Enclosure 2 of AET 05-0027

Submittal of Reference Documents Related to the Environmental Report (Free Release)

DOE/EA-1392, DOE/EA-1346, and Phase I Archaeological Survey dated July 15, 1997

DOE/EA-1392

ENVIRONMENTAL ASSESSMENT

WINTERIZATION ACTIVITIES IN PREPARATION FOR COLD STANDBY AT THE PORTSMOUTH GASEOUS DIFFUSION PLANT PIKETON, OHIO

June 2001

U.S. Department of Energy
Oak Ridge Operations Office
Oak Ridge, Tennessee

APPROVED FOR RELEASE BY:

W H Thomas
7/6/05

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ENVIRONMENTAL ASSESSMENT

WINTERIZATION ACTIVITIES IN PREPARATION FOR COLD STANDBY AT THE PORTSMOUTH GASEOUS DIFFUSION PLANT PIKETON, OHIO

Date Issued—June 2001

U.S. Department of Energy
Oak Ridge Operations Office

U.S. Department of Energy
Oak Ridge Operations, Oak Ridge, Tennessee

FINDING OF NO SIGNIFICANT IMPACT FOR WINTERIZATION ACTIVITIES IN PREPARATION FOR COLD STANDBY AT THE PORTSMOUTH GASEOUS DIFFUSION PLANT, PIKETON, OHIO

AGENCY: Department of Energy

ACTION: Finding of No Significant Impact

SUMMARY: The U.S. Department of Energy (DOE) has prepared an environmental assessment (EA), DOE/EA-1392, for Winterization Activities in Preparation for Cold Standby at the Portsmouth Gaseous Diffusion Plant (PORTS) in Piketon, Ohio. Proposed winterization activities include installation and operation of a hot water heating facility with associated recirculating water pumps and installation and operation of a series of electric heaters in PORTS process buildings. Initially, the hot water boilers would operate on #2 fuel oil and would be converted to natural gas in the future. Since use of natural gas would require running an approximate 5-mile natural gas line to the site, the impact of the new gas line is also addressed in the EA.

Based on the analyses in the EA, DOE has determined that the proposed action does not constitute a major Federal action significantly affecting the quality of the human environment, within the meaning of the *National Environmental Policy Act* of 1969 (NEPA), 42 U.S.C. Code §4321, et seq. Therefore, the preparation of an environmental impact statement (EIS) is not required, and the Department is issuing this Finding of No Significant Impact (FONSI).

PUBLIC AVAILABILITY: Copies of this EA and FONSI are available from:

U.S. Department of Energy
Public Reading Room
230 Warehouse Road, Building 1916-T2
Suite 300
Oak Ridge, Tennessee 37831
(865) 241-4780

For further information concerning the DOE NEPA process, contact:

David R. Allen, NEPA Compliance Officer
U.S. Department of Energy
Oak Ridge Operations Office
Post Office Box 2001 MS-SE-30-1
Oak Ridge, Tennessee 37831-8540
(865) 576-0411

PUBLIC PARTICIPATION:

In April 2001, the DOE Oak Ridge Operations Office notified affected and interested stakeholders of its intention to conduct winterization activities at PORTS. A public meeting to discuss the proposal was held at the Ohio State University Research Center in Piketon, Ohio, on May 15, 2001. Written comments were solicited from attendees at this meeting. Comments and responses have been included in the EA as Appendix E.

A draft copy of the EA also was distributed at the public meeting held on May 15, 2001, and a public notice was published in the local newspapers announcing the availability of the EA for review. Because of the critical nature of the proposed action the comment period was abbreviated to 10 days and closed on May 25, 2001.

DESCRIPTION OF PROPOSED ACTION:

Under the proposed action, a new hot water boiler system supplied with #2 fuel oil with the potential for conversion to natural gas would be installed, a hot water heating facility would be added to the northeast corner of Building X-3002, and a series of electric heaters would be installed in PORTS process buildings. This alternative would provide a solution for heating site structures and would mitigate facility and equipment damage as well as environmental and safety concerns prior to the onset of the winter season. This solution is timely and would not interfere with safe environmentally sound operations of the site. This alternative would allow currently installed fire protection systems to operate without alteration. This alternative ties into an existing hot water distribution system and would be the most viable option due to the lower capital and operating costs.

ALTERNATIVES:

Three alternatives other than the proposed action were considered: (1) modification to the X-600 Coal Fired Steam Plant, (2) installation of electric hot water boilers in the process, operations, and administrative buildings, and (3) the no-action alternative.

X-600 Coal Fired Steam Plant

Although the United States Enrichment Corporation (USEC) is curtailing operations at PORTS, the amount of steam required to heat transfer and shipping facilities will increase. As a result, the steam supply for USEC facilities that will continue operation is not sufficient to meet additional recirculating hot water (RHW) requirements without substantial modification to the aged facility.

Several variations of this alternative using the X-600 Coal Fired Steam Plant were investigated. These included placement of heat exchangers in the process buildings to replace process waste heat currently used for these structures; installation of an additional boiler; and enhancements to the X-600 Coal Fired Steam Plant to improve efficiencies.

A steam distribution system was used to heat several of the facilities on the gaseous diffusion plant (GDP) side of the plant before RHW was available; however, only a small steam supply line is routed to the Gas Centrifuge Enrichment Plant (GCEP) side of the plant. If this alternative were selected, additional aboveground steam and condensate lines adequately sized and routed to the GCEP side of the plant would be required.

The steam distribution piping could be renovated and extended to serve the larger facilities inside the GCEP portion of the plant. Steam supplied by the renovated steam supply piping could be used to serve a facility heat exchanger that could be used with the existing RHW piping and circulation pumps to circulate hot water to the different heating coils inside these buildings. In addition, smaller buildings that use the RHW to supply small hot water coil space heaters could be taken off the RHW and steam. The hot water space heaters could be replaced with electric space heaters.

In general, sufficient steam from the steam plant is not available, and the cost associated with the required modifications would be prohibitive. In addition, excavation for required modifications would require generation of large volumes of potentially hazardous waste and may interrupt critical plant site operations.

Electric Hot Water Boilers

Electric hot water boilers could be purchased and placed, as required, throughout the process, operations, and administrative buildings. The costs for electricity to power these heating units would be substantial when compared to other alternatives. In addition, electrical service in many of the facilities is inadequate to support this configuration.

The larger facilities currently using RHW would be equipped with a large electric boiler that would maintain the existing RHW loop and circulating system inside each building. Hot water space heaters supplied with RHW, which are currently used to heat smaller buildings, would be replaced with electric space heaters.

The advantage of using electric boilers in each facility would be the independence from the existing central systems. There would be no dependence on the steam plant or the existing RHW system and its problem of corrosion, pipe breaks, and leaks.

The main disadvantage of this alternative would be the potential for disruption of operations as multiple modifications are completed. Processes and activities would be impacted during the construction phase of the project because a potential exists for disruption of RHW supply. Water makeup and corrosion inhibition devices would be required for each of these systems. In addition, the cost of utilities to power electric boilers would be substantial.

No Action

The no-action alternative provides an environmental baseline with which impacts of the proposed action and alternatives can be compared. The no-action alternative must be considered even if DOE is under a court order or legislative command to act [see 10 *Code of Federal Regulations (CFR)* 1021.321(c)]. Under the no-action alternative, ongoing operations would continue until USEC ceases uranium enrichment operations beginning in June 2001 and DOE places the GDP in cold standby. PORTS DOE Operations would continue without a heating supply for office buildings and operational facilities including Resource Conservation and Recovery Act Part B permitted waste storage facilities. The freezing of water lines, equipment damage caused by freezing, water damage, safety noncompliances, environmental noncompliances, and potential environmental insult would result in substantial environmental concerns and economic costs to DOE. The impact of the no-action alternative also would result in further underutilization of remaining facilities and a less industrialized site.

ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION:

The potential environmental impacts of the proposed action and alternatives were analyzed in the EA. All components of the proposed action were reviewed and appropriate agencies concerned with protection of wildlife, threatened and endangered species, and cultural and historic resources were notified of the proposed action (winterizing the Portsmouth Gaseous Diffusion Plant for cold standby). Through the application of best management practices and with the implementation of appropriate mitigation measures, potential adverse environmental impacts to soils, water resources, and ecological resources would be expected to be minimal. In all cases where potential minor impacts could occur, appropriate modifications to the proposed action would be made to avoid disturbance of these assets. In addition, potential impacts to these resources would be avoided during implementation by alteration of the route of the proposed pipeline or through minor alterations in project activities.

The FONSI for the proposed action is based on the following factors which are supported by information and analyses in the EA.

AIR QUALITY

Potential air quality impacts are expected to be minimal. An air permit-to-install has been submitted to the Ohio Environmental Protection Agency for the operation of the boilers, and potential emissions would not be expected to exceed current emissions from ongoing operations, result in a noncompliance of air quality standards, have an adverse impact on air quality, or be detrimental to human health. Potential air emissions information is summarized in Table 4.1 of the EA.

GEOLOGY AND SOILS

The majority of the activities associated with the proposed action would take place in areas previously disturbed by industrial development. Ground-disturbing activities associated with the proposed action include installation of a 5-mile natural gas pipeline.

WATER RESOURCES

Spills of fuel, hazardous material, waste, or a sewer line leak could have adverse impacts on surface waters if not controlled or contained. Impacts would primarily be a change to the water quality. which could affect vegetation and aquatic biota. Soil impacts would be mitigated through the use of best management practices. Dikes also would be installed to mitigate any environmental damage that could result from spillage. Fuel lines connecting the storage tank and boilers would be installed aboveground and regularly inspected to ensure that any leakage from these lines would be readily identified and contained.

FLOODPLAINS AND WETLANDS

Floodplains, streams, and wetland areas would be avoided to the extent practicable, and there would be no disturbance of sediment or sensitive habitats.

ECOLOGICAL RESOURCES

No threatened and/or endangered species are known to be present within any areas proposed for the natural gas line installation or the addition to the northeast corner of Building X-3002.

