LMS/PIQ/S00076-4.2
Level 4

Long-Term Surveillance and Maintenance Plan for the Piqua, Ohio, Decommissioned Reactor Site

November 2023

U.S. DEPARTMENT OF ENERGY | Legacy Management

This document has been designed for online viewing.

Contents

Figure

Appendixes

Abbreviations

AEC	U.S. Atomic Energy Commission
CFR	*Code of Federal Regulations*
cfs	cubic feet per second
D&D	Decontamination and Decommissioning
DOE	U.S. Department of Energy
FY	fiscal year
JSA	job safety analysis
LM	Office of Legacy Management
LTS&M	long-term surveillance and maintenance
LTS&M Plan	Long-Term Surveillance and Maintenance Plan
MARSSIM	*Multi-Agency Radiation Survey and Site Investigation Manual*
USC	*United States Code*

1.0 Introduction

1.1 Purpose and Scope

This Long-Term Surveillance and Maintenance Plan (LTS&M Plan) explains how the U.S. Department of Energy (DOE) Office of Legacy Management (LM) will fulfill its responsibilities as the long-term custodian of the onsite low-level radioactive waste material entombed at the former Piqua, Ohio, Decommissioned Reactor Site. This LTS&M Plan specifies procedures for site maintenance, inspections, monitoring, reporting, records management, and stakeholder support.

1.2 Site History and Background

The Piqua site was an experimental reactor operated in the 1960s by the U.S. Atomic Energy Commission (AEC) as part of a power demonstration reactor program. It was the first 45.5-megawatt (thermal) organically cooled and moderated reactor built by AEC. Beginning in 1963, the city operated and maintained the facility under contract to AEC.

The demonstration reactor was organically cooled and moderated using a mixture of aromatic hydrocarbons called terphenyls. The reactor produced steam to generate electricity for the city. It produced 150,000 pounds per hour of 550 °F superheated steam at a pressure of 450 pounds per square inch. Reactor-produced steam was carried in pipes across the Great Miami River to the Piqua Municipal Power Plant, where it was mixed with steam from the power station and fed to steam turbine generators to produce electricity for the city. During the time the reactor operated, the average reactor power was 20 megawatts.

The reactor was shut down in January 1966 because of economic and technical considerations. Control rod problems and fouling of heat transfer surfaces due to the accumulation of carbon material in the core contributed to the decision to shut the reactor down. AEC terminated its operating contract with the city (Contract No. AT[11-1]-652) on December 13, 1967 (City of Piqua 1959). In 1968, AEC and the city entered into Contract No. AT(11-1)-1798, which defined responsibilities in connection with decontaminating the facility, entombing the reactor, making the site safe and usable, and maintaining the continued safety of the site (City of Piqua 1968). Appendix A provides a copy of Contract No. AT(11-1)-1798. The reactor vessel was decommissioned, decontaminated, and entombed in place with low-level surface contamination and mildly activated steel and concrete in 1969. Contract No. AT(11-1)-1798 provided that the city would convey title to the federal government of that portion of the leased land on which the Reactor Facility was erected, and the government would thereafter lease the premises back to the city.

In 1969, AEC entered into a lease agreement with the city (City of Piqua 1969). Appendix B provides a copy of the 1969 lease agreement. Under terms of this lease agreement, DOE leased the Decontamination and Decommissioning (D&D) Program facilities to the city at no cost. Because of its role as facility occupant in accordance with the terms of the lease, the city effectively controls the site with the exception of the entombment in the Reactor Facility.

The 1969 lease agreement with the city specifies the responsibilities of both AEC/DOE and the city. DOE is granted access to the site for inspections and ensuring that no unsafe radiological

conditions exist until the radioactivity within the entombment either (1) decays to the levels specified in Title 10 *Code of Federal Regulations* Section 20 (10 CFR 20) or (2) is safely removable.

DOE also ensures that the Nuclear Hazards Indemnity Clause in Contract No. AT(11-1)-652 between the federal government and the city survives the contract termination. The contract referred to here is the original contract with AEC to construct and operate the reactor (City of Piqua 1959).

In 2019, the original contract and lease of 1969 were amended as a result of the city's notification to DOE that it no longer had an interest in maintaining the buildings and using it for city operations. The primary provision of the amendments was to transfer the responsibility of facilities and site maintenance from the city to DOE. In addition, the city confirmed its interest in maintaining its reversionary right to the land pursuant to the 1969 deed, but the city waived its reversionary rights to the buildings.

In 2021, LM conducted an environmental analysis in accordance with the National Environmental Policy Act of 1969, as amended. The final Environmental Assessment for the proposed demolition of the buildings at the Piqua site (DOE 2021) resulted in the decision to demolish the Piqua site facilities while leaving the entombed low-level radioactive waste material in place.

Beginning in May 2022, DOE initiated demolition activities at the Piqua site. Specifically, DOE demolished utility vaults, the Auxiliary Building, and the decommissioned Reactor Building and removed and disposed all debris at a licensed landfill. No demolition activities generated radiological waste. DOE is leaving the buried and entombed radioactive material in place following demolition project completion in 2023. This entombment, and its low-level radioactive waste material, remained undisturbed and in a safe configuration that remained protective of human health and the environment both during demolition and postdemolition activities.

In 2020, a formal *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)* (NRC et al. 2000) radiological characterization survey was performed of the Reactor Building and Auxiliary Building at the site. Minor additional MARSSIM surveys were performed in July 2022 of a room and a tank that were not accessible until building demolition started. All of the MARSSIM survey results were below survey plan identified action levels and well below regulatory radiological release limits (NV5 2021a; DOE 2022). As a result of these MARSSIM surveys and their results, the buildings and the site, excluding the entombed radioactive material and the internals of the entombment structure, were released without restrictions (or released for unrestricted use).

The decision for unrestricted release of the buildings and site (excluding the entombed low-level radioactive waste materials) was based on the requirements identified in DOE Order 458.1 Chg 4 (LtdChg), *Radiation Protection of the Public and the Environment*; 10 CFR 20, "Standards for Protection Against Radiation" (specifically 10 CFR 20.1402); and the State of Ohio's radiological protection regulations in Ohio Administrative Code 3701:1-38-22 (OAC 3701:1-38-22), "Decommissioning."

In addition to the MARSSIM surveys performed at the site, RESRAD dose-modeling evaluations were performed in 2021 that evaluated a future industrial/commercial use of the site's ground level surface (postdemolition) using the radioactive material inventory inside the buried entombment. In the evaluation report (NV5 2021b), it was concluded that "any further remediation of the entombment other than adding the additional concrete [added in 2023] is not warranted and that current controls are adequate to minimize public exposure to a negligible level."

Crystalline concreted was applied to the exterior of the reactor's bioshield in 2023 in accordance with project's demolition work plans. This concrete application finished the final action to ensure that the entombed radioactive material would remain protected from future environmental elements, and that the entombed radioactive material would stay entombed. With the addition of the crystalline concrete to the bioshield, it was determined that future environmental monitoring activities (e.g., groundwater, surface water, soil, or airborne monitoring or sampling) would not be necessary and that protection of human health and environment would remain intact.

The results from the numerous radiological surveys conducted and the dose modeling performed at the site was used to validate that the external radiation exposure risk to personnel working or living at the former reactor site (directly above where the entombment is buried) would be significantly below the naturally-occurring background radiation levels in the Piqua area and would be orders of magnitude below current regulatory dose limits established for members of the public. In addition, it has been determined that a release to the environment of the radioactive material entombed at site is considered extremely unlikely and would pose insignificant or negligible risk to personnel working at or living at the site.

As a result of the D&D of the Piqua decommissioned reactor facility, the Auxiliary Building, and the utility vaults at the site, the City of Piqua is now able to use the property as an industrial and commercial laydown yard, in accordance with the existing lease and contract with DOE. Institutional controls (as described in this LTS&M Plan) will remain in place to ensure long-term protectiveness of the entombment, and LM will continue long-term stewardship of the site.

1.3 Legal and Regulatory Requirements

The Piqua site is managed under the LM D&D Program under the authority of the Atomic Energy Act of 1954, as amended. DOE is self-regulating under the D&D Program and abides by applicable DOE orders, 10 CFR 20, and 10 CFR 835. DOE is also responsible for maintaining compliance with the lease agreement and contracts with the City of Piqua. During decommissioning in the late 1960s, AEC, a predecessor agency to DOE, estimated that the entombed radiological materials would reach free-release criteria under 10 CFR 20, "Standards for Protection Against Radiation," in 2106. LM is responsible for the long-term custody and stewardship of the onsite low-level radioactive waste material entombment. The site is owned by DOE and was leased to the City of Piqua in perpetuity at no cost starting in 1969. The city vacated the property in 2018. The site facilities remained vacant from 2018 to May 2022 when the demolition project began. Before the demolition, LM performed annual site inspections and conducted radiological surveys in accordance with 10 CFR 835, "Occupational Radiation Protection Program," to ensure that the entombment remained protective of human health and the environment. Following demolition, LM remains responsible for the long-term custody and stewardship of the onsite entombed low-level radioactive waste material. When the onsite

entombed low-level radioactive waste material achieves free-release criteria, site ownership will revert to the city.

1.4 Role of DOE

In 1988, DOE designated the Grand Junction Projects Office (now called the LM Field Support Center at Grand Junction, Colorado) as the program office for managing (1) DOE sites that contain regulated low-level radioactive materials, (2) the portions of DOE sites that do not have a DOE mission after cleanup, and (3) other sites as assigned. The DOE facility at Grand Junction, Colorado, would also serve as a common office for the security, surveillance, monitoring, and maintenance of these sites. DOE established the long-term surveillance and maintenance (LTS&M) Program to fulfill these responsibilities.

DOE formally established LM in December 2003. The LM mission is to fulfill DOE's postclosure responsibilities and ensure the future protection of human health and the environment of the Piqua site. In 2023, following the completion of the demolition project, LM remains responsible for implementing the LTS&M for the onsite low-level radioactive waste material entombed at the Piqua site.

2.0 Site Background

2.1 Description of Site Area

2.1.1 Location and Property Ownership

The site is in southwestern Ohio (north of Dayton) on the east bank of the Great Miami River in the southeastern portion of the City of Piqua (Figure 1). It is on DOE-owned land about 900 feet southeast of the Piqua Municipal Power Plant and about 150 feet north of the city's wastewater treatment plant. The north and east sides of the decommissioned facility are bounded by a limestone quarry owned by the Armco Steel Company. The site is approximately 120 feet from the Great Miami River (DOE 1993).

Title to the land (on which the Reactor Facility and Auxiliary Buildings were located) was transferred to DOE at the completion of decommissioning in the late 1960s and subsequently leased back to the city. This arrangement will continue until the radioactive materials left in place decay to levels that would permit transfer of site ownership back to the city. At that time, DOE will reconvey the title to the land and facilities to the city (DOE 1993). A legal description is in Appendix B of this document. Directions to the site are as follows:

- From Dayton, Ohio, travel north on Interstate 75.
- North of Troy, take County Road Exit 25A and turn left from the exit ramp to go north toward Piqua. The power plant will be on the left. Drive past the power plant to the second light at the intersection with Garnsey Street.
- Turn right onto Garnsey Street and travel across a bridge to the other side of the river. At the first road, turn to the right. The dome-shaped Reactor Building on the site should be visible.

