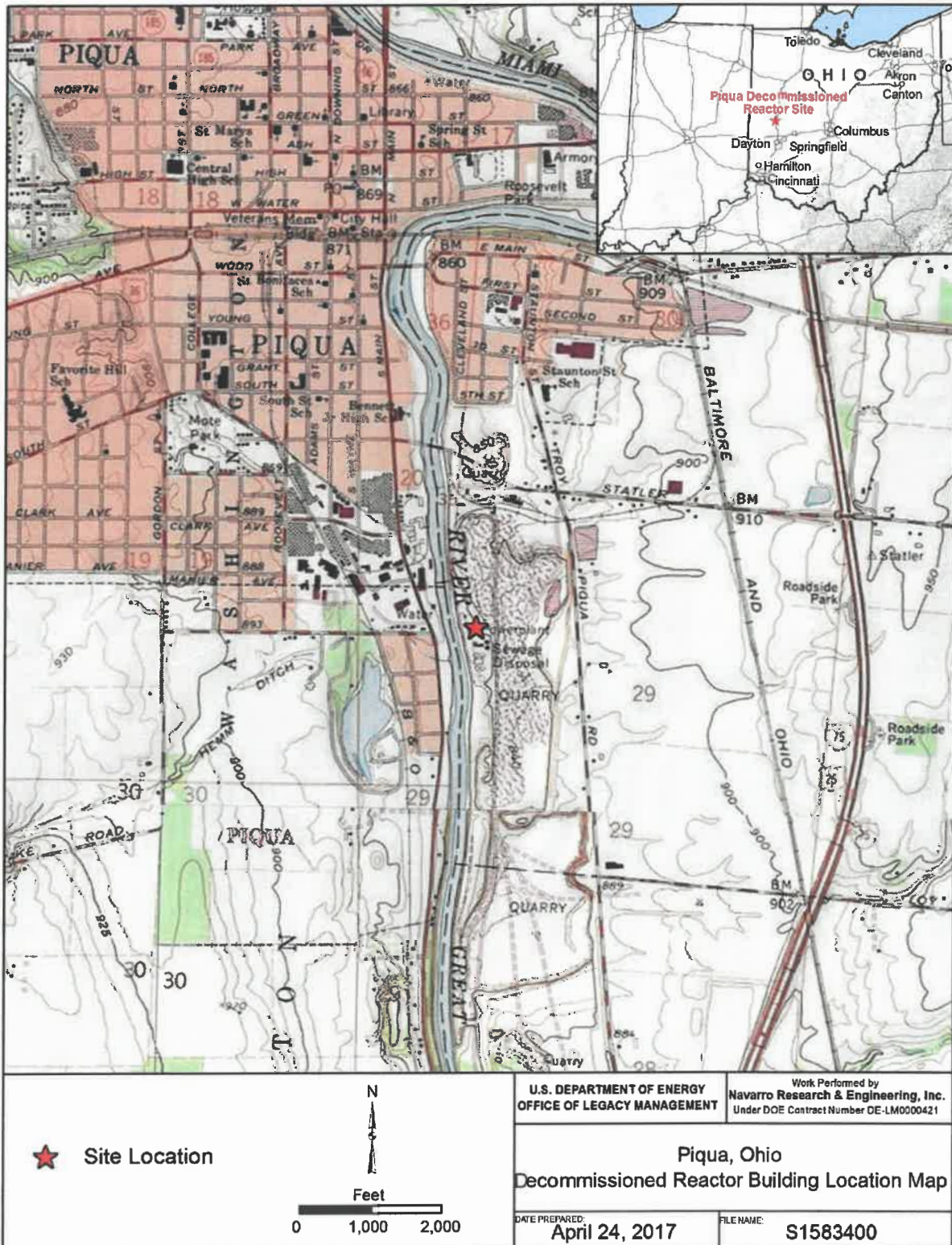
12/15/21

Name:
Jim Oda, Library Director,

Date:

Contact:
Piqua City Library
116 West High Street
Piqua, OH 45356
(937) 773-6753
joda@piqualibrary.org

APPENDIX A: MAP



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