CULTURAL RESOURCES

The proposed action has been reviewed in accordance with Section 106 of the National Historic Preservation Act and 36 *CFR* Part 800. On March 8, 2001, a letter of notification was transmitted to the Ohio State Historic Preservation Officer (SHPO) with a DOE determination that there would be no adverse effects on historical resources included or eligible for inclusion on the National Register of Historic Places; and on April 23, 2001, a letter was received from the Ohio SHPO concurring with this determination. On April 25, 2001, a letter of notification was transmitted to the Ohio SHPO concerning the proposed installation of a natural gas pipeline from Zahns Corner to the X-3002 building. Copies of these letters are included in Appendix A of the EA. In addition, an assessment of cultural and historic resources was conducted for the routing of the proposed gas line, and a copy of this report has been provided to the Ohio SHPO and is included in Appendix B of the EA.

SOCIOECONOMICS

Modifications to Building X-3002 would have a minor impact on transportation; however, no other socioeconomic impacts, including Environmental Justice concerns, would result from this proposed action. Installation of the natural gas pipeline would result in temporary impacts involving property disturbance during pipeline installation and associated nuisance related to construction activities. In addition, the pipeline would be within 1000 ft of Piketon Jr. High School. Protective and emergency services are expected to be adequate for the plant. Based on the absence of minority tracts relative to PORTS, disproportionate impacts to minority populations would not occur. Although many low-income populations are located in Pike County, no disproportionately high and adverse human health or environmental impacts to these populations are expected.

INFRASTRUCTURE AND SUPPORT SERVICES (Transportation and Utilities)

Transportation impacts associated with the proposed action would be minimal. Impacts to transportation in the area would not require modification of roads or other infrastructure to accommodate additional traffic.

The potential utilities impact of the proposed action would result in two additional fuel sources being available on plant site. Installation of the natural gas pipeline would supply an additional fuel source at the site that is currently not available and would enhance redevelopment opportunities at the Portsmouth complex.

NOISE

Noise impacts would be minimal from this proposed action. No sensitive noise receptor sites (e.g., picnic areas, playgrounds, churches) are located within or near PORTS.

HUMAN HEALTH AND SAFETY

No unique occupational health and safety hazards would be posed by the proposed action. Falls, spills, vehicle accidents, confined-space incidents, and injuries from tool and machinery operation could occur, and similar hazards also would be present during construction activities. On-site occupational radiological exposures for subcontractors implementing any modifications discussed in the EA would be similar to the doses estimated for on-site workers and would be kept below the 5000 mrem/yr limit for occupational exposures of radiation workers set by the NRC and DOE. However, DOE has established an administrative control limit of 2000 mrem/yr. Bechtel Jacobs Company LLC (BJC), DOE's managing and integrating contractor, has adopted DOE's administrative control limit guidance as their policy. To further reduce exposures, each BJC project establishes an even lower administrative control level. PORTS follows the principles of As Low As Reasonably Achievable to further limit doses to the workers as much as possible.

ACCIDENTS

Accidents could occur during construction activities or operation of a new or existing facility or from operator error, equipment malfunction, or from natural phenomena. Transportation accidents also could occur but would be expected to be similar to those that could occur during normal operations at PORTS. The use of safety procedures, spill prevention plans, and spill response plans in accordance with state and federal laws would minimize the severity of potential impacts from accidents. A potential of a fire could exist from malfunctioning electric heaters in the process buildings. The facilities would be operated in accordance with applicable fire protection standards and would be inspected on a regular basis to ensure equipment is operating in a safe and efficient manner.

There is a potential for an explosion accident to occur because of a rupture of the natural gas pipeline. Scoping calculations were performed to address postulated accident scenarios related to a natural gas vapor cloud explosion due to a rupture in the gas pipeline associated with excavation of the gas main pipeline and the ignition of the vapor cloud with an external source. In the event of an explosion, damage to Building X-622 (located within 30 ft of the proposed pipeline route) could occur and chemicals could be released to the environment resulting in potential impacts to surface water, groundwater, and soils in the immediate vicinity. All necessary precautions would be taken to prevent the occurrence of this type of accident.

WASTE MANAGEMENT AND WASTE MINIMIZATION

Only minor quantities of solid waste and construction debris would be generated from the proposed action. Waste generation and handling, including any pollution prevention and waste minimization practices, would be accomplished in accordance with established procedures and regulations.

CUMULATIVE IMPACTS

The proposed action would have minimal cumulative impacts on local or regional air quality, surface water and groundwater resources, existing habitats and biota, socioeconomics, transportation, and public and occupational health. Cumulative impacts would be expected to be equal to or less than those that currently exist in and around PORTS.

Potential cumulative impacts that could occur from the proposed action to provide an alternate heating system to accomplish winterization of PORTS facilities following placement of the GDP in cold standby were discussed in the EA. Detailed environmental impact analysis of many of the actions is beyond the scope of the EA and would be subject to separate NEPA review. Installation of the natural gas line is not expected to result in changes to existing land use.

DETERMINATION:

Based on the analyses contained within the EA, DOE has determined that the proposed action to perform winterization activities in preparation for cold standby at the Portsmouth Gaseous Diffusion Plant does not constitute a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act of 1969. Therefore, an Environmental Impact Statement on the proposed action is not required.

Issued in Oak Ridge, Tennessee, this 13th day of June 2001.

G. Leah Dever, Manager
Oak Ridge Operations Office

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ABBREVIATIONS AND ACRONYMS

Am	americium
AMSL	above mean sea level
bgs	below ground surface
BHP	boiler horsepower
BJC	Bechtel Jacobs Company LLC
BLEVE	Boiling Liquid Expanding Vapor Explosion
BMP	best management practice
Btu	British thermal unit
CAA	Clean Air Act of 1970
CAS/CMS	Cleanup Alternatives Study/Corrective Measures Study
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CEQ	Council on Environmental Quality
CFR	*Code of Federal Regulations*
Ci	curie
CWA	Clean Water Act of 1972
CX	Categorical Exclusion
D&D	decontamination and decommissioning
DOE	U.S Department of Energy
EA	environmental assessment
EDE	effective dose equivalent
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
ERPG	Emergency Response Planning Guideline
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
FY	fiscal year
gal	gallon
GCEP	Gas Centrifuge Enrichment Plant
GDP	gaseous diffusion plant
ha	hectare
HEU	highly enriched uranium
HF	hydrogen fluoride
IGWMP	Integrated Groundwater Monitoring Plan
km/h	kilometers per hour
L/d	liters per day
MGD	million gallons per day
mph	miles per hour
mrem	millirem
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NCS	nuclear criticality safety
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
Np	neptunium
NPDES	National Pollutant Discharge Elimination System
NRC	Nuclear Regulatory Commission

NRCE	National Register Criteria for Evaluation
NRHP	National Register of Historic Places
ODNR	Ohio Department of Natural Resources
ODOD	Ohio Department of Development
OSHA	Occupational Safety and Health Act of 1970
OVEC	Ohio Valley Electric Corporation
PCB	polychlorinated biphenyl
pCi/L	picocuries per liter
PGDP	Paducah Gaseous Diffusion Plant
PORTS	Portsmouth Gaseous Diffusion Plant
PRG	preliminary remediation goal
PSD	prevention of significant deterioration
psi	pounds per square inch
Pu	plutonium
RCRA	Resource Conservation and Recovery Act of 1976
RCW	recirculating cooling water
RHW	recirculating hot water
ROD	Record of Decision
ROI	region of influence
ROW	right-of-way
SAR	Safety Analysis Report
SHPO	State Historic Preservation Officer
SODI	Southern Ohio Diversification Initiative
SOMC	Southern Ohio Medical Center
STP	sewage treatment plant
Tc	technetium
TCE	trichloroethene
Th	thorium
TSCA	Toxic Substances Control Act of 1976
U	uranium
USACE	U.S. Army Corps of Engineers
U.S. EPA	U.S. Environmental Protection Agency
UF_6	uranium hexafluoride
USEC	United States Enrichment Corporation
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
WWH	Warmwater Habitat