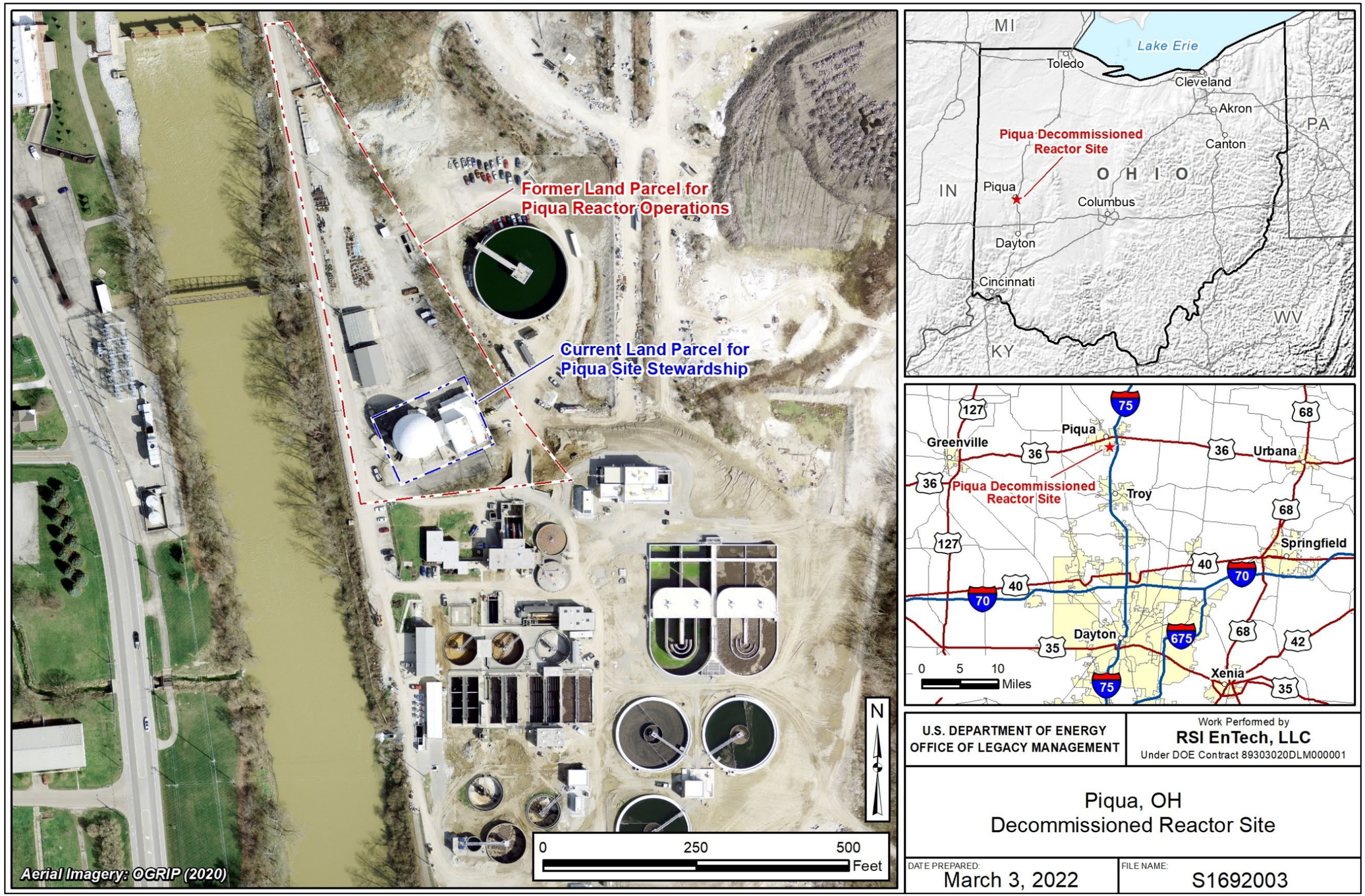

Figure 1. Location of the Piqua Site

2.1.2 Topography and Surface Hydrology

The site is near the center of the Great Miami River Valley, which is a nearly flat plain 8 to 19 miles across and 50 to 100 feet below the general elevation of the adjacent terrain (DOE 1993). The above-grade portion of the site is approximately 866 feet above sea level.

The Great Miami River originates 40 miles northeast of Piqua and flows south around the eastern edge of Piqua to the Ohio River, approximately 90 miles south of Piqua. River flow originates from three major and two minor subdrainage systems. Before 1921, considerable flooding occurred throughout the Great Miami River basin. Since the construction of retarding basins in 1921, flooding on the river has been greatly reduced (DOE 1993). Based on U.S. Geological Survey stream gage station 03262500 (in the Great Miami River at Piqua, Ohio), average annual flows from 2013 to 2022 ranged from 753.8 to 1683 cubic feet per second (cfs).

One of the Great Miami River retarding dams and basins was established 4 miles upstream of Piqua. This dam, together with levees and river channel improvements at Piqua, was designed to permit a maximum river flow at Piqua of 80,000 cfs. During a flow of that magnitude, the elevation of the river near the site will not exceed 864.5 feet above sea level. The highest river flow at the Piqua site since the construction of the dams was 22,000 cfs in 1929 and 1933, and the elevation of the river at the site during these flows was 857.4 feet above mean sea level (DOE 1993). As for the Piqua site postdemolition, the top of the entombed reactor core lies at an elevation of 866 feet above mean sea level.

2.1.3 Physiography and Hydrogeology

Southwest Ohio is characterized by gently rolling glacial till plains. Geologic profiles at the site indicate that alluvial soil and rock material extend from the surface to a depth of approximately 8 feet. The Brassfield Formation underlies the uppermost soil and rock layer and extends to a depth of 30 feet. Blue weathered shale and fossiliferous limestone of the Richmond Formation underlie the Brassfield Formation to a depth of 50 feet. Hard impervious bedrock exists below 50 feet (DOE 1993).

Groundwater in the area of the site occurs mostly in the blue weathered shale, and most wells in the region are drilled to this stratum. Movement of groundwater is generally toward areas of natural discharge, such as surface streams. Around the site, groundwater flow is dominated by water levels in the Great Miami River (DOE 1993).

2.1.4 Climate

Piqua is characterized by a continental-type climate with about 35 inches of rain per year. High relative humidity prevails much of the time. There are about 130 days per year with rainfall. The average tornado frequency for the state of Ohio is 3.2 per year. The average seasonal temperatures range from 31 °F during winter to 73 °F in the summer.

2.2 Stabilization and Isolation Approach

The Piqua site reactor was decommissioned, dismantled, and retired between 1967 and 1969. The reactor fuel, coolant, and most of the radioactive material were physically removed from the site. Contaminated piping and equipment inside the Reactor Building were removed or decontaminated. The reactor vessel, concrete shielding, and fixed components within the reactor vessel were left in place. The reactor vessel is contained within both a cavity liner and an 8-foot-thick concrete biological shield. The radioactive materials remaining onsite were integral parts of the reactor structure (i.e., contaminated or activated steel and concrete). The reactor vessel remains housed within the below-grade reinforced concrete structure. The thickness of concrete, steel, and other materials near the stored radioactive materials was dictated primarily by shielding considerations for the operational reactor plant. Because of the original design considerations, the concrete structure was identified and used to retain its integrity for an indefinite period of time (DOE 1993).

In December 2021, DOE finalized the decision to demolish the buildings at the site via an Environmental Assessment/Finding of No Significant Impact. DOE decided to leave an entombment of low-level radioactive waste onsite and belowground in a protected state. In May 2022, DOE initiated demolition of the facility, with the work being concluded in fall 2023. Specifically, DOE demolished utility vaults, the Auxiliary Building, and the decommissioned Reactor Facility, and removed and disposed of the debris at a licensed landfill. No demolition activities generated radiological waste.

The 18-month project involved the full demolition of aboveground structures and reconstruction of the work area. The areas affected during demolition amount to approximately 1 acre of potential land disturbance.

The D&D project was divided into six phases: Phase 1 included general site-preparation activities, such as procuring equipment and materials and establishing a haul road, temporary office trailers, project fencing, and project signage. This phase also included the conventional demolition of the Auxiliary Building as well as demolition of all subgrade utility vaults. Phase 2 work included abating lead-based paint and selectively demolishing walls and infrastructure in the below grade portion of the Reactor Building. During Phase 3, work included encapsulating the existing entombment in crystalline concrete and backfilling the space between the entombment and building walls. Phase 4 involved demolishing the Reactor Building and dome and backfilling remaining void spaces. Phase 5 involved reconstruction activities, such as site grading, paving, and installing the entombment cover and signage. The last phase of work, Phase 6, consisted of finalizing site acceptance with the City of Piqua and completing the as-built record drawings.

In 2023, during Phase 3 of the demolition work and as a long-term protective measure, the entombment was further encased with additional crystalline waterproofing concrete as required by the demolition project design specification before backfilling the former below-grade reactor hull. Crystalline waterproofing for cast-in-place concrete was used to ensure that no water would infiltrate through the entombment and would provide additional physical protection for the entombment from accidental breaches. The existing entombment was cleared of all perturbances and the crystalline waterproofed self-healing concrete was cast around the existing entombment. Crystalline waterproofing is a chemical admixture that fills the capillaries naturally occurring in

concrete with crystalline structures. This crystalline admixture chemically reacts with moisture to produce non-soluble crystalline structures. The crystalline structure renders the concrete waterproof. The integral nature of crystalline waterproofing also seals hairline cracks, making the concrete structure somewhat self-healing.

2.3 Site Information

A sealed container or "time capsule" lies beneath the concrete protective cover, above the entombed low-level radioactive waste material. The specific location is included in the Miami County deed book. A copy of the deed book information is included in Appendix B of this document.

2.4 Groundwater Conditions

There is no record of groundwater contamination associated with the site, as such there was no groundwater monitoring program during reactor operations or over the past 5 decades (1970-2023).

During the 2021 entombment exposure evaluation (NV5 2021b) it was determined that water intrusion into the entombment would not be considered to be a credible event. This conclusion was made as a result of the future requirement to add a 2-foot-thick crystalline concrete barrier to the entombment (which occurred in 2023). Crystalline concrete is considered waterproof as adding water only increases the crystalline structure and makes it more impervious. It is also self-healing in the event of concrete cracking, which virtually eliminates the risk of water entering the entombment volume. Even in the unlikely event that water intrusion to the entombment occurs, the risk of radioactive material escaping to the environment is small. This is because the reactor vessel and upper cavity are filled with dry sand. While this will not prevent water flow, it does provide a volume of material that will impede the movement of radioactive particulates. Sand is known to be an excellent particulate filter and would trap most particulates if they were to become soluble. As part of the reactor's retirement, an analysis of the potential for corrosion was written by Atomics International, TI-745-20-005, *PNPF Retirement, Corrosion of Steel Surfaces*. This document quotes a study that showed steel in contact with silica (sand) corrodes at a much lower rate than steel covered only by water. The corrosion study also shows that corrosion of the steel reactor vessel and core internals is a very slow process. For example, if the steel was in a completely saturated environment, corrosion would be 0.002 to 0.006 inches per year. The total weight expected to corrode per year is estimated at 0.865 ounces per square foot (24.5 grams per square foot).

The radioactive source term identified in Section 5.1 of the exposure evaluation report has already been converted to picocuries per gram (pCi/g) which will allow a worst case determination of material at risk. However, this assumes a complete submersion of the metal in water with no silica present, which is contrary to current situation. Any leak into the reactor would likely be very slow because a catastrophic failure of the vessel is not considered a credible scenario. Not only would water intrusion be a slow process, but diffusion and migration of material out of the entombment would also be a very slow process (even neglecting the effects of the sand material in the entombment).

The corrosion processes described earlier apply to the iron component of the steel. Materials such as nickel, silver, and cobalt do not corrode in water. As such, isotopes of these metals would not corrode, dissolve, and then be available for dispersion. If a pathway for water intrusion into the reactor develops, then the corrosion process would be slow, and it would require that a large volume of water be present to drive it. In addition, the corrosion of most of the entombment material would be minimal.

As identified in the exposure evaluation report summary, "it has been concluded that a release to the environment of the potential radioactive material currently entombed at former PNPF site release to the environment of the radioactive material entombed at Piqua is considered extremely unlikely and poses no insignificant or negligible risk to personnel working at or living on the former PNPF site." As such, it was determined that future environmental monitoring activities (e.g., groundwater, surface water, soil, or airborne monitoring or sampling) are not necessary or required to be performed as part of the LTS&M for the site.

2.5 Radiological Conditions

The low-level radioactive waste material remains buried at the site in the below-grade reinforced concrete structure (the cavity liner and 8-foot-thick concrete biological shield that has been encased with additional crystalline waterproofing concrete). This low-level radioactive waste material has been in place in the entombment since 1969 and remains entombed and not a hazard to human health or a risk to the environment. This is evident given historical results from the annual radiological surveys performed at the site, which identified that there was no removable radioactive contamination and that radiation dose rates in and around the Reactor Building and Auxiliary Building were at background levels. In 2020, a formal *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)* (NRC et al. 2000) radiological characterization survey was performed of the Reactor Building and Auxiliary Building at the site. Minor additional MARSSIM surveys were performed in July 2022 of a room and a tank that were not accessible until building demolition started (NV5, 2021b). All the MARSSIM survey results were below survey plan identified action levels and well below regulatory radiological release limits (NV5 2021a; DOE 2022). As a result of these MARSSIM surveys and their results, the buildings and the site, excluding the entombed radioactive material and the internals of the entombment structure, were released without restrictions (or released for unrestricted use).

The decision for unrestricted release of the buildings and site (excluding the entombed low-level radioactive waste materials) was based on the requirements identified in DOE Order 458.1 Chg 4 (LtdChg), *Radiation Protection of the Public and the Environment*; 10 CFR 20, "Standards for Protection Against Radiation" (specifically 10 CFR 20.1402); and the State of Ohio's radiological protection regulations in *Ohio Administrative Code* 3701:1-38-22 (OAC 3701:1-38-22), "Decommissioning."

In addition to the MARSSIM surveys performed at the site, RESRAD dose-modeling evaluations were performed in 2021 that evaluated a future industrial/commercial use of the site's ground-level surface (postdemolition) using the radioactive material inventory inside the buried entombment. In the evaluation report (NV5 2021b), it was concluded that "any further remediation of the entombment other than adding the additional concrete [added in 2023] is not warranted and that current controls are adequate to minimize public exposure to a negligible level." While the vast majority of reactor fission fragment radioactive isotopes and activation

product radioactive isotopes inside the entombment and as part of the entombment structure have radioactively decayed away, there remain multiple radioactive isotopes with activities that do not meet current regulatory release criteria or limits (in 2023). As described in the exposure evaluation report (NV5 2021b), "it will take approximately 100 years for the radioactive material in the entombment to decay to levels where there is no potential external exposure hazard to members of the public. It will take a little over one million years for the longest lived radionuclides (*radioactive isotopes*) to decay to levels below current screening guidelines. However, the potential exposure to these long lived isotopes is considered to be an extremely unlikely event."

Based on decay calculations performed on the entombed radioactive material inventory, in the year 4023 (2000 years from now), nickel-59 will make up approximately 86% of the isotopic inventory and be at an activity level of roughly 4.8×10^{-2} curies while calcium-41 will make up approximately 9% of the inventory and be at an activity level of roughly 4.9×10^{-3} curies. The current DOE volumetric isotopic release concentration values for both nickel-59 and calcium-41 is 3.0×10^{-9} curies per gram.

There is no radioactive material (associated with the reactor and its past operations) outside of the buried entombment at the site.

Given the above radiological conditions, no environmental (e.g., groundwater, surface water, soil, or airborne) or human health radiological monitoring or measurements (radiological surveys or sampling and analysis) are necessary or required to be performed as part of the LTS&M for the site.

3.0 LTS&M Plan

3.1 Site Maintenance

In 2021, LM conducted an environmental analysis in accordance with the National Environmental Policy Act of 1969, as amended. The final Environmental Assessment for the proposed demolition of the buildings at the Piqua site (DOE 2021) resulted in the decision to demolish the Piqua site facilities, leaving the entombment in place. From decommissioning in the 1960s through demolition completion in 2023, the onsite entombed low-level radioactive waste material remained undisturbed in a safe configuration protective of human health and the environment.

LM remains responsible for the long-term custody and stewardship of the low-level radioactive waste material entombment until the entombment achieves free-release criteria, and then the site ownership will revert to the city.

3.2 Site Inspections and Frequency

Following demolition completion in 2023, LM continues its responsibility for periodic site inspections to document that the onsite entombed low-level radioactive waste material remains undisturbed in a safe configuration protective of human health and the environment.

The criteria for the site inspections include looking for slumping or other issues with the riprap cover or parking lot; erosion of the vegetation on the eastern hillside or any observations of hillslope instability, slumping, or sliding; health of the vegetation on that hillside; vegetation and weeds in the riprap cover and management as necessary (for aesthetic purposes only, not for cap integrity); trespassing; obvious evidence of non-industrial/commercial use; and the condition of the rail barriers and site signage. LM will verify that the terms and conditions of the lease and contract are being upheld by the City of Piqua and that no actions have been taken or are planned that could impact the entombment. LM will also meet with the City of Piqua to reinforce suitable land uses under the site's institutional controls and ensure that the entity within the city that is adjacent to the site boundary that is using the area is aware of applicable institutional controls.

Site inspections will occur annually for the first 3 fiscal years (FYs) following demolition (FY 2024–2026), and then the frequency is expected to change to every 5 FYs starting in FY 2027 and will continue until the entombment reaches free-release criteria under 10 CFR 20, "Standards for Protection Against Radiation." During years that an inspection is not conducted, a desktop assessment will be performed and documented. Specifically, the assessor will contact the City of Piqua to verify that site usage and institutional controls are understood by the entity using the site. In addition, the assessor will verify long-term plans for the area and document any potential changes that could impact the city's obligations under the contract and lease or the entombment's integrity.

Although DOE is self-regulating under the D&D Program, as a best management practice, DOE intends to invite the applicable state agency to participate in site inspections. Currently, the Ohio Department of Health is the state entity that is responsible for oversight of radiological material.

3.3 Inspection Report

DOE develops, issues, and then posts inspection reports on the LM public website at https://lmpublicsearch.lm.doe.gov/SitePages/default.aspx?sitename=Piqua. The reports include inspection results and any recommendations for site maintenance, as well as the need for follow-up inspections, monitoring, or maintenance actions, if any become necessary.

3.4 Follow-Up Inspections

Follow-up inspections are unscheduled inspections that may be required (1) as a result of discoveries during a previous site inspection and monitoring event or (2) as a result of changed site conditions reported by a citizen; an employee; or a federal, state, or local agency.

3.4.1 Criteria

DOE will conduct follow-up inspections if either of the following occurs:

- A condition is identified during the site inspection or during another site visit that requires personnel, perhaps personnel with specific expertise, to return to the site to evaluate the condition
- DOE is notified by a citizen; an employee; or a federal, state, or local agency that conditions at the site are substantially changed

Once a condition or concern is identified at the site, DOE will evaluate the information and decide whether to respond with a follow-up inspection.

In the event of "unusual damage or disruption" that threatens or compromises site safety, security, or integrity, including an actual breach in containment materials (which is unlikely), DOE will begin the occurrence notification process in accordance with DOE Order 232.2A, *Occurrence Reporting and Processing of Operations Information*, respond with an immediate follow-up inspection, and begin emergency measures (Section 3.5) to contain or prevent dispersion of radioactive materials from the site. At any time, DOE may request the assistance of local authorities or subject matter experts to confirm the seriousness of a condition at the site before scheduling a follow-up inspection or initiating other appropriate action.

3.4.2 Reports of Follow-Up Inspections

Results of routine follow-up inspections are included in the next scheduled inspection report (Section 3.3). Separate reports will not be prepared unless DOE determines it advisable to notify an outside agency or stakeholder of a problem at the site.

If follow-up inspections are required for more serious or emergency reasons, DOE will prepare a preliminary report about the follow-up inspection within 90 days.

3.5 Emergency Measures

Emergency measures are the actions LM will take in response to "unusual damage or disruption" that threatens or compromises site safety, security, or integrity. LM will respond to "unusual damage or disruption" that threatens or compromises the entombment, as deemed appropriate. DOE will contain or prevent dispersal of radioactive materials in the unlikely event of an actual breach in site containment materials. Other site-specific emergency response information for the Piqua site (i.e., fire, ambulance, air rescue, police) is contained in the *LM/LMS All Hazards Emergency Management Plan* (LM-Procedure-3-20-17.0, LMS/POL/S37643).

3.6 Records

To support LTS&M of the Piqua site, LM maintains physical (paper hard copy) records at the LM Business Center at Morgantown, West Virginia. Digital records associated with the project are maintained and stored in the LM Content Manager electronic records software system. These project records contain important information required to protect human health and the environment, manage land and assets, protect the legal interests of DOE and the public, and mitigate community impacts resulting from the cleanup of legacy waste. Site historical records about the environmental remediation and stewardship are included in the collection.

All LM records will be managed in accordance with National Archives and Records Administration protocols with the following requirements:

- Title 44 *United States Code* Section 29 (44 USC 29), "Records Management by the Archivist of the United States," available at https://www.archives.gov/about/laws/records-management.html

- 44 USC 31, "Records Management by Federal Agencies," available at https://www.archives.gov/about/laws/fed-agencies.html
- 44 USC 33, "Disposal of Records," available at https://www.archives.gov/about/laws/disposal-of-records.html
- 36 CFR 1220–1249, "Records Management," available at https://www.gpo.gov/fdsys/granule/CFR-2011-title36-vol3/CFR-2011-title36-vol3-chapXII-subchapB
- DOE Order 243.1B Admin Chg 1, *Records Management Program*, available at https://www.directives.doe.gov/directives-documents/200-series/0243.1-BOrder-b-admchg1/@@images/file
- LM Records Management Program procedures

3.7 Stakeholder Support

The stewardship of the Piqua site also includes responding to stakeholder inquiries that may arise. LM is committed to prompt response to the stakeholder whether by phone, email, or formal Freedom of Information Act inquiry.

3.8 Quality Assurance

The long-term custody of the site and all activities related to the surveillance and maintenance of the site will comply with DOE Order 414.1D Admin Chg 1, *Quality Assurance*. Quality assurance requirements are routinely fulfilled through a work planning process, standard operating procedures, trained personnel, documents and records maintenance, and assessment activities. Requirements are transmitted through procurement documents to subcontractors when appropriate.

3.9 Safety and Health

Safety and health requirements and procedures for DOE activities are consistent with DOE orders, federal regulations, and applicable codes and standards. The DOE Integrated Safety Management process serves as the basis for the Legacy Management Support contractor's safety and health program.

Specific guidance is contained in a job safety analysis (JSA) prepared for any fieldwork performed at the Piqua site. The JSA identifies specific hazards associated with the anticipated scope of work and provides direction for the control of these hazards. During the preinspection briefing, personnel are required to review the JSA to ensure that they understand the potential hazards and the safety and health requirements associated with the work to be performed.

4.0 References

10 CFR 20. "Standards for Protection Against Radiation," *Code of Federal Regulations*.

10 CFR 835. "Occupational Radiation Protection Program," *Code of Federal Regulations*.

36 CFR 1220–1249. "Records Management," *Code of Federal Regulations*.

44 USC 29. "Records Management by the Archivist of the United States," *United States Code*.

44 USC 31. "Records Management by Federal Agencies," *United States Code*.

44 USC 33. "Disposal of Records," *United States Code*.

City of Piqua, 1959. *United States Atomic Energy Commission, Contract No. AT(11-1)-652, City of Piqua, Ohio*, June 1.

City of Piqua, 1968. *Contract No. AT(11-1)-1798, Agreement between the United States of America acting through the United States Atomic Energy Commission and the City of Piqua, Ohio*, May 10, as amended in 2019.

City of Piqua, 1969. *Lease Between the U.S. Atomic Energy Commission and the City of Piqua, Ohio*, June 25, as amended in 2019.

DOE (U.S. Department of Energy), 1993. *Environmental Restoration and Waste Management Site Specific Plan: Volume VII, Piqua Nuclear Power Facility*, DOE/CH-9225, January.

DOE (U.S. Department of Energy), 2021. *Environmental Assessment, Proposed Demolition of the Buildings at the Piqua, Ohio, Decommissioned Reactor Site*, DOE/EA-2107, LMS/PIQ/S35626, Office of Legacy Management, November.

DOE (U.S. Department of Energy), 2022. *Addendum Characterization Survey Report for the Piqua, Ohio, Decommissioned Reactor Site Room B-7*, LMS/PIQ/42087, Office of Legacy Management, August.

DOE Order 232.2A, *Occurrence Reporting and Processing of Operations Information*, U.S. Department of Energy, archived October 4, 2019.

DOE Order 243.1B Admin Chg 1, *Records Management Program*, U.S. Department of Energy, archived February 7, 2022.

DOE Order 414.1D Admin Chg 1, *Quality Assurance*, U.S. Department of Energy, archived August 26, 2020.

DOE Order 458.1 Chg 4 (LtdChg), *Radiation Protection of the Public and the Environment*, U.S. Department of Energy, September 15, 2020.

LM/LMS All Hazards Emergency Management Plan, LM-Procedure-3-20-17.0, LMS/POL/S37643, continually updated, prepared by the LMS contractor for the U.S. Department of Energy Office of Legacy Management.