1. INTRODUCTION

1.1 PURPOSE AND NEED FOR U.S. DEPARTMENT OF ENERGY ACTION

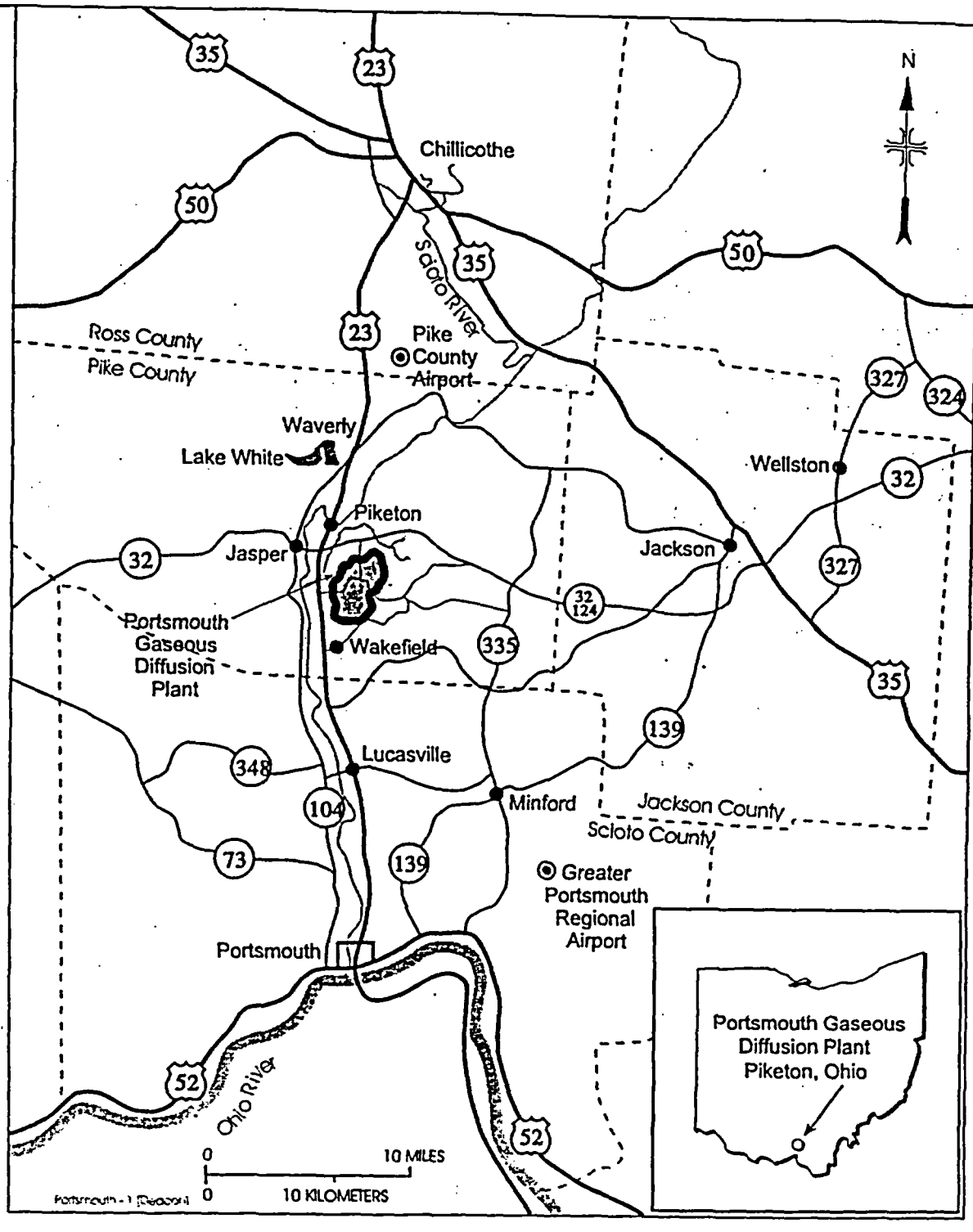
The proposed action evaluated in this Environmental Assessment (EA) is to provide heating capability for winterization of facilities at the U.S. Department of Energy's (DOE) Portsmouth Gaseous Diffusion Plant (PORTS) located at Piketon, Ohio. Winterization of PORTS is necessary because of DOE's decision to place the plant in cold standby and facilities and systems must be protected from freezing following the USEC decision to cease uranium enrichment at PORTS by June 2001. Freezing of facilities and systems would likely result in substantial and costly damage from freezing of fire protection systems; potential Resource Conservation and Recovery Act of 1976 (RCRA) waste storage permit noncompliances due to lack of heat; and the potential for generating contaminated water or other materials requiring cleanup, processing, storage and/or disposal. Other impacts include lack of heating for facilities housing DOE and contractor staff, disruption of the RCRA Corrective Actions Program, and possible concerns with facilities containing highly enriched uranium (HEU). In addition, nuclear criticality safety (NCS) problems could result from the uncontrolled release of water from fire protection systems caused by freezing of sprinkler system lines in areas where uranium hexafluoride (UF_6) is present at various levels of enrichment.

1.2 BACKGROUND

PORTS is one of only two federally owned, privately operated uranium enrichment facilities in the United States. The uranium enrichment production and operations facilities at the site are owned by DOE and leased to the United States Enrichment Corporation (USEC). DOE's managing and integrating contractor, Bechtel Jacobs Company LLC (BJC), is responsible for environmental restoration, waste management, and operation of non-leased facilities (facilities not leased to USEC) (DOE 1999a). Martin Marietta Energy Systems, Inc., and its successor company Lockheed Martin Energy Systems, Inc., were the management contractors for DOE from November 1986 through March 1998. On April 1, 1998, BJC assumed responsibility as the environmental management contractor for DOE. BJC is responsible for environmental restoration, waste management, and operation of non-leased facilities (facilities that are not leased to USEC) at PORTS. PORTS is located in a rural area of Pike County in south central Ohio, on a 9.3-km^2 (5.8-$mile^2$) site (Figs. 1.1 and 1.2). The nearest residential center in this area is Piketon, which is about 8.1 km (5 miles) north of the plant on U.S. Route 23. The county's largest community, Waverly, is about 16.1 km (10 miles) north of the plant. Additional population centers within 80.5 km (50 miles) of the plant are Portsmouth, 43.5 km (27 miles) south; Chillicothe, 43.5 km (27 miles) north; and Jackson, 41.9 km (26 miles) east. In June 2000, USEC announced that enrichment operations would cease by June 2001. The three enrichment process buildings plus 32 other buildings are now heated by waste heat from operation of the enrichment process.

1.2.1 PORTS History

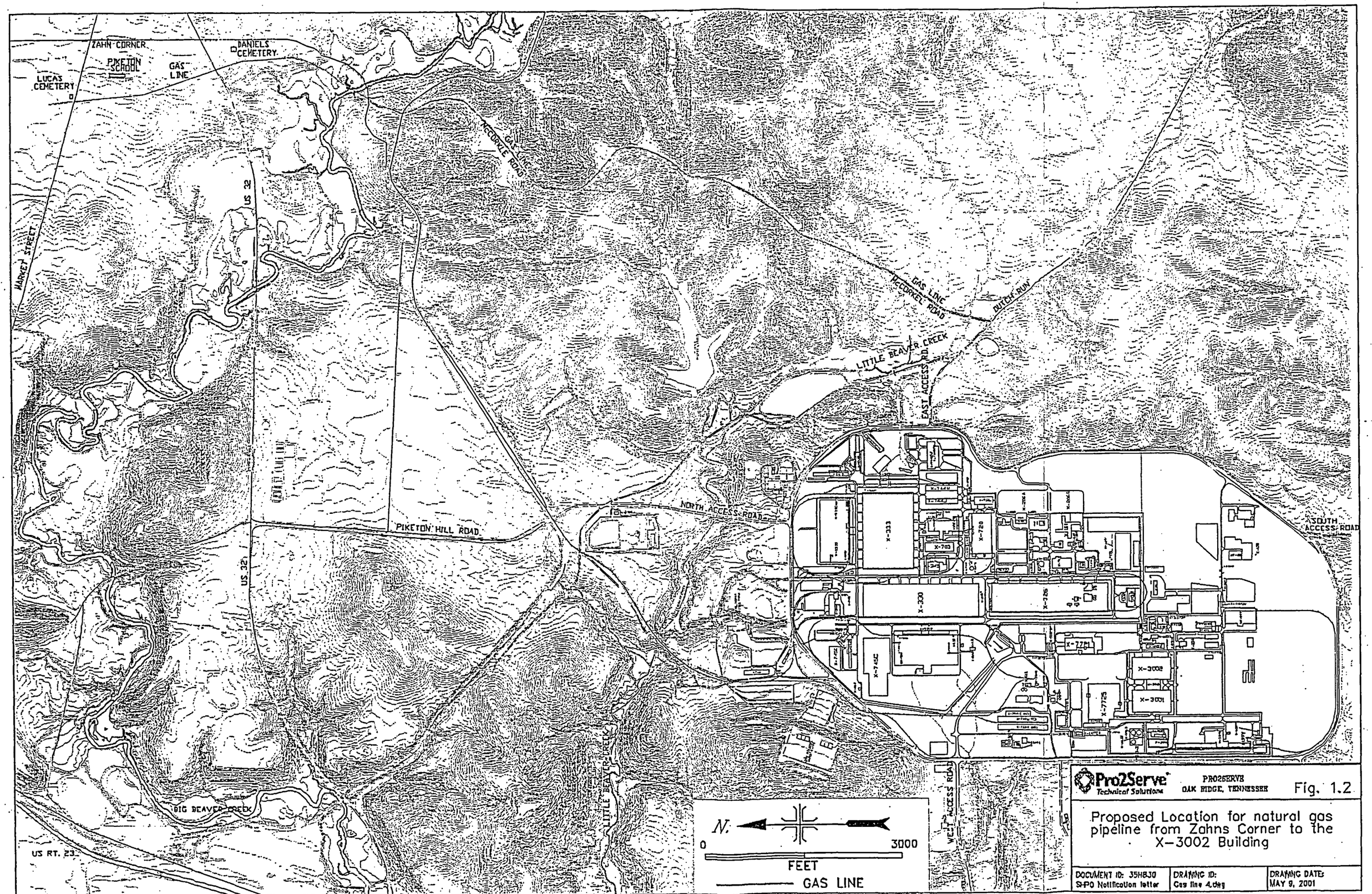
PORTS has been in operation since the mid 1950s as an active uranium enrichment facility supplying enriched uranium for government and commercial use. Initially, PORTS was needed to provide ^{235}U at assays above those of the other production facilities at Oak Ridge, Tennessee, and Paducah, Kentucky. In the late 1970s, PORTS was chosen as the site for a new enrichment facility using gas centrifuge technology. Construction of the Gas Centrifuge Enrichment Plant (GCEP) began in 1979 but was halted in 1985 because the demand for enriched uranium decreased.



Pro2Serve **Fig. 1.1**

Location of PORTS in relation to the geographic region

DOCUMENT ID:	DRAWING ID	DRAWING DATE:
DOE/EA/1392	Fig1.1b.cdr	May 18, 2001


ZAHN CORNER
PIKETON SCHOOL
DANIELS CEMETERY
LUCAS CEMETERY
GAS LINE
MCCORKLE ROAD
GAS LINE
US 32
MARKET STREET
GAS LINE
MCCORKLE ROAD
DUTCH RUN
LITTLE BEAVER CREEK
EAST ACCESS RD.
NORTH ACCESS ROAD
PIKETON HILL ROAD
US 32
SOUTH ACCESS ROAD
X-333
X-720
X-703
X-300
X-726
X-745C
X-770
X-3002
X-3001
X-7725
BIG BEAVER CREEK
LITTLE BEAVER CREEK
WEST ACCESS ROAD
US RT. 23
N.
0
3000
FEET
GAS LINE
Pro2Serve
Technical Solutions
PRO2SERVE
OAK RIDGE, TENNESSEE
Fig. 1.2
Proposed Location for natural gas pipeline from Zahns Corner to the X-3002 Building
DOCUMENT ID: 35H830
SHPO Notification letter
DRAWING ID:
Gas line 4.dwg
DRAWING DATE:
MAY 9, 2001

In 1991, DOE suspended production of HEU for the U.S. Navy at PORTS. The plant continues to produce only low-enriched uranium for use by commercial nuclear power plants (DOE 1999a; ORNL 1999).