NRC (U.S. Nuclear Regulatory Commission), EPA (U.S. Environmental Protection Agency), and DOE (U.S. Department of Energy), 2000. *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)*, Revision 1, NUREG-1575, EPA 402-R-97-016, DOE/EH-0624, August.

NV5, 2021a. *Piqua Nuclear Power Facility Characterization Survey Final Report,* 100552-RPT-20200709, June.

NV5, 2021b. *Piqua Nuclear Power Facility Entombment Exposure Evaluation – Final Report*, 100552-RPT-20210406-Rev 0, July.

OAC 3701:1-38-22. "Decommissioning," *Ohio Administrative Code*.

Appendix A

Contract No. AT(11-1)-1798, as Amended in 2019

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE	OF	PAGES
	1		2

2. AMENDMENT/MODIFICATION NUMBER	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQUISITION NUMBER	5. PROJECT NUMBER *(If applicable)*
0001	See Box 16C.	NA	NA

6. ISSUED BY	CODE	7. ADMINISTERED BY *(If other than Item 6)*	CODE
U.S. Department of Energy Office of Headquarters Procurement Services MA-64 1000 Independence Ave., S.W. Washington DC 20585	00112		

8. NAME AND ADDRESS OF CONTRACTOR *(Number, street, county, State and ZIP Code)*	(X)	9A. AMENDMENT OF SOLICITATION NUMBER
City of Piqua 201 W. Water Street Piqua, Ohio 45356	☐	NA 9B. DATED *(SEE ITEM 11)* See Box 16C.
	☐	10A. MODIFICATION OF CONTRACT/ORDER NUMBER AT(11-1)-1798 10B. DATED *(SEE ITEM 13)*

CODE	FACILITY CODE

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers ☐ is extended. ☐ is not extended.

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or electronic communication which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by letter or electronic communication, provided each letter or electronic communication makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA *(If required)*

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NUMBER AS DESCRIBED IN ITEM 14.

CHECK ONE	
☐	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: *(Specify authority)* THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NUMBER IN ITEM 10A.
☐	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES *(such as changes in paying office, appropriation data, etc.)* SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
☐	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
☒	D. OTHER *(Specify type of modification and authority)* 52.243-1 Changes - Fixed-Price

E. IMPORTANT: Contractor ☐ is not ☒ is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION *(Organized by UCF section headings, including solicitation/contract subject matter where feasible.)*

The purpose of this modification is to update the roles/responsibilities associated with AGREEMENT Section, numbers 8 and 13.

See the attached "Continuation Page" for details.

15A. NAME AND TITLE OF SIGNER *(Type or print)*	16A. NAME AND TITLE OF CONTRACTING OFFICER *(Type or print)*
GARY A. HUFF, CITY MANAGER	Darryl D. Groves

15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
(Signature of person authorized to sign)	12-31-18	*(Signature of Contracting Officer)*	01-10-19

Previous edition unusable

STANDARD FORM 30 (REV. 11/2016)
Prescribed by GSA FAR (48 CFR) 53.243

In accordance with FAR Clause 52.243-1 Changes - Fixed-Price, the following changes are hereby incorporated into the contract:

1. AGREEMENT, Section 8 is hereby revised to, "Except for the activities referred to in Section 3. above necessitated by the presence of the sealed radioactive source, the City shall be responsible for non-nuclear maintenance of the property, excluding the reactor building and auxiliary building, during the period of time it occupies the property under the lease from the Government. The Government may remove, in a manner of the Government's choosing, all above-ground structures and facilities on the premises excluding the entombment for the sealed radioactive source".

2. AGREEMENT, Section 13 is hereby revised to, "The City Shall hold the Government harmless from any liability or claim arising out of damage or injury to persons or property resulting from non-nuclear causes in connection with the property covered by the lease from the Government to the City, except for such liability or claims which may result from a failure by the Government to fulfill any of the responsibilities or obligation assumed by it hereunder.

3. All other terms and conditions remain unchanged and in full force and effect.

Appendix B

Lease as Amended in 2019, Legal Description, and Other Deed Book Information

8108940
Tx:4059690
MIAMI COUNTY RECORDER
JESSICA A LOPEZ
2019OR-01544
PRESENTED FOR RECORD
MIAMI COUNTY, TROY, OHIO
02/11/2019 02:59:03 PM
REFERENCES 2
RECORDING FEE 252.00
PAGES: 29

29 pgs ADDENDUM

ADDENDUM
TO
LEASE AGREEMENT
BETWEEN
THE UNITED STATES DEPARTMENT OF ENERGY
AND
THE CITY OF PIQUA, OHIO

This addendum is entered into this 7th day of January, 2019, by and between the United States of America (herein the "Government"), acting through the U.S. Department of Energy (herein "DOE"), the successor to the Atomic Energy Commission (herein the "AEC"), and the City of Piqua, Ohio (herein the "City").

Recitals

WHEREAS, on March 7, 1961, the City leased to the Government a tract of land described in Miami County Lease Book 24, Page 334, (the "premises") on which the Government constructed a Government-owned nuclear reactor, which the City operated under Contract No. AT(11-1)-652 with the AEC. Said contract was terminated on December 13, 1967. On May 10, 1968, the City and the AEC entered into Contract No. AT(11-1)-1798 (Exhibit A), which defined the responsibilities of the parties thereto in connection with certain land and facilities (the "premises") including decontamination of the premises, entombment of a Government-owned reactor located on the premises, maintenance of the premises, and future ownership of the premises; and provided that the "Government shall lease such land and the structures thereon to the City" and the "City shall thereafter assume responsibility for the non-nuclear safety and maintenance of such property;" and

WHEREAS, pursuant to Contract No. AT(11-1)-1798, the City conveyed the premises to the Government by deed of March 24, 1969, recorded in the land records of Miami County, Ohio on March 26, 1969 (**Deed Book 460, Page 599**) (Exhibit B). Section 9 of that contract references the Deed from the City to the Government, and section 2 of such Deed provides when the radioactivity level of the material has decayed to a condition permitting unrestricted use, that the "premises shall revert to, vest in, and become absolutely the property of the grantor, its successors and assigns;" and

WHEREAS, the Government, through the AEC, leased "a parcel of land, together with the building erected thereon" (Piqua facility) to the City via a lease dated June 25, 1969, recorded in the land records of Miami County, Ohio at **Lease Book 24, Page 334** (Exhibit C); and

WHEREAS, the City has informed DOE that it does not intend to utilize the reactor building and auxiliary building on the premises, as referenced in Contract No. AT(11-1)-1798, in the future, but that the City seeks continued access to the land for storage or other purposes; and

WHEREAS, the Government requires full and exclusive access to the premises to conduct work on the structures and facilities, potentially including removal of same;

NOW, THEREFORE, the Government and the City hereby agree as follows:

1. Section 3 of the Lease, is hereby modified as follows:

"The Government warrants that it has title in fee simple to the leased land and that it is free of liens and encumbrances. Effective the date of this addendum, the City's access to the entire premises for any purpose shall be held in abeyance until such time as the Government completes its contemplated work thereupon and therein, as the Government may choose to conduct, up to and including potential abatement and/or removal of any or all structures and facilities. The Government shall have full rights of access to the premises to the exclusion of the City during this time period. At the time the Government completes its contemplated work associated with the structures and facilities, it shall provide written notice to the City notifying the City of the effective date of the abeyance, and the resumption of "free and undisturbed use of such land," except for those limitations provided in the 1968 contract and the 1969 lease.

2. Effective the date hereof, the City is relieved of its current obligations for non-nuclear safety and maintenance of the reactor building and auxiliary building located on the premises, as referenced in Contract No. AT(11-1)-1798 and as described in Section 8 of Appendix A to the lease, but shall retain those obligations for the balance of the premises at the conclusion of the abeyance set forth in Section 1 hereof. Furthermore, the City specifically waives its reversionary interest in any and all structures and facilities, but not the land, at the premises as those interests may exist pursuant to the reversionary clause in the above-mentioned deed of March 26, 1969 from the City to the Government.

3. Upon termination of the abeyance set forth in Section 1 hereof, the City shall resume its responsibility for the non-nuclear maintenance and upkeep of the premises, as it then exists, excluding the aforementioned reactor building and auxiliary building, should they remain.

4. Except as modified hereby, the agreements of the parties shall continue and remain in full force and effect.

IN WITNESS WHEREOF, the Parties hereby agree to the foregoing effective as of the last date set forth below.

The City of Piqua, Ohio

Gary Huff, City Manager — Date 12-31-18

UNITED STATES OF AMERICA, U.S. DEPT. OF ENERGY

Real Estate Contracting Officer — Date 1.7.19

State of Ohio
County of Miami ss:

On this 31st day of December, 2018 appeared before me, a Notary Public in and for the State of Ohio, Gary A. Huff, the City Manager of the City of Piqua, Ohio, the municipal corporation which executed the foregoing lease amendment who acknowledged that the seal affixed to said instrument is the seal of said City of Piqua; that he did sign and seal such instrument as such City Manager on behalf of said City and by authority of its City Commission; and that said instrument is his free act and deed individually and as the City Manager, and the free and corporate act and deed of the City of Piqua, a municipal corporation.

NOTARIAL SEAL STATE OF OHIO

DEBORAH ANN STEIN
Notary Public, State of Ohio
My Commission Expires 11/14/2019

Deborah Ann Stein
Notary Public

State of Colorado
County of Jefferson ss:

On this 7th day of January, 2019 appeared before me, a Notary Public in and for the State of Colorado, Mr. David P. McNeil, Real Estate Contracting Officer of the U.S. Dept. of Energy, Legacy Management, who acknowledged that he has full authority to execute the foregoing on behalf of the United States of America, and that the above is his signature and his free act and deed, and the free act and deed of the United States.

Katherine Koett
Notary Public

KATHERINE KOETT
Notary Public
State of Colorado
Notary ID # 20074027594
My Commission Expires 07-17-2019

Contract No. AT (11-1)-1798 AEC

Exhibit A

City of Piqua, Ohio

CONFORMED COPY

Contract No. AT(11-1)-1798

AGREEMENT

This agreement is entered into this 10th day of May , 1968, effective April 1, 1968, between the UNITED STATES OF AMERICA (hereinafter referred to as the "Government"), acting through the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter referred to as the "Commission"), and the CITY OF PIQUA, OHIO (hereinafter referred to as the "City").

RECITALS

The Government has terminated its contract with the City for the operation of the Piqua Nuclear Power Facility (hereinafter called the PNPF) and the City has waived its contract option to purchase the reactor and appurtenances. A lease dated March 7, 1961, from the City to the Government of the land on which the PNPF was constructed obligated the Government to decontaminate the land and structures upon termination of the operating contract. The City has released the Government from a part of this obligation and will permit certain radioactive material to remain "entombed" on-site.

The parties have further agreed that the title to the land upon which the PNPF is situated, together with such perimeter area as may be necessary for fulfillment of the Government obligations hereunder, shall be conveyed in fee simple by the City to the Government and that the Government shall assure and be responsible for the nuclear safety of such land and the structures thereon. The Government shall lease such land and the structures thereon to the City for its use and the City shall thereafter assume responsibility for the non-nuclear safety and maintenance of such property.

AGREEMENT

NOW THEREFORE, the parties hereto agree as follows:

1. The Government shall at no expense to the City do all things necessary to decontaminate the premises leased from the City on March 7, 1961, and the structures thereon, except as specifically provided hereafter, to 10 CFR 20 levels for unrestricted access to all exposed surfaces, and to assure that the reactor building and auxiliary building are left in a clean and usable condition.

2. The Government shall do all things necessary to seal off and completely isolate from access, the reactor vessel and its internals, the biological shield and any other areas which cannot be decontaminated to 10 CFR 20 levels or below.

3. The Government shall retain full responsibility to inspect the premises periodically to assure that no unsafe radiological conditions exist, until such time as the radioactivity within the isolated areas decays to 10 CFR 20 levels or below or is safely removable, and shall do all things necessary to alleviate any unsafe radiological conditions found to exist at any time prior to the expiration of such time as aforesaid. All costs of alleviating any such unsafe radiological conditions shall be borne by the Government, unless such conditions occur as a result of a breach by the City of the obligations undertaken pursuant to paragraph 6 hereof.