In accordance with the Energy Policy Act of 1992, USEC, a newly created government corporation, assumed full responsibility for uranium enrichment operations at PORTS on July 1, 1993. DOE retains certain responsibilities for decontamination and decommissioning (D&D), waste management, depleted UF_6 cylinders, and environmental remediation. USEC subsequently became a publicly held private corporation on July 28, 1998 (DOE 1999a; ORNL 1999).

The PORTS process buildings were constructed from 1952 to 1954, as gaseous diffusion facilities for the isotopic enrichment of uranium. The process buildings contain approximately 8,213,608 gross square footage. Each of the three process facilities (X-326, X-330, and X-333) are approximately one-half mile in length and contain approximately 30 acres and two floors each. The buildings are heated primarily by heat of process (compression) and, in the case of extended process pipe runs, some auxiliary steam heat. This steam heat is designed and applied to maintain the process gas in the gaseous phase and has very little or no effect on building internal ambient temperature.

The PORTS cascade is comprised of over 4,000 stages consisting of a motor, a compressor, a converter, and the interconnecting piping and valves. As the process gas moves through the individual stages, it is compressed, producing a great amount of process heat. In the early 1980s, a recirculating hot water (RHW) waste heat recovery system was installed to supply heat to the added GCEP and to a few of the previously heated gaseous diffusion plant (GDP) buildings. As currently designed, the RHW system circulates GDP hot water to 32 buildings for heating. In June 2000, USEC announced it will shut down the PORTS GDP cascade after June 2001. Consequently, the waste heat for support buildings heating will no longer be available.

1.2.2 Uranium Enrichment Activities at PORTS

The uranium enrichment production and operations facilities at PORTS are leased to USEC and take place on approximately 259 hectares (ha) (640 acres) within the 1503-ha (3714-acre) DOE reservation. In addition to the three gaseous diffusion process buildings, extensive support facilities are required to maintain the diffusion process. The support facilities include administration buildings, a steam plant, electrical switchyards, cooling towers, cleaning and decontamination facilities, water and wastewater treatment plants, fire and security headquarters, maintenance, warehouse, and laboratory facilities.

As mentioned previously, on June 21, 2000, USEC announced that it would cease uranium enrichment operations at PORTS starting in June 2001 (USEC 2000). Since USEC's announcement, DOE has proposed placing the GDP in cold standby (see Sect. 4.13.1) for a definition of cold standby). USEC intends to operate its transfer and shipping facilities at PORTS for approximately 5 years after the current enrichment operations cease.

1.2.3 Environmental Restoration at PORTS

The DOE-PORTS Environmental Restoration Program was developed in 1989. Site cleanup is managed in accordance with RCRA, amended in 1984 by the Hazardous and Solid Waste Amendments. Other applicable laws include the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, amended in 1986; Toxic Substances Control Act of 1976 (TSCA); Clean Water Act of 1972 (CWA); and Clean Air Act of 1970 (CAA). Oversight of cleanup activities at PORTS is conducted by the Ohio Environmental Protection Agency (Ohio EPA) and U.S. EPA under the directive of a Consent Decree between the State of Ohio and DOE, issued on August 29, 1989, and an

Administrative Consent Order between DOE, Ohio EPA, and the U.S. EPA, issued on September 29, 1989 (amended in 1994 and 1997) (DOE 1999a). The site is divided into quadrants based on groundwater flow patterns to facilitate the investigation and cleanup. In 1998, DOE submitted a Cleanup Alternatives Study/Corrective Measures Study (CAS/CMS) for two of the quadrants. The Ohio EPA and U.S. EPA approved the CAS/CMS for Quadrant III on July 13, 1998, and Quadrant IV on October 18, 1998. The Quadrant I CAS/CMS was approved on June 12, 2000, and the final study for Quadrant II was submitted in August 2000 and accepted in January 2001.

1.2.4 Waste and Materials Management at PORTS

DOE-PORTS, through its Waste Management Program, oversees the management of waste generated from DOE operations and from environmental restoration projects. Under the USEC lease agreement, USEC pays DOE for storage of some waste generated by plant operations. However, USEC is responsible for waste treatment and disposal of wastes generated from their operations. Waste management requirements are varied and often complex because of the variety of wastes generated by DOE-PORTS activities, including radioactive, hazardous (chemical), polychlorinated biphenyls (PCBs), asbestos, industrial, and mixed (radioactive and hazardous) wastes. All DOE waste management activities are conducted in compliance with state and federal regulations. Supplemental policies also have been implemented for waste management. They include:

- minimizing waste generation;
- characterizing and certifying wastes before they are stored, processed, treated, or disposed;
- pursuing volume reduction and use of on-site storage (when safe and cost effective) until a final treatment and/or disposal option is identified; and
- recycling.

1.2.5 Reindustrialization Program

Several ongoing initiatives are underway at PORTS in coordination with the Southern Ohio Diversification Initiative (SODI), the recognized community reuse organization for PORTS. DOE's Office of Worker and Community Transition established community reuse organizations to minimize the negative effects of workforce restructuring at DOE facilities that have played an historic role in the nation's defense. These organizations provide assistance to the neighboring communities negatively affected by changes at these sites. Currently, an EA is being developed for the Reindustrialization Program at PORTS, DRAFT DOE/EA-1346, *Environmental Assessment, Reindustrialization Program at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio.* This EA is for a proposed action to transfer real property (i.e., underutilized, surplus, or excess PORTS land and facilities) by lease and/or sale (i.e., donation, transfer to another federal agency, or exchange) via a reindustrialization program.

1.3 SCOPE OF THIS EA

DOE has prepared this EA to present the public with information on the potential impacts associated with the proposed action (installation and operation of a hot water heating facility with associated recirculating water pumps tied to an existing hot water distribution system, installation of a natural gas pipeline, and installation of approximately 900 electric space heaters in the three gaseous diffusion process buildings) and reasonable alternatives as well as to ensure that potential environmental impacts are considered in the decision-making process. DOE is required to assess the potential consequences of its activities on the human environment in accordance with the Council on Environmental Quality (CEQ)

regulations [40 *CFR* Parts 1500–1508] implementing National Environmental Policy Act (NEPA) and DOE NEPA Implementing Procedures (10 *CFR* 1021). If the impacts associated with the proposed action are not identified as significant as a result of this EA, DOE would issue a Finding of No Significant Impact (FONSI) and would proceed with the action. If impacts are identified as significant, an Environmental Impact Statement would be prepared.

This EA (1) describes the existing environment at PORTS relevant to potential impacts of the proposed action and alternatives; (2) analyzes potential environmental impacts; (3) identifies and characterizes cumulative impacts that could result from PORTS in relation to other ongoing or proposed activities within the surrounding area; and (4) provides DOE with environmental information for use in prescribing restrictions to protect, preserve, and enhance the human environment and natural ecosystems.

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2. DESCRIPTION OF ALTERNATIVES

2.1 PURPOSE OF ACTION

DOE proposes to provide heating capability for winterization of facilities at PORTS located at Piketon, Ohio. Winterization of PORTS is necessary because of DOE's decision to place the plant in cold standby and facilities and systems must be protected from freezing. Freezing of facilities and systems would likely result in substantial and costly damage from freezing of fire protection systems; potential RCRA waste storage permit noncompliances due to lack of heat; and the potential for generating contaminated water or other materials requiring cleanup, processing, storage and/or disposal. Other impacts include lack of heating for facilities housing DOE and contractor staff, disruption of the RCRA Corrective Actions Program, and possible concerns with facilities containing HEU. In addition, NCS problems could result from the "uncontrolled" release of water from fire protection systems caused by freezing of sprinkler system lines in areas where UF_6 is present at various levels of enrichment. Sprinkler system lines were installed as part of the original design of the facilities, and the use of sprinklers is approved as part of the safety basis for the operation of the GDP. The NCS problems would result from the "uncontrolled" release of water from the sprinkler system lines.

2.2 PHYSICAL CHARACTERISTICS OF ALTERNATIVES EVALUATED

2.2.1 X-600 Coal Fired Steam Plant

Several variations of this alternative using the X-600 Coal Fired Steam Plant were investigated. Under this alternative, modifications to the X-600 Coal Fired Steam Plant would be required. The modifications would include:

- Placement of steam to water heat exchangers in the process buildings to replace process waste heat source obtained from the operating plant.
- Installation of an additional oil-fired boiler; oil-storage yard; and steam, condensate, and electrical connections would be required to provide normal heating requirements.
- Enhancements to the X-600 Coal Fired Steam Plant to improve efficiencies.
- Aboveground steam and condensate lines would require resizing and rerouting to the new heat exchanger.
- Smaller buildings that use the RHW to supply small hot water coil space heaters would be taken off the RHW and would be replaced with electric space heaters.
- Electric space heaters would be installed in the three process buildings to provide heat to these facilities.

2.2.2 Electric Hot Water Boilers

Under this alternative, electric hot water boilers would be purchased and placed as required throughout the support facilities and administrative buildings. Modifications would include:

- Larger facilities currently using RHW would be equipped with several large electric boilers that would maintain the existing RHW loop and circulating system inside each building.

- Hot water space heaters supplied with RHW, which are currently used to heat smaller buildings, would be replaced with electric space heaters.

- Electric space heaters would be installed in the three process buildings to provide heat to these facilities.

2.2.3 New Hot Water Boiler System Supplied with Fuel Oil with the Potential for Conversion to Natural Gas and Electric Space Heaters and Vent Sealing in Process Buildings (Proposed Action)

Under the proposed action, modifications to Building X-3002 would be required. The modifications would include:

- Two 2000 boiler horsepower (BHP) hot water boilers with an option for an additional 1800 BHP hot water boiler would be installed in X-3002.

- A floor mounted exhaust stack would be installed for each of the boilers. The exhaust stacks would penetrate the roof of Building X-3002 90 ft above the floor elevation of the boilers and extend approximately 10 ft above the elevation of the roof.

- An RHW pumping system consisting of 4 recirculating pumps would be installed.

- Expansion tanks would be installed that are suitable to accommodate expansion of water in the recirculating system and the facilities the system serves.

- A tie-in for the supply and return RHW between the existing RHW piping system and the new RHW plant would be installed. The supply and return RHW piping would be routed aboveground from the boiler system to the RHW mains (supply and return lines) which are located underground external to Building X-3002.

- Equipment drains would be installed that allow drainage to be routed to the X-6619 STP.

- Supplemental area lighting would be provided as required for operation of new equipment.

- Forced air intake louvers would be installed to provide combustion air for the boilers.

- Building X-3002 roofing would be replaced in the area above the boilers and equipment.

- Electrical distribution systems would be installed to accommodate electrical power needs for the boilers, pumps, and other support equipment.

- A diked, fenced area would be installed that would contain the corrosion inhibitor system. This system would maintain acceptable corrosion inhibiting characteristics for the water within the RHW System.

In addition, modifications of other existing systems and buildings, which are common to all alternatives, would include:

- Seal vents in process buildings.

- Install 900 portable, 480-volt electric space heaters (27-in wide x 23-in deep x 34-in high). Some building modifications would be required which include installation of additional receptacles to accommodate the electric heaters. A 24-ft wide oil storage yard access road would be constructed from Falcon Avenue to the oil storage filling area.

- A concrete pad would be constructed to support the oil filling station.

- Oil storage tanks would be installed in a concrete, diked storage area and would have sufficient capacity to contain a 72-hr supply of oil for all the hot water boilers at peak operation. A capacity of 120,000 gallons (gal) of #2 fuel oil would be required using three 40,000-gal tanks.

- Oil supply piping from the Oil Storage Yard to the boilers would be installed using existing overhead pipe supports where possible. All piping would be installed aboveground.

- Piping and valves would be installed, as necessary, to transform the existing RHW supply system (supplied by pumps located in Building X-330) into a closed loop system (supplied from the proposed RHW supply pumps and boilers in Building X-3002).

- At the X-330 building, a secondary existing RHW return line to the cooling towers would be drained and isolated from the RHW system.

- RHW system would be modified to transform the open-loop system, currently fed from the waste heat recovery system, to a closed-loop recirculating system fed from the proposed hot water boilers.

- RHW system would be modified to expose, drain, and cap the supply and return RHW headers to the cooling tower catch basins.

- Installation of a natural gas supply line from Zahns Corner to Building X-3002.

In the planning stages for this project, a route for the natural gas pipeline was chosen that resulted in the least impact to structures and facilities adjacent to the proposed pipeline route. Based on safety considerations, a decision was made to exclude installation of a high-pressure gas main on the DOE site and to support gas flow requirements only at the 100-psi low-pressure level on the reservation, thus minimizing potential accident consequences from a gas cloud explosion. The routing from Zahns Corner to the plant is through a remote rural setting. Zahns Corner is the nearest point with a high-pressure gas main with sufficient supply to meet DOE's uninterrupted needs. Any other location of the pipeline would have resulted in routing through more heavily residential areas.

Areas surrounding buildings would be landscaped and maintained to preserve an aesthetically pleasing environment. There would be no conflicts between the proposed action and any future land use planning efforts that have been proposed for PORTS or the surrounding area.

2.2.4 No Action

Under the no-action alternative, ongoing operations would continue until USEC ceases uranium enrichment operations beginning in June 2001 and DOE places the GDP in cold standby. PORTS DOE Operations would continue without a heating supply for office buildings and operational facilities including RCRA Part B permitted waste storage facilities. The freezing of water lines, equipment damage

caused by freezing, water damage, safety noncompliances, environmental noncompliances, and potential environmental insult would result in substantial environmental concerns and economic costs to DOE.

The impact of the no-action alternative would be further underutilization of remaining facilities and a less industrialized site.

2.3 RANGE OF REASONABLE ALTERNATIVES

This section discusses the alternatives considered for providing heat for PORTS facilities following the cessation of GDP operations at the site. The alternatives considered investigated all of the reasonable options for provision of a heating facility and included the use of the existing steam plant (which will continue to be used by USEC for the operation of autoclaves at the site); installation of electric boilers; and installation of a new hot water boiler system capable of being fired with #2 fuel oil or natural gas. In addition, for each alternative evaluated, it was determined to be more economically and technically feasible to install electric space heaters within the three process buildings to provide heat to these facilities. Electric space heaters are currently used within these process buildings to provide heat to cold areas within the structures, and there would be no environmental impacts associated with installation of additional electric heaters in the process buildings (see Sect. 2.5 for further discussion regarding additional heating options evaluated).

Propane fuel and solar energy were also considered as alternatives for providing heat to PORTS facilities. After reviewing the associated costs and assessing the numerous safety concerns associated with propane fuel, it was determined that propane fuel should not be given further consideration. Solar energy was eliminated as a reasonable alternative because of the significant cost associated with installation of solar panels and concern regarding the reliability of a stable energy supply. See Table 2.1 for a comparison of construction, operating, and maintenance costs for each alternative evaluated (Tetra Tech 2000).

2.3.1 X-600 Coal Fired Steam Plant

Although USEC is curtailing operations at PORTS, the amount of steam required to heat transfer and shipping facilities will increase. As a result, the steam supply for USEC facilities that will continue operation is not sufficient to meet additional RHW requirements without substantial modification to the aged facility.

Several variations of this alternative using the X-600 Coal Fired Steam Plant were investigated. These included placement of heat exchangers in the process buildings to replace process waste heat currently used for these structures; installation of an additional boiler; and enhancements to the X-600 Coal Fired Steam Plant to improve efficiencies (Tetra Tech 2000).

A steam distribution system was used to heat several of the facilities on the GDP side of the plant before RHW was available; however, only a small steam supply line is routed to the GCEP side of the plant. If this alternative was selected, additional aboveground steam and condensate lines adequately sized and routed to the GCEP side of the plant would be required.

The steam distribution piping could be renovated and extended to serve the larger facilities inside the GCEP portion of the plant. Steam supplied by the renovated steam supply piping could be used to serve a facility heat exchanger that could be used with the existing RHW piping and circulation pumps to circulate hot water to the different heating coils inside these buildings as well. In addition, smaller buildings that use the RHW to supply small hot water coil space heaters could be taken off the RHW and steam. The hot water space heaters could be replaced with electric space heaters.

In general, sufficient steam from the steam plant is not currently available, and the cost associated with the required modifications would be high. In addition, excavation for required modifications would require generation of large volumes of potentially hazardous waste and may interrupt critical plant site operations.

2.3.2 Electric Hot Water Boilers

Electric hot water boilers could be purchased and placed as required throughout the process, operations, and administrative buildings. The costs for electricity to power these heating units would be substantial when compared to other alternatives (Tetra Tech 2000). In addition, electrical service in many of the facilities is inadequate to support this configuration.

The larger facilities currently using RHW would be equipped with a large electric boiler that would maintain the existing RHW loop and circulating system inside each building. Hot water space heaters supplied with RHW, which are currently used to heat smaller buildings, would be replaced with electric space heaters.

The advantage of using electric boilers in each facility would be the independence from the existing central systems. There would be no dependence on the steam plant or existing RHW system and its problem of corrosion, pipe breaks, and leaks.

The main disadvantage of this alternative would be the potential for disruption of operations as multiple modifications are completed. Processes and activities would be impacted during the construction phase of the project because a potential exists for disruption of RHW supply. Water makeup and corrosion inhibition devices would be required for each of these systems. In addition, the cost of utilities to power electric boilers would be substantial (Tetra Tech 2000).

2.3.3 New Hot Water Boiler System Supplied with Fuel Oil with the Potential for Conversion to Natural Gas and Electric Space Heaters and Vent Sealing in Process Buildings (Proposed Action)

This alternative would provide a solution for heating site structures and would mitigate facility and equipment damage as well as environmental and safety concerns prior to the onset of the winter season. This solution would allow for the heating of the facilities in a manner that is timely and would not interfere with safe and environmentally sound operation of the site. This alternative would also allow currently installed fire protection systems to operate without alteration. New hot water boilers, hot water supply pumps, and associated piping and equipment would comprise a new RHW Hot Water Boiler System at the X-3002 building that would produce and circulate hot water required to heat the GCEP and GDP facilities at PORTS currently heated by RHW. The new RHW Hot Water Boiler System would connect to the existing 36-in supply and return headers that currently supply GCEP. The new RHW Hot Water Boiler System would be sized for the peak demand of approximately 19,200 gallons per minute of hot water required for a heating load of approximately 194,179,000 British thermal unit (Btu)/hr to heat the GCEP and GDP areas (Tetra Tech 2000).

In addition, approximately 900 electric space heaters (300 space heaters in each building) would be installed to heat the three process buildings. Electric space heaters are currently used within these process buildings to provide heat to cold areas within the structures. The safety authorization basis for installation of additional electric space heaters would not require DOE or Nuclear Regulatory Commission (NRC) approval because electric space heaters are already present within the structures.

The proposed boiler system could operate on an array of combinations of oil and natural gas. These boilers could be easily switched from one fuel source to another and be operated in different combinations of fuel supply. For example, two boilers could be operated from natural gas at the same time the third is operated on fuel oil.

Natural gas would be the most cost efficient fuel for the hot water boilers. An underground natural gas transmission line originating at the Zahns Corner Industrial Park would be the closest point where natural gas could be supplied from a transmission line and from there the gas could be routed through the eastern side of the DOE Reservation. Figure 1.2 presents the proposed location for the new, underground, natural gas supply line. Minor adjustments to this route could be required to avoid cultural resources, historic sites, critical habitats, floodplains, wetlands, site structures, utilities, or areas where interference with corrective action implementation could be expected. The proposed 350 pounds per square inch (psi) supply line would originate at Zahns Corner, cross under Route 32 near the Big Beaver Golf Course, continue south crossing under the railroad spur, closely following McCorkle Road to Dutch Run Road. At this point, the gas pressure would be reduced to approximately 100 psi. The pressure reduction facility would be located adjacent to the East Access Road of the DOE Reservation. Once on the DOE Reservation, the natural gas line would then continue along East Access Road and cross East Access Road and continue along Perimeter Road, south to a point aligned with Second Street where it would turn west. The natural gas line would cross the abandoned airfield and continue along the south side (outside) of the security fence (also south of the railroad track). At this point, the gas line would enter the secured portion of the DOE Reservation and continue to the proposed Hot Water Boiler Plant at the X-3002 building. A metering and second pressure reduction station would be located as close to the Hot Water Boiler Plant as practical.