4. After agreement by the parties concerning the perimeter area surrounding the reactor building which should be held by the Government so that it may fulfill its responsibility for the radiological safety of the land and building, the City shall have the area surveyed. The City shall supply to the Government a record of land survey and a description of the land covered thereunder, together with a current report and certificate of title. The City shall further convey to the Government title in fee simple to such land.

5. When the land and structures have been made radiologically safe, the Government shall lease to the City the above land together with the structures thereon and warrant to the City the free and undisturbed use of such land and facilities except for those limitations stated herein and in such lease document.

6. The City shall not breach the barrier to the sealed radioactive source and it shall engage in no activities on the land in question which might contribute to a breach of such barrier, nor shall it permit any such activities by others.

7. The City shall report promptly to the Government any condition which it has reason to believe is causing or may cause a radiological hazard to persons or property in, on or about the premises, and shall cooperate with the Government in protecting all persons and property from any such hazards.

8. Except for the activities referred to in Section 3. above necessitated by the presence of the sealed radioactive source, the City shall be responsible for non-nuclear maintenance of the structures and facilities during the period of time it occupies the land and structures as a lessee under the lease from the Government. The City may replace, remove and dispose

of any equipment which is a part of the leased facility, provided that this action is taken in a manner which will neither impair nor tend to impair the integrity of the sealed radioactive source.

9. The deed from the City to the Government shall be recorded in the land records of the County of Miami and shall contain a restrictive covenant describing the nature of the radioactive material left in place and prohibiting any action which might disturb it. It shall also provide that title to the land shall revert automatically to the City upon a finding by the Commission or its successor in function that the radioactive level of the "entombed" material has decayed to 10 CFR 20 conditions for unrestricted areas, as they may be amended by cognizant government authority.

10. The lease from the Government to the City shall also be recorded in the land records of the County and shall prohibit any action which might impair or tend to impair the integrity of the sealed radioactive source. The lease shall expire upon the reverter of title to the City.

11. The Government assures the City that the Nuclear Hazards Indemnity Clause contained in Contract No. AT(11-1)-652 between the Government and the City survives the termination of the contract.

12. In the event of any damage or injury to persons or property resulting from nuclear causes in connection with the presence of the sealed radioactive source on the property covered by the above-described deed and lease, the Government shall hold the City, its officers, agents and employees, harmless from any liability or claims therefor, except for any such damage or injury which may result from a failure by the City to fulfill any of the responsibilities or obligations assumed by it hereunder.

13. The City shall hold the Government harmless from any liability or claim arising out of damage or injury to persons or property resulting from non-nuclear causes in connection with the land and structures covered by the lease from the Government to the City, except for such liability or claims which may result from a failure by the Government to fulfill any of the responsibilities or obligations assumed by it hereunder.

14. The City shall permit the Government, its representatives and contractors, free and ready access to the premises at any and all times for the purposes of carrying out any of the provisions of this agreement.

15. The Commission shall provide at no expense to the City an operable water level alarm system and the City shall maintain, inspect, and replace as necessary, such system or component parts thereof for such period of time as necessary to the maintenance of the sealed radiological source in a radiologically safe condition (estimated to be approximately 50 years). Upon the execution of the lease described in Section 5. hereof, the Commission shall pay, and the City shall accept, a lump sum payment of $20,000.00 for the assumption of this obligation.

16. The Commission shall at no expense to the City make the existing cathodic protection system operable, or install a new, operable system, and the City shall maintain, inspect, and replace as necessary, such system or component parts thereof for such period of time as necessary to the maintenance of the sealed radioactive source in a radiologically safe condition (estimated to be approximately 50 years). Upon the execution of the lease described in Section 5. hereof, the Commission agrees to pay, and the City agrees to accept, a lump sum payment to be negotiated for the assumption of this obligation. The amount of such lump sum payment shall be evidenced by an exchange of correspondence without requiring a formal modification of this agreement.

IN WITNESS WHEREOF, the Government and the City have executed this agreement on the date first above written.

THE UNITED STATES OF AMERICA

BY: /s/ F. J. Walcavich

F. J. Walcavich, Deputy Manager

Chicago Operations Office
U. S. Atomic Energy Commission

CITY OF PIQUA, OHIO

BY: /s/ Robert M. Hance

City Manager

(TITLE)

WITNESSES:

/s/ Lucy D. Laug

/s/ Linda Houser

(SEAL)

Exhibit B Deed AEC

City of Piqua, Ohio

Know all men by these presents:

The City of Piqua, in Miami County, in the State of Ohio, having obtained title to the within described premises by certain instruments recorded in volume 339, page 428, and volume 362, page 490, of the deed records of Miami County, Ohio, in consideration of the commitments of the parties under Contract No. AT(11-1)-1798, and of the sum of $1.00 and other good and valuable considerations, the receipt and sufficiency of which are hereby acknowledged, does hereby give, grant, bargain, sell and convey unto the United States of America and its assigns all that tract of land situate in the west central part of Section 29, Town 1, Range 11, M.R.S. Springcreek Township, Miami County, State of Ohio, and being more particularly described as follows:

> Beginning at a railroad spike at the northeast corner of tract number one, said spike being South ten degrees and thirty-nine minutes East (S 10° - 39' E) eighteen hundred and fifty-nine feet (1,859) of the corner of Sections 29, 30, 35, and 36 M.R.S.; thence South, eighty-one degrees eleven minutes West (S 81° - 11' W) two hundred thirteen and eighty-five hundredths (213.85') feet to a railroad spike; thence South, twelve degrees fifty-four minutes East (S 12° - 54' E) one hundred thirty-three (133.0) feet to an iron spike; thence North, sixty-three degrees thirty-six minutes East (N 63° - 36' E) thirty-seven (37.0) feet to place of beginning of the herein described parcel; thence continuing last said course, one hundred sixty-six (166.0) feet to a point; thence South, twenty-six degrees twenty-four minutes East (S 26° - 24' E) one hundred twenty (120.0) feet to a point; thence South, sixty-three degrees thirty-six minutes West (S 63° - 36' W) one hundred sixty-six (166.0) feet to a point, thence North, twenty-six degrees twenty-four minutes West (N 26° - 24' W) one hundred twenty (120.0) feet to the place of beginning.
>
> Said parcel containing .457 Acres, more or less.

To have and to hold the granted premises, with all the rights, easements and appurtenances thereto belonging, to the United States of America and its assigns, to its and their own use, subject only to the following:

1. It is expressly understood and agreed by and between the parties hereto and their assigns and successors that no use of the premises nor action thereon will be permitted which will disturb or tend to disturb certain irradiated materials, including the vessel of a government-owned nuclear reactor and its internals and the biological shield surrounding such vessel, all of which will remain entombed in

MAR 26 1969
CARL DAVIS, AUDITOR
MIAMI COUNTY, OHIO

the land, sealed and isolated from all access, and which are more fully described in the appendix attached hereto. Duplicate copies of engineering documents and descriptive data concerning the reactor complex have been deposited at the reactor site in two sealed containers. The locations of the containers are also identified in the attached appendix.

2. It is further understood and agreed by and between the parties hereto and their assigns and successors that upon a finding by the United States Atomic Energy Commission or its successor in function that the radioactivity level of the above material has decayed to a condition permitting unrestricted use of the premises, the above described premises shall revert to, vest in, and become absolutely the property of the grantor, its successors and assigns.

The City warrants that it has title, in fee simple, to the above land and that the same is free of liens and encumbrances and that it will warrant and defend the same to the United States Government and its assigns against the lawful claims and demands of all persons.

IN WITNESS WHEREOF, the City has hereunto subscribed its name and seal this 24th day of March, 1969.

CITY OF PIQUA, OHIO

BY: Robert M. Hance

This Conveyance has been examined and the Grantor has complied with Section 319.202 of the Revised Code.
FEE $
EXEMPT
CARL DAVIS

IN PRESENCE OF

R K Wilson

Robert May

STATE OF OHIO, MIAMI COUNTY, ss:

Before me, a Notary Public, in and for said State, personally appeared Robert M. Hance, Jr., City Manager and Purchasing Agent of the City of Piqua Ohio, the municipal corporation which executed the foregoing deed who acknowledged that the seal affixed to said instrument is the seal of said City of Piqua; that he did sign and seal such instrument as such City Manager and Purchasing Agent in behalf of said City and by authority of its City Commission; and that said instrument is his free act and deed individually and as such City Manager and City Purchasing Agent, and the free and corporate act and deed of the City of Piqua, a municipal corporation.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed my official seal this 24th day of March, 1969.

R K Wilson
Notary Public

This instrument was prepared
By R. K. Wilson

APPENDIX

I. LOCATION OF RADIOACTIVE MATERIALS AND OF DESCRIPTIVE DATA

Radioactive materials are located in a region called the "reactor complex" which is located below the main floor level within the reactor building. The materials became radioactive during the period of reactor plant operation ending in 1966. The region containing said materials extends outward in all directions a distance of 8 feet, more or less, from a point; said point being located 9.0 feet, south 65 degrees west from the geometric center of the reactor building, and 24.6 feet below the surface of the main floor. The intensity of radioactivity diminishes with time and at increasing distances from said point.

The locations of the radioactive materials, and of one of two sealed containers, or "time capsules," containing detailed information describing these materials and the related structures, are shown by Exhibit 1. The diagram identified as Exhibit 1. is a cross sectional view of the reactor looking easterly, made by a vertical plane oriented north 25 degrees west, and located 9.0 feet, south 65 degrees west from the geometric center of the reactor building. The intercept of the said line from the building center with the vertical plane is a point on the vertical centerline of the reactor and, that point on the floor surface has the reference elevation of 100.3 feet. One of the sealed containers previously mentioned is located at reference elevation 98.5 feet, and the center of the radioactive region has a reference elevation of 75.8 feet. The second sealed container is mounted on a wall 6 feet above the floor surface and 32.5 feet from the reactor center. It is located behind a metal plaque bearing the following inscription:

PIQUA NUCLEAR POWER FACILITY

-NOTICE-

Behind this plaque is a metal box containing detailed information concerning the reactor complex structure and contents. This box is not to be opened without the permission of the United States Government.

-United States Atomic Energy Commission-

-1969-

The above locations are more specifically described as follows:

Beginning at a railroad spike at the northeast corner of Tract No. 1, (the beginning point of the description of the land covered by this deed) said spike being south, ten degrees and thirty-nine minutes east (S 10°-39' E) eighteen hundred and fifty-nine feet (1859') of the corner of Sections 29, 30, 35 and 36 M.R.S.; thence south, eighty-one degrees eleven minutes west (S 81°-11' W) two hundred thirteen and eighty-five hundredths feet (213.85') to a railroad spike; thence south, twelve degrees fifty-four minutes east (S 12° -54' E) one hundred eighty-eight and seventeen hundredths feet (188.17') to a point, said point being in the intersection of the property line and center line of the reactor building; thence north, sixty-three degrees eight minutes twenty seconds east (N 63° -08' -20" E) ninety-two and thirty-seven hundredths feet (92.37') to the center of the sealed reactor vessel; thence, continuing said course thirty-two and fifty hundredths feet (32.50') to a point; thence above this point a sealed container, the second "time capsule" mentioned above, will be found mounted in the wall.

II. RADIOACTIVE SOURCE MATERIALS

The materials having the highest levels of radioactivity are located within the reactor vessel, hereinafter referred to as Region I. After a period of 80 years (2046 AD) more or less, the materials in Region I will have a radioactivity level of approximately 1000 times the level considered to be safe (by 1969 standards); however, it is predicted that the materials associated with the reactor vessel and biological shielding, Regions II and III, respectively, will have reached safe levels by that time.

The summaries of radioactive materials given on Exhibit 2 allow for decay periods of 25 to 100 years from the last date of reactor operation (January 1966). At the time of completion of the dismantlement program (January 1969) the levels of radioactivity from the radionuclides listed on Exhibit 2 are somewhat greater as given on Exhibit 2.1.

There are other radionuclides which are not significant after 25 or more years but which are significant sources at the present. These are the radionuclides having half lives of about one month to one year, which are listed on Exhibit 2.2. Exhibit 3 shows the ratio of radioactivity levels to safe levels (per 1969 standards) over a period of 140 years from 1966.

The radionuclide content left in the retired PNPF was compiled from the retirement safety analysis reports, AI-AEC-MEMO-12708* and the AI-AEC-MEMO-12708 Supplement A.* Safe levels of radioactivity are those levels which would allow unconditional release. The unconditional release criteria have been interpreted to mean the following:

1. External radiation hazards shall be deemed not to exist if the surface dose rate from every component is less than 0.2 mrem/hr.

2. Internal radiation hazards shall be deemed nonexistent if:

   a. Specific activity and solubility are such that the applicable nonoccupational MPC_W cannot be exceeded,

   b. The total activity, times the fraction deposited upon ingestion or inhalation, is less than a nonoccupational maximum permissible body burden, and

   c. The total amount of the element in the standard man were replaced by the element taken from the PNPF and would not result in a nonoccupational body burden. This is not applicable for elements such as europium for which the intestine or lung is the critical organ.

III. ACCESS TO REACTOR COMPLEX

The reactor complex region has been enclosed so as to preclude accidental entry or the transfer of radioactive materials to the outside. Unauthorized entry is forbidden by the United States Government. When entry to the reactor complex is authorized, access to one of the time capsules previously mentioned can be obtained by removing the concrete floor surface (about 4 inches thick) within a radius of 6 feet from the reactor centerline previously described, to expose the shield plug which weighs 11,000 pounds. After breaking the welds at the perimeter of the shield plug at a diameter of 11.8 feet, the shield plug can be lifted away exposing the region containing the "time capsule." The engineering drawings and other data contained therein describe the configuration of the installations in detail and include the basic data from which exhibits included in this appendix were compiled.

---

* Copies of these documents are in the two sealed containers described in Part I of this appendix.

A second sealed container containing duplicates of all documents in the "time capsule" is located on an inside wall of the reactor building, 23.3 feet, north 65 degrees east of the building center, at an elevation of 6 feet above the floor level.

EXHIBIT I

REACTOR CROSS SECTIONLOOKING EAST

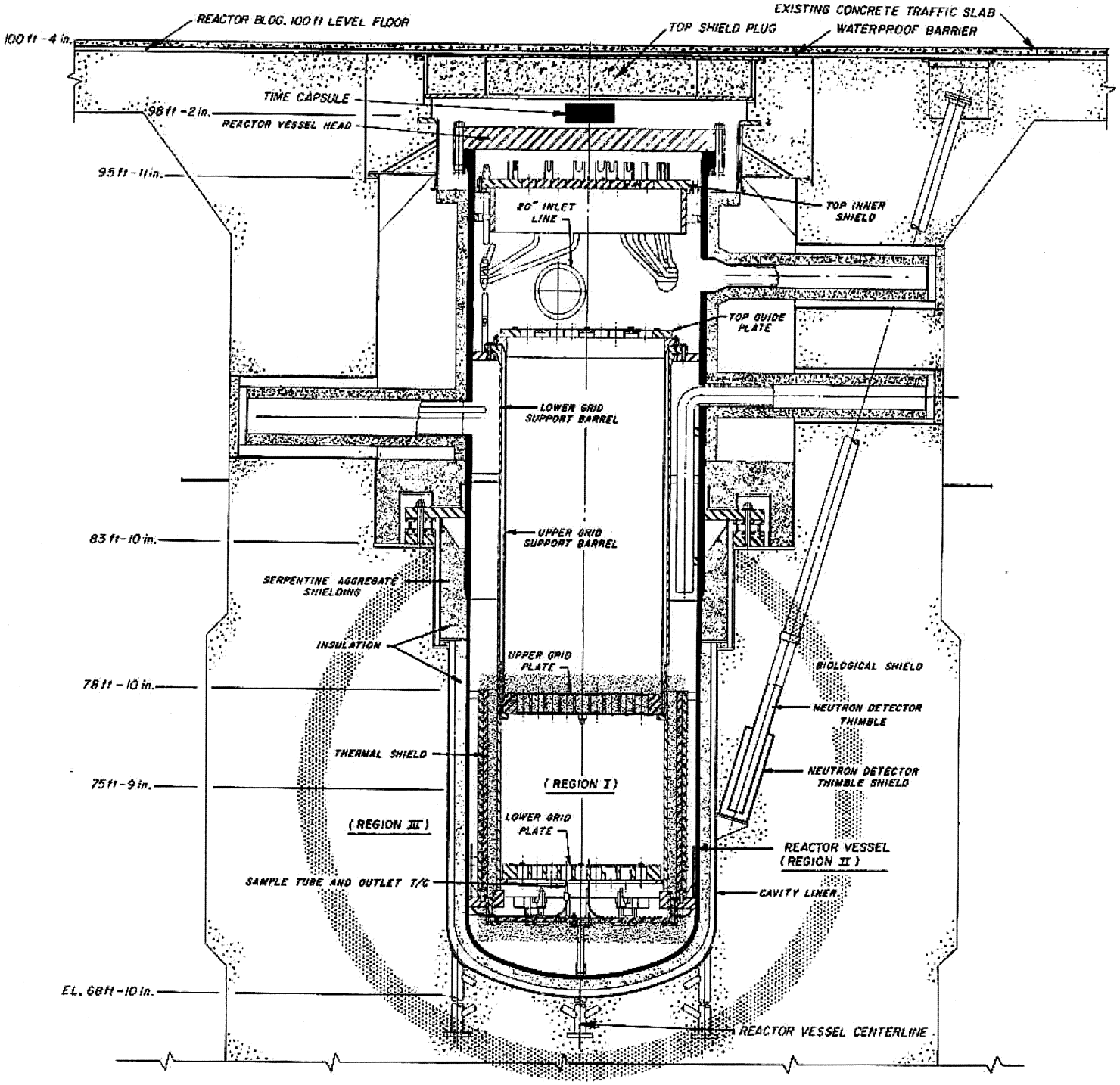

EXHIBIT 2

TOTAL RADIOACTIVITY (Curies) OF SIGNIFICANT LONG-LIVED RADIONUCLIDES IN THE RETIRED PIQUA NUCLEAR POWER FACILITY

	YEAR 1991				YEAR 2016			
Radio-nuclide	Region I* (inside vessel)	Region II† (vessel and insulation)	Region III§ (liner and shield)	Total	Region I* (inside vessel)	Region II† (vessel and insulation)	Region III§ (liner and shield)	Total
^{3}H	-	-	5.6×10^{-1}	5.6×10^{-1}	-	-	1.4×10^{-1}	1.4×10^{-1}
^{14}C	5.7×10^{-5}	1.0×10^{-4}	2.4×10^{-5}	1.8×10^{-4}	5.7×10^{-5}	1.0×10^{-4}	2.4×10^{-5}	1.8×10^{-4}
^{22}Na	-	5.9×10^{-8}	-	5.9×10^{-8}	-	-	-	-
^{36}Cl	-	1.6×10^{-4}	2.2×10^{-4}	3.8×10^{-4}	-	1.6×10^{-4}	2.2×10^{-4}	3.8×10^{-4}
^{39}Ar	-	4.1×10^{-6}	2.8×10^{-4}	2.8×10^{-4}	-	3.9×10^{-6}	2.8×10^{-4}	2.8×10^{-4}
^{41}Ca	-	4.7×10^{-4}	3.4×10^{-3}	3.9×10^{-3}	-	4.7×10^{-4}	3.4×10^{-3}	3.9×10^{-3}
^{55}Fe	1.4×10^{2}	6.1×10^{-1}	3.2×10^{-1}	1.4×10^{2}	1.9×10^{-1}	8.0×10^{-4}	4.2×10^{-4}	1.9×10^{-1}
^{59}Ni	4.9×10^{-2}	2.6×10^{-4}	-	4.9×10^{-2}	4.9×10^{-2}	2.6×10^{-4}	-	4.9×10^{-2}
^{60}Co	5.4×10^{1}	2.3×10^{-1}	1.3×10^{-1}	5.4×10^{1}	2.1×10^{0}	8.8×10^{-3}	4.9×10^{-3}	2.1×10^{0}
^{63}Ni	6.5×10^{0}	3.5×10^{-2}	1.5×10^{-3}	6.5×10^{0}	5.4×10^{0}	2.9×10^{-2}	1.2×10^{-3}	5.4×10^{0}
^{93}Mo	-	1.0×10^{-6}	-	1.0×10^{-6}	-	1.0×10^{-6}	-	1.0×10^{-6}
^{108m}Ag	8.5×10^{-3}	-	-	8.5×10^{-3}	6.0×10^{-3}	-	-	6.0×10^{-3}
^{151}Sm	-	-	8.2×10^{-4}	8.2×10^{-4}	-	-	7.0×10^{-4}	7.0×10^{-4}
^{152}Eu	-	-	3.4×10^{-2}	3.4×10^{-2}	-	-	7.7×10^{-3}	7.7×10^{-3}
^{154}Eu	-	-	1.5×10^{-3}	1.5×10^{-3}	-	-	5.3×10^{-4}	5.3×10^{-4}
Total	1.9×10^{2}	8.8×10^{-1}	1.0×10^{0}	1.9×10^{2}	7.7×10^{0}	3.8×10^{-2}	1.4×10^{-1}	7.8×10^{0}

	YEAR 2041				YEAR 2066			
Radio-nuclide	Region I* (inside vessel)	Region II† (vessel and insulation)	Region III§ (liner and shield)	Total	Region I* (inside vessel)	Region II† (vessel and insulation)	Region III§ (liner and shield)	Total
^{3}H	-	-	3.3×10^{-2}	3.3×10^{-2}	-	-	8.1×10^{-3}	8.1×10^{-3}
^{14}C	5.7×10^{-5}	1.0×10^{-4}	2.4×10^{-5}	1.8×10^{-4}	5.7×10^{-5}	1.0×10^{-4}	2.4×10^{-5}	1.8×10^{-4}
^{22}Na	-	-	-	-	-	-	-	-
^{36}Cl	-	1.6×10^{-4}	2.2×10^{-4}	3.8×10^{-4}	-	1.6×10^{-4}	2.2×10^{-4}	3.8×10^{-4}
^{39}Ar	-	3.6×10^{-6}	2.6×10^{-4}	2.6×10^{-4}	-	3.4×10^{-6}	2.4×10^{-4}	2.4×10^{-4}
^{41}Ca	-	4.7×10^{-4}	3.4×10^{-3}	3.9×10^{-3}	-	4.7×10^{-4}	3.4×10^{-3}	3.9×10^{-3}
^{55}Fe	2.3×10^{-4}	9.9×10^{-7}	5.2×10^{-7}	2.3×10^{-4}	-	-	-	-
^{59}Ni	4.9×10^{-2}	2.6×10^{-4}	-	4.9×10^{-2}	4.9×10^{-2}	2.6×10^{-4}	-	4.9×10^{-2}
^{60}Co	7.5×10^{-2}	3.2×10^{-4}	1.8×10^{-4}	7.5×10^{-2}	2.7×10^{-3}	1.1×10^{-5}	6.3×10^{-6}	2.7×10^{-3}
^{63}Ni	4.4×10^{0}	2.4×10^{-2}	1.0×10^{-3}	4.4×10^{0}	3.7×10^{0}	2.0×10^{-2}	8.5×10^{-4}	3.7×10^{0}
^{93}Mo	-	1.0×10^{-6}	-	1.0×10^{-6}	-	1.0×10^{-6}	-	1.0×10^{-6}
^{108m}Ag	4.2×10^{-3}	-	-	4.2×10^{-3}	3.0×10^{-3}	-	-	3.0×10^{-3}
^{151}Sm	-	-	5.9×10^{-4}	5.9×10^{-4}	-	-	4.8×10^{-4}	4.8×10^{-4}
^{152}Eu	-	-	1.9×10^{-3}	1.9×10^{-3}	-	-	4.3×10^{-4}	4.3×10^{-4}
^{154}Eu	-	-	1.9×10^{-4}	1.9×10^{-4}	-	-	6.7×10^{-5}	6.7×10^{-5}
Total	4.5×10^{0}	2.4×10^{-2}	3.9×10^{-2}	4.5×10^{0}	3.7×10^{0}	2.0×10^{-2}	1.4×10^{-2}	3.7×10^{0}

*Region I: Inside Reactor Vessel; includes - Upper Core Grid, Lower Core Grid, Lower Support Barrel, Thermal Shield, Sampling Tube Support Plate, Fuel Channel TC's (85), Moderator Flow TC's (3), Thermal Shield and Barrel TC's (6), and Mixed Mean TC's