An aboveground oil storage and supply system to make up any interruption of natural gas supply would be installed. Three 40,000-gal tanks located within a diked area would make up an oil storage supply of 120,000 gal. This quantity of fuel oil would provide a source of fuel for all three boilers operating at peak capacity for a period of 72 hr. This alternate source of fuel should be considered due to the reliability and availability concerns of the natural gas supply for peak demands over an extended period (Tetra Tech 2000).

2.4 NO-ACTION ALTERNATIVE

The no-action alternative provides an environmental baseline with which impacts of the proposed action and alternatives can be compared. The no-action alternative must be considered even if DOE is under a court order or legislative command to act. See 10 *CFR* 1021.321(c). Under this alternative, PORTS DOE Operations would continue without a heating supply for office buildings and operational facilities including RCRA Part B permitted waste storage facilities. The freezing of water lines, equipment damage caused by freezing, water damage, safety noncompliances, environmental noncompliances, and potential environmental insult would result in substantial environmental concerns and economic costs to DOE.

2.5 OPTIONS CONSIDERED FOR HEATING PROCESS BUILDINGS BUT ELIMINATED BECAUSE OF TECHNICAL INFEASIBILITY

Several options in addition to installing electric heaters were considered for providing heat to the process buildings. The options considered are described in this section.

2.5.1 Uncoupled Motors

An option considered for heating the three PORTS process buildings would be to energize the available process stage motors but uncoupled from their respective compressors. The main advantage of using the motors for heating is their availability and locations throughout the buildings. A secondary advantage is that heat could be controlled by switching motors on or off, with motors at the building periphery operating most often. The uncoupled motors option was evaluated and eliminated because it was determined to be technically infeasible.

2.5.2 Conversion from Wet to Dry Fire Protection System

An option considered to avoid heating the three PORTS process buildings would be to convert the existing wet-type sprinkler system to a dry-type sprinkler system. The sprinkler system is currently a wet-type sprinkler system in which there is a constant presence of water under pressure in the sprinkler lines. Because of safety issues (i.e., potential oxygen deficiencies) associated with installation of the dry-type sprinkler system and substantial costs associated with converting the system, this option was eliminated.

2.5.3. Combination Steam and Electric Heaters

An option considered for heating the three PORTS process buildings would be to use existing steam heaters and electric space heaters to heat the perimeter portions and other areas of the process buildings. The power for these electrical heaters could be obtained through the four auxiliary substations per process unit. Only part of one building (X-326) has steam heaters installed in the air ducts to supply building heat, and these are currently in use. The remaining existing systems would function well to circulate the air throughout the buildings; however, a heat source would still be required. The most cost-effective method of supplying the heat would be to utilize the many heaters that are currently used to heat process pipe housings. This could be accomplished simply by removing a certain number of housing covers and allowing the heat to "spill" out into the building proper. In addition, some minor building modifications, sealing roof vents/fans and filter rooms, may be required to contain the heat. Because of insufficient steam capacity to support the steam heaters, this option was eliminated.

Table 2.1. Comparison of Construction, Operating, and Maintenance Costs

Option	Construction Cost ($ millions)	Operation and Maintenance Costs Per Year (Base) ($ millions)
NEW HOT WATER BOILER SYSTEM SUPPLIED WITH FUEL OIL WITH THE POTENTIAL FOR CONVERSION TO NATURAL GAS AND ELECTRIC SPACE HEATERS AND VENT SEALING IN PROCESS BUILDINGS	$31.0 M	$15.8 M
New RHW Hot Water Boiler System with Natural Gas Supply Lines; Fuel Oil Storage and Supply System; Heating Process Buildings X-326, X-330, and X-333 totally with Electric Space Heaters		
Proposed Action		
X-600 COAL FIRED STEAM PLANT		
Provide a Bank of Heat Exchangers in Building X-330 Fed From the Existing Steam Plant and Circulated With Existing Pumps, Modify Fire Protection System From a Wet to a Dry Type System	$67.8 M	$12.6 M
Not Feasible – Inadequate steam supply available for heat exchangers		
ELECTRIC HOT WATER BOILERS		
Provide Electric Boilers at the Individual Facilities for RHW, Heating Process Buildings with Electric Space Heaters	$38.9 M	$20.2 M
Not Feasible – The initial capital and operating cost is higher		
NO ACTION		
The costs of this option would be incalculable	—	—

3. AFFECTED ENVIRONMENT

3.1 LAND AND FACILITY USE

PORTS is situated on a 1503-ha (3714-acre) parcel of DOE-owned land (Fig. 1.2). The Perimeter Road surrounds a 485.6-ha (1200-acre) centrally developed area. The terrain surrounding the plant, except for the Scioto River floodplain, consists of marginal farmland and densely forested hills. The Scioto River floodplain is farmed extensively, particularly with grain crops.

The reservation land outside Perimeter Road is used for a variety of purposes, including a water treatment plant, holding ponds, sanitary and inert landfill, and open and forested buffer areas. The majority of the site improvements associated with the GDP are located within the 202-ha (500-acre) fenced area. Within this area are three large process buildings and auxiliary facilities that are currently leased to USEC. A second, large developed area covering about 121 ha (300 acres) contains the facilities built for GCEP. These areas are largely devoid of trees, with grass and paved roadways dominating the open space. The remaining area within Perimeter Road has been cleared and is essentially level. Controlled access exists within the limited security area as well as closed sites.

Approximately 190 buildings are located within PORTS as well as the utility structures on the site. In general, the X-100 through X-700 series of buildings are directly related to the gaseous diffusion process. Most of the buildings in this series are located within the 202-ha (500-acre) fenced area. The X-200 and X-300 series are the production buildings and related infrastructure facilities. Most of the buildings and infrastructure included in the X-1000 through X-7000 series of buildings are located within the 121-ha (300-acre) GCEP expansion area. The facilities containing the administrative activities include the facilities numbered in the X-100 series for the GDP and X-1000 series for the more recent construction. The facilities house such activities as administrative offices, engineering, cafeteria, medical services, security, and fire protection.

The X-500 series in the GDP and the X-5000 series in the GCEP area pertain to the power operations facilities. Included are switchyards, switch houses, valve houses, and test and repair facilities. The X-600 and X-6000 series of facilities are utility related functions. Included are a steam plant, well fields, pump houses, a water treatment plant, a sewage treatment plant (STP), and numerous cooling towers. In addition, dry air and nitrogen generation facilities are housed in the GDP process buildings. The X-700 and X-7000 series of buildings house chemical operations, a laboratory, maintenance shops, and numerous storage facilities. The major maintenance facility for the GDP is the X-720 building. The building contains more than 91,440 m^2 (300,000 ft^2) of space for various shop activities, offices, and storage of parts. The GCEP-equivalent facility is the X-7721 Maintenance, Stores, and Training Building located in the 121-ha (300-acre) expansion area. The X-7721 building contains more than 36,576 m^2 (120,000 ft^2) of space.

The uranium enrichment production and operations facilities at PORTS are leased by USEC. The lease between DOE and USEC is active through July 1, 2004, although some facilities may be returned to DOE on an earlier date. Besides the leased facilities, USEC also leases common areas that include ditches, creeks, ponds, and other areas (i.e., roads and rail spurs) necessary for ingress, egress, and proper maintenance of facilities.

3.2 CLIMATE AND AIR QUALITY

3.2.1 Climate

PORTS is located in the humid continental climate zone of North America and has weather conditions that vary greatly throughout the year. The mean annual temperature is about 12.7°C (55°F). Average summer and winter temperatures are 22.2°C (72°F) and 0°C (32°F), respectively. Record high and low temperatures are 39.4°C (103°F) and –32°C (–25°F), respectively.

Prevailing winds are out of the south–southwest and average 8.05 kilometers per hour (km/h) [5 miles per hour (mph)]. The highest monthly average wind speed, 17.7 km/h (11 mph), typically occurs in the spring. Total precipitation averages approximately 101.6 cm (40 in.) annually and is usually well distributed throughout the year. Fall is the driest season. Snowfall averages approximately 51.8 cm/year (20.4 in./year). Although snow amounts and frequencies vary greatly from year to year, an average 8 d/year have greater than 2.54 cm (1 in.) of snowfall.

3.2.2 Air Quality

The PORTS region is classified as an attainment area for the pollutants listed in the National Ambient Air Quality Standards (NAAQS). These standards are shown in Table 3.1. Primary standards protect against adverse health effects, while secondary standards protect against welfare effects such as damage to crops, vegetation, and buildings. The State of Ohio has adopted the NAAQS and regulations to guide the evaluation of hazardous air pollutants and toxins to specify permissible short- and long-term concentrations.

PORTS is located in a Class II prevention of significant deterioration (PSD) area. PSD regulations were established to prevent significant deterioration of air quality in areas that already meet the NAAQS. Specific details of PSD are found in 40 *CFR* 51.166. Among other provisions, cumulative increases in sulfur dioxide, nitrogen dioxide, and PM-10 levels after specified baseline dates must not exceed specified maximum allowable amounts. These allowable increases, also known as increments, are especially stringent in areas designated as Class I areas (e.g., national parks and wilderness areas) where the preservation of clean air is particularly important. All areas not designated as Class I currently are designated as Class II. The nearest Class I PSD area is the Dolly Sods Wilderness Area, which is approximately 280 km (174 miles) east of PORTS in West Virginia.

Airborne discharges of radionuclides from PORTS are regulated under the CAA National Emission Standards for Hazardous Air Pollutants (NESHAP). Releases of radionuclides are used to calculate a dose to members of the public (Sect. 3.11.1).

The majority of radiological emissions at PORTS result from the uranium enrichment process operated by USEC. In 1999, USEC reported emissions of 0.9 Ci (curie: a measure of radioactivity) from its 19 radionuclide sources. DOE-PORTS is responsible for two radiological emission sources, the X-326 L-Cage glove box and the X-744G glove box. These glove boxes are used to repackage wastes or other materials that contain radionuclides. Emissions from these sources are based on waste analysis data and standard engineering procedures. Radiological emissions from these two DOE sources were 0.000064 Ci in 1999 (DOE 2000c).

Nonradiological releases to the atmosphere are permitted under the Ohio Permit to Operate regulations. Under Ohio regulations, the Ohio EPA can register small emission sources rather than issue a formal permit. DOE-PORTS had 4 permitted and 10 registered air emission sources at the end of 2000.