†Region II: Reactor Vessel and Insulation; includes - Reactor Vessel, Insulation, Insulation Bonding, and Serpentine

§Region III: Cavity Liner and Shield; includes - Cavity Liner, Concrete Biological Shield, Reinforcing Steel, and Embedded TC's

EXHIBIT 2.1

TOTAL RADIOACTIVITY (Curies) OF SIGNIFICANT LONG-LIVED RADIONUCLIDES IN THE RETIRED PIQUA NUCLEAR POWER FACILITY – YEAR 1969

Radionuclide	Region I* (inside vessel)	Region II† (vessel and insulation)	Region III§ (liner and shield)	Total
^{3}H	-	-	2.2×10^{0}	2.2×10^{0}
^{14}C	5.7×10^{-5}	1.0×10^{-4}	2.4×10^{-5}	1.8×10^{-4}
^{22}Na	-	2.7×10^{-5}	-	2.7×10^{-5}
^{36}Cl	-	1.6×10^{-4}	2.2×10^{-4}	3.8×10^{-4}
^{39}Ar	-	4.3×10^{-6}	3.0×10^{-4}	3.0×10^{-4}
^{41}Ca	-	4.7×10^{-4}	3.4×10^{-3}	3.9×10^{-3}
^{55}Fe	5.1×10^{4}	2.2×10^{2}	1.2×10^{2}	5.1×10^{4}
^{59}Ni	4.9×10^{-2}	2.6×10^{-4}	-	4.9×10^{-2}
^{60}Co	1.1×10^{3}	4.7×10^{0}	2.6×10^{0}	1.1×10^{3}
^{63}Ni	7.7×10^{0}	4.1×10^{-2}	1.8×10^{-3}	7.7×10^{0}
^{93}Mo	-	1.0×10^{-6}	-	1.0×10^{-6}
^{108m}Ag	1.2×10^{-2}	-	-	1.2×10^{-2}
^{151}Sm	-	-	9.8×10^{-4}	9.8×10^{-4}
^{152}Eu	-	-	1.3×10^{-1}	1.3×10^{-1}
^{154}Eu	-	-	4.1×10^{-3}	4.1×10^{-3}
Total Long-Lived	5.2×10^{4}	2.2×10^{2}	1.2×10^{2}	5.2×10^{4}
Total Short-Lived from Exhibit 2.2	480	2.03	2.1×10^{5}	2.1×10^{5}
Total	5.2×10^{4}	2.2×10^{2}	2.1×10^{5}	2.6×10^{5}

*Region I: Inside Reactor Vessel; includes – Upper Core Grid, Lower Core Grid, Lower Support Barrel, Thermal Shield, Sampling Tube Support Plate, Fuel Channel TC's (85), Moderator Flow TC's (3), Thermal Shield and Barrel TC's (6), and Mixed Mean TC's

†Region II: Reactor Vessel and Insulation; includes – Reactor Vessel, Insulation, Insulation Banding, and Serpentine

§Region III: Cavity Liner and Shield; includes – Cavity Liner, Concrete Biological Shield, Reinforcing Steel, and Embedded TC's

NUCLEAR REACTION DATA AND TOTAL RADIOACTIVITY OF SIGNIFICANT SHORT-LIVED RADIONUCLIDES IN THE RETIRED PIQUA NUCLEAR POWER FACILITY

Product Isotope	Half Life	Parent Isotope	Reaction	σ Reaction Cross Section (barns)	I Isotopic Abundance of Parent (fraction)	N_o/A 10^{24} Atoms Per Gram (parent element)	$(1 - e^{-\lambda T})e^{-\lambda t}$ Saturation x Decay Fraction ($T = 1.2$ yr, $t = 3$ yr)	Total Activity (Curies) January 1969			
								Region I (inside vessel)	Region II (vessel and insulation)	Region III (lines and shield)	Total
^{33}P	25d	^{33}S	(n,p)	6.5×10^{-2}	0.0076	0.01826	6.27×10^{-14}	$<10^{-6}$	$<10^{-6}$	-	-
^{35}S	86.7d	^{34}S	(n,2n)	3.0×10^{-5}	0.0422	0.01772	1.52×10^{-4}	$<10^{-6}$	$<10^{-6}$	-	-
		^{35}Cl	(n,p)	6.5×10^{-2}	0.7553	0.01722	1.52×10^{-4}	-	1.3×10^{-5}	-	1.3×10^{-5}
^{37}Ar	35.1d	^{40}Ca	(n,α)	6.7×10^{-3}	0.9697	0.01506	4.16×10^{-10}	-	$<10^{-6}$	-	-
^{45}Ca	163d	^{44}Ca	(n,γ)	7.0×10^{-1}	0.0206	0.01370	7.98×10^{-3}	-	2.9×10^{-2}	2.1×10^{5}	2.1×10^{5}
		^{46}Ca	(n,2n)	2.8×10^{-4}	3.3×10^{-5}	0.01311	7.98×10^{-3}	-	$<10^{-6}$	-	-
		^{48}Ti	(n,α)	4.0×10^{-5}	0.7394	0.01256	7.98×10^{-3}	-	$<10^{-6}$	-	-
^{46}Sc	83.8d	^{46}Ti	(n,p)	9.0×10^{-3}	0.0793	0.01310	1.39×10^{-12}	-	$<10^{-6}$	-	-
^{51}Cr	27.8d	^{50}Cr	(n,γ)	1.7×10^{1}	0.043	0.01206	5.46×10^{-2}	$<10^{-6}$	$<10^{-6}$	-	-
		^{52}Cr	(n,2n)	3.0×10^{-5}	0.8376	0.01159	5.46×10^{-2}	$<10^{-6}$	$<10^{-6}$	-	-
		^{54}Fe	(n,α)	7.4×10^{-4}	0.0582	0.01116	5.46×10^{-2}	$<10^{-6}$	$<10^{-6}$	$<10^{-6}$	-
^{54}Mn	312d	^{54}Fe	(n,p)	5.1×10^{-2}	0.0582	0.01116	1.13×10^{-4}	4.8×10^{2}	2.0	1.05	480
		^{55}Mn	(n,2n)	2.0×10^{-4}	1.000	0.01096	1.13×10^{-4}	2.9×10^{-1}	1.2×10^{-3}	2.3×10^{-4}	0.29
^{58}Co	71d	^{58}Ni	(n,p)	7.3×10^{-2}	0.6788	0.01039	2.22×10^{-5}	2×10^{-3}	9×10^{-6}	-	2×10^{-3}
		^{59}Co	(n,2n)	2.0×10^{-4}	1.000	0.01022	2.22×10^{-5}	1×10^{-6}	$<10^{-6}$	$<10^{-6}$	1×10^{-6}
^{59}Fe	45d	^{58}Fe	(n,γ)	1.2×10^{0}	0.0033	0.01039	4.54×10^{-8}	5×10^{-4}	2×10^{-6}	1×10^{-6}	5×10^{-4}
		^{59}Co	(n,p)	1.7×10^{-3}	1.000	0.01022	4.54×10^{-8}	$<10^{-6}$	$<10^{-6}$	$<10^{-6}$	-
		^{62}Ni	(n,α)	1.8×10^{-5}	0.0366	0.00972	4.54×10^{-8}	$<10^{-6}$	$<10^{-6}$	-	-
^{89}Sr	50.6d	^{92}Zr	(n,α)	7.4×10^{-5}	0.1711	0.00655	3.05×10^{-7}	$<10^{-6}$	-	-	-
^{91}Y	59d	^{91}Zr	(n,p)	2.8×10^{-4}	0.1123	0.00662	2.74×10^{-6}	$<10^{-6}$	-	-	-
^{95}Zr	65d	^{94}Zr	(n,γ)	8.0×10^{-2}	0.1740	0.00641	8.20×10^{-6}	$<10^{-6}$	-	-	-
		^{96}Zr	(n,2n)	4.0×10^{-3}	0.0280	0.00628	8.20×10^{-6}	$<10^{-6}$	-	-	-
		^{98}Mo	(n,α)	6.6×10^{-5}	0.2378	0.00615	8.20×10^{-6}	$<10^{-6}$	-	-	-
^{110m}Ag	260d	^{109}Ag	(n,γ)	3.5×10^{0}	0.4818	0.00553	3.68×10^{-2}	6×10^{-2}	-	-	-
Total								480	2.03	2.1×10^{5}	2.1×10^{5}

EXHIBIT 3

RATIO OF ACTUAL TO SAFE RADIOACTIVITY LEVELS

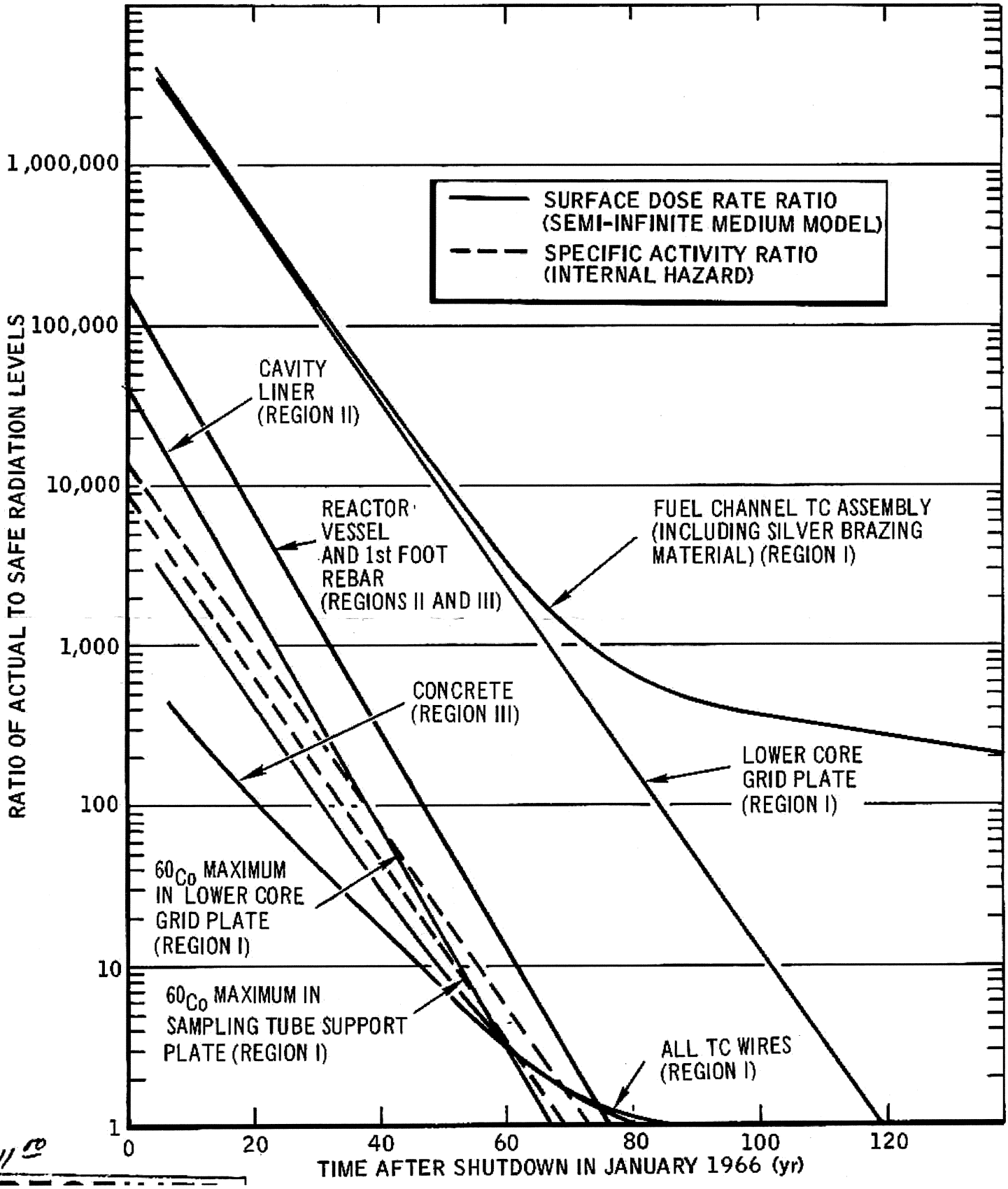

Exhibit C

1969 Piqua Lease with City

City of Piqua, Ohio

BOOK 24 PAGE 334

62357

LEASE
BETWEEN
THE U. S. ATOMIC ENERGY COMMISSION
AND
CITY OF PIQUA, OHIO

This lease is entered into this 25th day of June , 1969, by and between the UNITED STATES OF AMERICA (hereinafter referred to as the "Government"), acting through the U. S. ATOMIC ENERGY COMMISSION (hereinafter referred to as the "Commission"), and the CITY OF PIQUA, OHIO (hereinafter referred to as the "City").

RECITALS

Under date of March 7, 1961, the City leased to the Commission a tract of land on which the Commission constructed a Government-owned nuclear reactor. The City operated that reactor under Contract No. AT(11-1)-652 with the Commission until the contract was terminated on December 13, 1967. The Commission and the City then entered into Contract No. AT(11-1)-1798 which defined the responsibilities of both in connection with the decontamination of the premises, entombment of the reactor, making the site safe and useable, and maintaining the continued safety of the site. Contract AT(11-1)-1798 provided that the City would convey title to the Government of that portion of the leased land on which the reactor building was erected and that the Government would thereafter lease the premises to the City. The City conveyed title to that parcel of land to the Government by deed recorded in the land records of Miami County, Ohio, on March 26, 1969. This lease is entered into in accordance with the provisions of Contract No. AT(11-1)-1798.

AGREEMENT

NOW THEREFORE, the parties hereto agree as follows:

1. In consideration of the commitments of the parties under Contract No. AT(11-1)-1798 and of the sum of $1.00 and other good and valuable considerations, the receipt and sufficiency of which are hereby acknowledged, the Commission does hereby lease to the City the following described parcel of land, together with the building erected thereon, situate in the west central part of Section 29, Town 1, Range 11, M.R.S. Springcreek Township, Miami County, State of Ohio, and being more particularly described as follows:

Beginning at a railroad spike at the northeast corner of tract number one, said spike being South ten degrees and thirty-nine minutes East (S 10° - 39' E) eighteen hundred and fifty-nine feet (1,859) of the corner of Sections 29, 30, 35, and 36 M.R.S.; thence South, eighty-one degrees eleven minutes West (S 81° - 11' W) two hundred thirteen and eighty-five hundredths (213.85') feet to a railroad spike; thence South, twelve degrees fifty-four minutes East (S 12° - 54' E) one hundred thirty-three (133.0) feet to an iron spike; thence North, sixty-three degrees thirty six minutes East (N 63° - 36' E) thirty seven (37.0) feet to place of beginning of the herein described parcel; thence continuing last said course, one hundred sixty-six (166.0) feet to a point; thence South, twenty-six degrees twenty-four minutes East (S 26° - 24' E) one hundred twenty (120.0) feet to a point; thence South, sixty-three degrees thirty-six minutes West (S 63° - 36' W) one hundred sixty-six (166.0) feet to a point; thence North, twenty-six degrees twenty-four minutes West (N 26° - 24' W) one hundred twenty (120.0) feet to the place of beginning.

Said parcel containing .457 Acres, more or less.

2. This lease shall commence on February 15, 1969 and shall continue until title to the land reverts to the City under the conditions specified in the deed from the City to the Government covering the above-described parcel of land. The City shall pay no rent for the above land.

3. The Government warrants that it has title in fee simple to the leased land and that it is free of liens and encumbrances. The Government further warrants that the City's possession and enjoyment of the leased land and building thereon shall be free and undisturbed except for those limitations stated herein and in Contract No. AT(11-1)-1798 between the Commission and the City, a copy of which is attached hereto as Appendix A.

4. The Government has sealed in place a radioactive source and irradiated materials, an inventory and description of which, together with the deed covering the herein identified land, has been recorded in the land records of Miami County, Ohio in Book 460 at pages 599 through 608.

5. The City shall not take nor shall it permit any one else to take any action which might impair or tend to impair the integrity of the sealed radioactive source.

6. In the event of any damage or injury to persons or property resulting from nuclear causes in connection with the presence of the sealed radioactive source on the property leased herein, the Government shall hold the City, its officers, agents and employees, harmless from any liability or claims therefor, except for any such damage or injury which may result from the failure of the City to fulfill any responsibilities or obligations assumed under this lease or under the aforesaid Contract No. AT(11-1)-1798.

7. The City shall hold the Government, its officers, agents and employees, harmless from any liability or claim arising out of damage or injury to persons or property resulting from non-nuclear causes in connection with the land and structures leased hereunder, except for such liability or claims which may result from a failure by the Government to fulfill any of the responsibilities or obligations assumed by it under this lease or the aforesaid Contract No. AT(11-1)-1798.

8. The City shall permit the Government, its representatives and contractors, free and ready access to the premises at any and all times for the purposes of carrying out any of the provisions of this lease or the aforesaid Contract No. AT(11-1)-1798.

9. The City warrants that no person or selling agency has been employed or retained to solicit or secure this lease upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the City for the purpose of securing business. For breach or violation of this warranty the Government shall have the right to annul this contract without liability or in its discretion to deduct from the contract price or consideration, or otherwise recover, the full amount of such commission, percentage, brokerage, or contingent fee.

10. No member of or delegate to Congress, or resident Commissioner, shall be admitted to any share or part of this contract, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

11. The City agrees that the Comptroller General of the United States or any of his duly authorized representatives shall until three years after the expiration or termination of this lease, or of the time periods for the particular records specified in Part 1-20 of the Federal Procurement Regulations (41 CFR Part 1-20), whichever expires earlier, have access to and the right to examine any directly pertinent books, documents, papers, and records of the City involving transactions related to this lease.

IN WITNESS WHEREOF, the parties hereto have hereunto subscribed their names as of the date first above written.

THE UNITED STATES OF AMERICA

BY: F. J. Walcavich

Chicago Operations Office
U. S. Atomic Energy Commission

State of Illinois, DuPage County, SS

I, Andrew J. Pryor, do hereby certify that F. J. Walcavich, personally known to me to be the person whose name is subscribed to the foregoing lease, appeared before me this day in person and acknowledged that he signed and delivered said lease on behalf of the United States of America as a free and voluntary act.

Given under my hand and seal this 25th day of June, 1969.

Andrew J. Pryor
Notary Public

Witness:

Clyde F. Tattershall

Lucy D. Lang

THE CITY OF PIQUA, OHIO

By Robert M. Hance
Its City Manager & Purchasing Agent

State of Ohio, Miami County, SS

Robert M. Hance, being first duly sworn, declares and says that he is the City Manager and City Purchasing Agent for the City of Piqua, Ohio, a municipal corporation, that he executed and acknowledged the within lease on behalf of said city, and that the same is his free act and deed and the free act and deed of said corporation.

R K Wilson

This instrument was prepared By R. K. Wilson

BOOK 24 PAGE 337

APPENDIX

I. LOCATION OF RADIOACTIVE MATERIALS AND OF DESCRIPTIVE DATA

Radioactive materials are located in a region called the "reactor complex" which is located below the main floor level within the reactor building. The materials became radioactive during the period of reactor plant operation ending in 1966. The region containing said materials extends outward in all directions a distance of 8 feet, more or less, from a point; said point being located 9.0 feet, south 65 degrees west from the geometric center of the reactor building, and 24.6 feet below the surface of the main floor. The intensity of radioactivity diminishes with time and at increasing distances from said point.

The locations of the radioactive materials, and of one of two sealed containers, or "time capsules," containing detailed information describing these materials and the related structures, are shown by Exhibit 1. The diagram identified as Exhibit 1. is a cross sectional view of the reactor looking easterly, made by a vertical plane oriented north 25 degrees west, and located 9.0 feet, south 65 degrees west from the geometric center of the reactor building. The intercept of the said line from the building center with the vertical plane is a point on the vertical centerline of the reactor and, that point on the floor surface has the reference elevation of 100.3 feet. One of the sealed containers previously mentioned is located at reference elevation 98.5 feet, and the center of the radioactive region has a reference elevation of 75.8 feet. The second sealed container is mounted on a wall 6 feet above the floor surface and 32.5 feet from the reactor center. It is located behind a metal plaque bearing the following inscription:

PIQUA NUCLEAR POWER FACILITY

-NOTICE-

Behind this plaque is a metal box containing detailed information concerning the reactor complex structure and contents. This box is not to be opened without the permission of the United States Government.

-United States Atomic Energy Commission-

-1969-

The above locations are more specifically described as follows:

Beginning at a railroad spike at the northeast corner of Tract No. 1, (the beginning point of the description of the land covered by this deed) said spike being south, ten degrees and thirty-nine minutes east (S 10°-39' E) eighteen hundred and fifty-nine feet (1859') of the corner of Sections 29, 30, 35 and 36 M.R.S.; thence south, eighty-one degrees eleven minutes west (S 81°-11' W) two hundred thirteen and eighty-five hundredths feet (213.85') to a railroad spike; thence south, twelve degrees fifty-four minutes east (S 12° -54' E) one hundred eighty-eight and seventeen hundredths feet (188.17') to a point, said point being in the intersection of the property line and center line of the reactor building; thence north, sixty-three degrees eight minutes twenty seconds east (N 63° -08' -20" E) ninety-two and thirty-seven hundredths feet (92.37') to the center of the sealed reactor vessel; thence, continuing said course thirty-two and fifty hundredths feet (32.50') to a point; thence above this point a sealed container, the second "time capsule" mentioned above, will be found mounted in the wall.

II. RADIOACTIVE SOURCE MATERIALS

The materials having the highest levels of radioactivity are located within the reactor vessel, hereinafter referred to as Region I. After a period of 80 years (2046 AD) more or less, the materials in Region I will have a radioactivity level of approximately 1000 times the level considered to be safe (by 1969 standards); however, it is predicted that the materials associated with the reactor vessel and biological shielding, Regions II and III, respectively, will have reached safe levels by that time.

The summaries of radioactive materials given on Exhibit 2 allow for decay periods of 25 to 100 years from the last date of reactor operation (January 1966). At the time of completion of the dismantlement program (January 1969) the levels of radioactivity from the radionuclides listed on Exhibit 2 are somewhat greater as given on Exhibit 2.1.

There are other radionuclides which are not significant after 25 or more years but which are significant sources at the present. These are the radionuclides having half lives of about one month to one year, which are listed on Exhibit 2.2. Exhibit 3 shows the ratio of radioactivity levels to safe levels (per 1969 standards) over a period of 140 years from 1966.

The radionuclide content left in the retired PNPF was compiled from the retirement safety analysis reports, AI-AEC-MEMO-12708* and the AI-AEC-MEMO-12708 Supplement A.* Safe levels of radioactivity are those levels which would allow unconditional release. The unconditional release criteria have been interpreted to mean the following:

1. External radiation hazards shall be deemed not to exist if the surface dose rate from every component is less than 0.2 mrem/hr.

2. Internal radiation hazards shall be deemed nonexistent if:

   a. Specific activity and solubility are such that the applicable nonoccupational MPC_W cannot be exceeded,

   b. The total activity, times the fraction deposited upon ingestion or inhalation, is less than a nonoccupational maximum permissible body burden, and

   c. The total amount of the element in the standard man were replaced by the element taken from the PNPF and would not result in a nonoccupational body burden. This is not applicable for elements such as europium for which the intestine or lung is the critical organ.

III. ACCESS TO REACTOR COMPLEX

The reactor complex region has been enclosed so as to preclude accidental entry or the transfer of radioactive materials to the outside. Unauthorized entry is forbidden by the United States Government. When entry to the reactor complex is authorized, access to one of the time capsules previously mentioned can be obtained by removing the concrete floor surface (about 4 inches thick) within a radius of 6 feet from the reactor centerline previously described, to expose the shield plug which weighs 11,000 pounds. After breaking the welds at the perimeter of the shield plug at a diameter of 11.8 feet, the shield plug can be lifted away exposing the region containing the "time capsule." The engineering drawings and other data contained therein describe the configuration of the installations in detail and include the basic data from which exhibits included in this appendix were compiled.

---

* Copies of these documents are in the two sealed containers described in Part I of this appendix.

A second sealed container containing duplicates of all documents in the "time capsule" is located on an inside wall of the reactor building, 23.3 feet, north 65 degrees east of the building center, at an elevation of 6 feet above the floor level.