Table 3.1. Air quality standards

Pollutant	Averaging time	NAAQS (μg/m³)		Allowable PSD increment (μg/m³)[a]	
		Primary	Secondary	Class I	Class II
Sulfur dioxide	3 h[b]		1300	25	512
	24 h[b]	365		5	91
	Annual	80		2	20
Nitrogen dioxide	Annual	100	100	2.5	25
Ozone	1 h[c]	235	235		
	8 h[d]	157	157		
Carbon monoxide	1 h[b]	10,000			
	8 h[b]	40,000			
PM-10[e]	24 h[c]	150	150	8	30
	Annual	50	50	4	17
PM-2.5[f,d]	24 h	65	65		
	Annual	15	15		
Lead	3 months[g]	1.5	1.5		

Note: Where no value is listed, there is no corresponding standard.

[a]Class I areas are specifically designated areas in which degradation of air quality is severely restricted; Class II areas have a less stringent set of allowable increments.

[b]Not to be exceeded more than once per year.

[c]Not to be exceeded more than one day per year on average over 3 years.

[d]The ozone 8-h standard and the PM-2.5 standards are included for information only. A 1999 federal court ruling blocked implementation of these standards, which the U.S. Environmental Protection Agency proposed in 1997.

[e]Particulate matter less than 10 μm in diameter.

[f]Particulate matter less than 2.5 μm in diameter.

[g]Calendar quarter.

NAAQS = National Ambient Air Quality Standard.

PSD = prevention of significant deterioration.

DOE-PORTS operates numerous small sources of conventional air pollutants such as nitrogen oxides, sulfur dioxide, and particulate matter. These emissions are estimated every 2 years for the Ohio EPA's biennial emission fee statement. Emissions of nonradiological air pollutants at PORTS are estimated using various U.S. EPA-approved procedures. In calculating air emissions, DOE assumes that each source emits the maximum allowable amount of each pollutant as provided in the permit or registration for the source. Under this worst-case scenario, DOE-PORTS estimated emissions of sulfur dioxide, nitrogen oxides, organic compounds, and particulate matter in 1999 to be 13 tons/year. Most of these worst-case emissions resulted from particulate (dust) emissions from the X-734 landfill closure. Worst-case air emissions excluding this source are no more than 1.5 tons/year (DOE 2000c).

The largest nonradiological airborne discharges from USEC sources are from the coal-fired boilers at the X-600 steam plant. The boilers are permitted by Ohio EPA with opacity, particulate, and sulfur dioxide limits. Electrostatic precipitators on each of the boilers control opacity and particulate emissions. In addition, the boilers emit nitrogen oxides and carbon monoxide. There are also minor contributions of these pollutants from oil-fired heaters, stationary diesel motors, and mobile sources (e.g., cars and trucks). Other air pollutants emitted from USEC operations include gaseous fluorides, water treatment chemicals, cleaning solvent vapors, and process coolants.

In October 2000, DOE collected data from a monitoring network of 15 air samplers. Data were collected both on-site at PORTS and in the area surrounding PORTS. The monitoring network is intended to assess whether air emission from PORTS affect air quality in the surrounding area. The air sampling stations measure americium-241, neptunium-237, plutonium-238, plutonium-239/240, plutonium-242, thorium-228, thorium-230, thorium-232, uranium-233/234, uranium-235, uranium-236, uranium-238, percent uranium-235, and total uranium. A background ambient air monitoring station is located approximately 21 km (13 miles) southwest of the site. The analytical results from air sampling stations closer to the plant are compared to background measurements.

3.3 GEOLOGY AND SOILS

3.3.1 Site Geology

The near-surface geologic materials that influence the hydrologic system at PORTS consist of several bedrock formations and unconsolidated deposits. The bedrock formations include (from oldest to youngest) Bedford Shale, Berea Sandstone, Sunbury Shale, and Cuyahoga Shale. The unconsolidated deposits of clay, silt, sand, and gravel compose the Minford Clay and Silt (Minford) member and the Gallia Sand and Gravel (Gallia) member of the Teays formation (DOE 1996a). Prior to the Pleistocene glaciation, the Teays River and its tributaries were the dominant drainage system in Ohio.

The preglacial Portsmouth River, a tributary of the Teays, flowed north across the plant site, cutting down through the Cuyahoga Shale and into the Sunbury Shale and Berea Sandstone, and deposited fluvial silt, sand, and gravel of the Gallia member of the Teays Formation (Fig. 3.1).

3.3.2 Bedrock geology

Bedrock consisting of clastic sedimentary rocks underlies the unconsolidated sediments beneath PORTS. The geologic structure of the area is very simple, with the bedrock (Cuyahoga Shale, Sunbury Shale, Berea Sandstone, and Bedford Shale) dipping gently to the east–southeast. No known geologic faults are located in the area; however, joints and fractures are present in the bedrock formations.

The Bedford Shale is the lowest stratigraphic unit encountered during environmental investigative activities at the site. Bedford Shale is composed of thinly bedded shale with interbeds and laminations of grey, fine-grained sandstone and siltstone. The typical depth to the top of this formation at PORTS is 21.3 to 30.5 m (70 to 100 ft) below ground surface (bgs). However, Bedford Shale outcrops are present in deeply incised streams and valleys within the reservation. The Bedford Shale averages 30.5 m (100 ft) in thickness.

The Berea Sandstone is a light grey, thickly bedded, fine-grained sandstone with thin shale laminations. The top 3.05 to 4.57 m (10 to 15 ft) consists of a massive sandstone bed with few joints or shale laminae. The Berea Sandstone averages 10.67 m (35 ft) in thickness; however, the lower 3.05 m (10 ft) has numerous shale laminations and is very similar to the underlying Bedford Shale. This gradational contact does not allow for a precise determination of the thickness of the Berea Sandstone.

Regionally, Berea Sandstone contains naturally occurring hydrocarbons (oil and gas) in quantities sufficient for commercial production. Generally, within Perimeter Road, the Berea Sandstone is the uppermost bedrock unit beneath the western portion of PORTS but is overlain by the Sunbury Shale to the east.

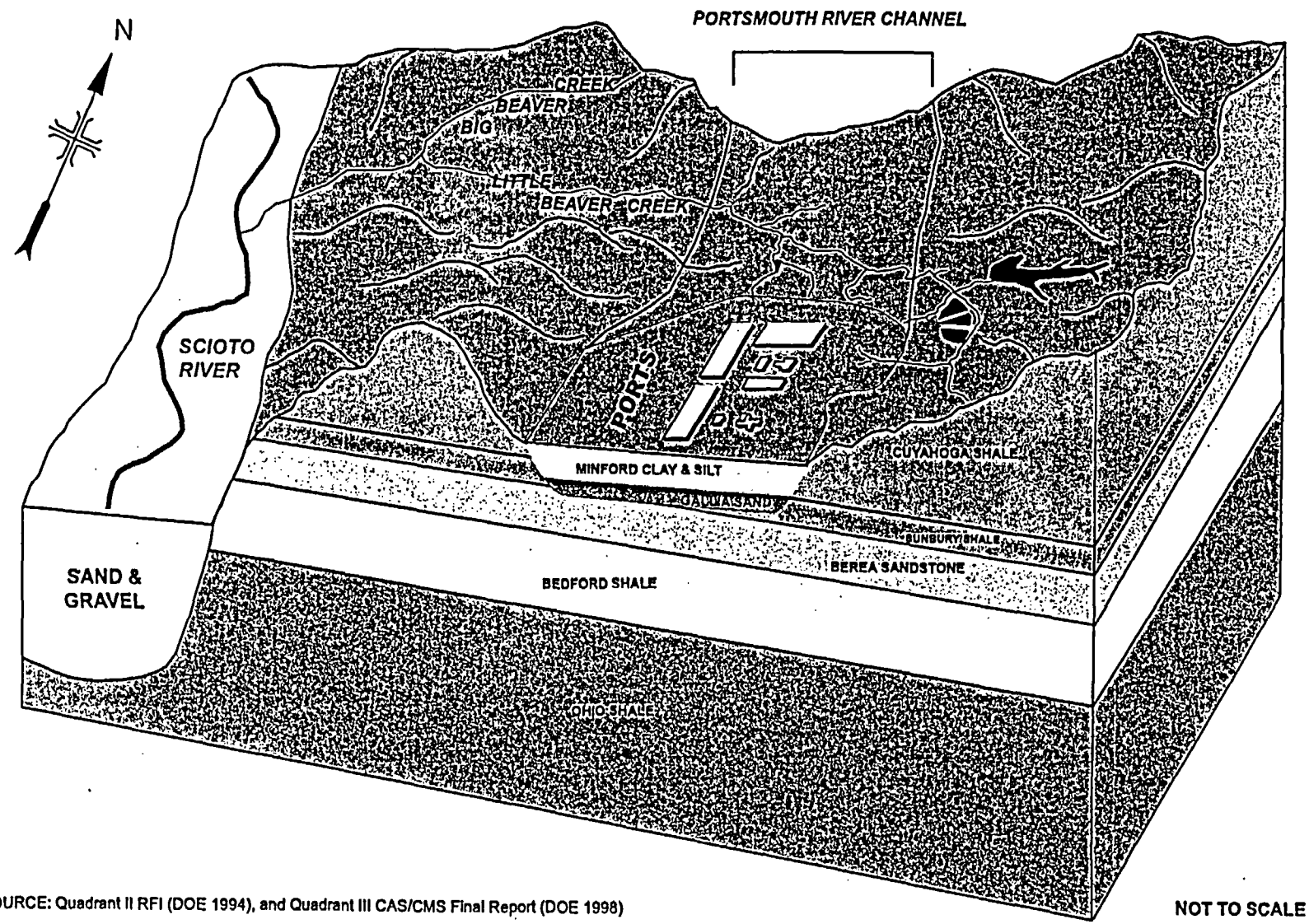
The Sunbury Shale is a black, very carbonaceous shale. The Sunbury Shale is 6.09 m (20 ft) thick beneath much of PORTS, but thins westward as a result of erosion by the ancient Portsmouth River, and is absent on the western half of the site. The Sunbury Shale also is absent in the drainage of Little Beaver Creek downstream of the X-611A Lime Sludge Lagoons and the southern portion of Big Run Creek, where it has been removed by erosion. The Sunbury Shale underlies the unconsolidated Gallia beneath the most industrialized eastern portion of the plant and underlies the Cuyahoga Shale outside of the Portsmouth River Valley.

The Cuyahoga Shale, the youngest and uppermost bedrock unit at the site, forms the hills surrounding PORTS. The Cuyahoga Shale has been eroded from most of the active portion of PORTS. It consists of grey, thinly bedded shale with scattered lenses of fine-grained sandstone and regionally reaches a thickness of approximately 48.77 m (160 ft).

3.3.3 Unconsolidated Deposits

Unconsolidated deposits in the vicinity of PORTS fill the ancient Portsmouth River Valley to depths of approximately 9.1 to 12.2 m (30 to 40 ft). The unconsolidated deposits are divided into two members of the Teays Formation, the Minford Clay and Silt and the Gallia Sand and Gravel.

Minford Clay and Silt. The Minford is the uppermost stratigraphic unit beneath PORTS. The Minford averages 6.1 to 9.1 m (20 to 30 ft) in thickness and grades from predominantly silt and very fine sand at its base to clay near the surface. The upper clay unit averages 4.88 m (16 ft) in thickness, is reddish-brown, plastic, and silty, and contains traces of sand and fine gravel in some locations. These thicknesses vary greatly as a result of construction cutting and filling operations, as discussed in the next paragraph. The lower silt unit averages 2.13 m (7 ft) in thickness, is yellow-brown and semiplastic, and contains varying amounts of clay and very fine sand.



SOURCE: Quadrant II RFI (DOE 1994), and Quadrant III CAS/CMS Final Report (DOE 1998)

NOT TO SCALE

Pro2Serve	Fig. 3.1	Schematic block diagram showing geology at PORTS.	DOCUMENT ID: DOE/EA/1392	DRAWING ID: Fig3-1a.cdr	DRAWING DATE: May 18, 2001

During the initial grading of the site, the deposits within the Perimeter Road were reworked to a depth as great as 6.1 m (20 ft) by preconstruction cut and fill activity. In most cases, the fill is indistinguishable from the undisturbed Minford. The combination of construction activities, bedrock topography, and erosion by modern streams has influenced the areal extent and thickness of the Minford at PORTS.

Gallia Sand and Gravel. Prior to Pleistocene glaciation, the Portsmouth River meandered north through the valley currently occupied by PORTS and deposited the sand and gravel of the Gallia. The Gallia averages 0.9 to 1.22 m (3 to 4 ft) in thickness at the site and is characterized by poorly sorted sand and gravel with silt and clay. Channel migration and variation in depositional environments that occurred during deposition of the Gallia resulted in the variable thickness of the Gallia. The areas of thickest accumulation of Gallia may represent the former channel location and include areas under the southern end of the X-330 building and near the X-701B. Gallia deposits beneath PORTS are generally absent above an approximate elevation of 198 m (650 ft) above mean sea level (AMSL).

As a result of similar depositional environments and source material, deposits from modern streams at the site often are visually indistinguishable from Gallia deposits. The modern surface-water drainage also has eroded the unconsolidated sediments and resulted in locally thin or absent Gallia and Minford.

3.3.4 Surface Soil Description

According to the Soil Survey of Pike County, Ohio, 22 soil types occur within the PORTS property boundary with the predominant soil type being Omulga Silt Loam (U.S. Department of Agriculture 1990). Most of the area within the active portion of PORTS is classified as Urban land-Omulga complex with a 0 to 6% slope, which consists of Urban land and a deep, nearly level, gently sloping, moderately well-drained Omulga soil in preglacial valleys. The Urban land is covered by roads, parking lots, buildings, and railroads that are so obscure or alter the soil that identification of the soil series is not feasible.

The surface layer of Omulga Silt Loam is dark grayish-brown, friable (easily crumbled), and approximately 25.4 cm (10 in.) thick. The subsoil is approximately 137.2 cm (54 in.) thick and is composed of three portions: (1) a yellowish-brown, friable silt loam; (2) a fragipan (brittle, compacted subsurface soil) of yellowish-brown, mottled, firm, and brittle silty clay loam middle; and (3) a yellowish-brown, mottled, friable silt loam approximately 50.8 cm (20 in.) thick. The root zone generally is restricted to the zone above the fragipan and contains none of the Urban land soils. Well-developed soil horizons may not be present in all areas inside Perimeter Road because of cut-and-fill operations related to construction.

Prime farmland is land that has the best combination of physical and chemical characteristics for producing crops of statewide or local importance. Seven of the soils that occur within the PORTS property are listed in the Pike County Soil Survey as prime farmland soils. Prime farmland is protected by the Farmland Protection Policy Act which seeks "... to minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmlands to nonagricultural uses..." [7 USC 4201(b)].

Seven soil types that occur within the DOE property boundary at PORTS are considered prime farmland in the Soil Survey of Pike County, Ohio. Of these, four soil types are found within four of the six areas that could potentially be transferred under the proposed action. These four soil types are the Omulga silt loam (0 to 3% slopes), Doles silt loam (0 to 3% slopes, where drained), Coolville silt loam (1 to 8% slopes), and Princeton fine sandy loam (3 to 8% slopes).

3.3.5 Seismicity

Geological studies conducted to determine the potential seismic hazard for PORTS have determined that only one fault is located within 40 km (25 miles) of the site, and no seismicity has been recorded on it and no recorded seismic events have occurred within 40 km (25 miles) of the site. The Kentucky River fault zone and the Bryant Station-Hickman Creek fault are located farther away from PORTS, the latter fault being roughly 96.5 km (60 miles) to the southwest. These faults bound the southern part of a north-to-northeast-trending area of seismicity in central and eastern Ohio. Soil testing for the GCEP facility indicated that the potential for earthquake-induced soil liquefaction is relatively low. The potential for soil-structure interaction (ground motion magnification) is also slight. Also, Pike County is not one of the political jurisdictions listed in Appendix VI of 40 *CFR* 264 for which compliance with seismic standards must be demonstrated (MMES 1994).

3.4 WATER RESOURCES

3.4.1 Groundwater

3.4.1.1 Site hydrogeology

The groundwater flow system at PORTS includes two water-bearing units (the bedrock Berea Sandstone and the unconsolidated Gallia) and two aquitards (the Sunbury Shale and the unconsolidated Minford). The basal portion of the Minford is generally grouped with the Gallia to form the uppermost and primary aquifer at the facility. The hydraulic properties of these units and groundwater flow at the site also have been well defined.

Groundwater recharge and discharge areas at PORTS include both natural and man-made recharge and discharge areas. Natural recharge to the groundwater flow system at PORTS comes from precipitation.

Land use and the presence of thick upper Minford clay and the Sunbury Shale effectively reduce recharge to underlying units. Recharge to the Minford and Gallia is reduced because a large percentage of the land is paved or covered by buildings. However, recharge to the Berea Sandstone from the overlying Gallia is increased as a result of the absence of the Sunbury Shale.

Groundwater flow at PORTS can generally be divided into four separate flow regions. Groundwater divides provide the basis for separation of the reservation into quadrants. The groundwater divides generally coincide with topographic highs along the center of the industrial complex (from south to north) and topographic highs radiating outward and separating the predominant surface water features draining the facility. The locations of the groundwater flow divides may migrate small distances in response to seasonal changes in precipitation and groundwater recharge. The rates of pumping the X-700/X-705 sumps and remediation wells can also influence the location of the groundwater divides in some areas.

Groundwater at PORTS discharges primarily to surface streams. Groundwater in the eastern and northern portions of the facility discharges to the East and North Drainage Ditches and to the Little Beaver Creek. In the southern portion of the facility, groundwater discharges to the Big Run Creek and to the unnamed Southwest drainage ditch. Along the western boundary of the site, the West Drainage Ditch serves as a local discharge area for all geologic units.

Groundwater recharge and discharge areas at PORTS also are affected by man-made features including the storm sewer system, the sanitary sewer system, the recirculating cooling water (RCW) system, water lines, and building sumps. The storm sewer system consists of numerous large-diameter

culverts and pipes that drain surface water from discrete segments of the site. Groundwater collected by these drains is transported to the discharge point for each storm drain. Discharge points for the storm drains generally coincide with site National Pollutant Discharge Elimination System (NPDES) outfalls that eventually discharge to the surface water units described previously. The RCW and fire hydrant supply systems are pressurized to ensure proper transport of water. If these systems have leaks, they may locally act as sources of recharge to groundwater. Although recharge from these lines to groundwater is difficult to measure, overall groundwater directions are not affected. These systems are generally located within 1.8 to 3.7 m (6 to 12 ft) of the ground surface. The depth to groundwater generally is more than 3.7 m (12 ft) bgs. Consequently, these systems and their associated backfills are usually located above the local water table. On the basis of these factors, none of these systems appears to act as a major discharge conduit for groundwater. Man-made features that do have a major effect on groundwater flow at the site include a set of sumps located in the X-700 and the X-705 buildings, extraction wells in the vicinity of X-231B, X-701B, and groundwater interceptor trenches at X-749 and X-701B.

Groundwater is used as a domestic, municipal, and industrial water supply in the vicinity of PORTS. Most municipal and industrial water supplies in Pike County are developed from the Scioto River Valley buried aquifer. Groundwater in the Berea sandstone and Gallia sand formations that underlie PORTS is not used as domestic, municipal, or industrial water supplies. Domestic water supplies are obtained from either unconsolidated deposits in preglacial valleys, major tributaries to the Scioto River Valley, or from fractured bedrock encountered during drilling.

The PORTS reservation is the largest industrial user of water in the vicinity and obtains its water from the X-608, X-605G, and X-6609 water supply well fields, which are next to the Scioto River south of Piketon. The wells tap the Scioto River Valley buried aquifer. Total groundwater production averages 49.4 million liters per day (L/d) [13 million gallons per day (MGD)] for the entire site, including USEC activities (DOE 1999b).

3.4.1.2 Groundwater monitoring

Groundwater and surface water monitoring at PORTS was initiated in the 1980s. Groundwater monitoring has been conducted in response to regulatory requirements of the Ohio Administrative Code, RCRA closure documents, an Administrative Consent Order between DOE and the U.S. EPA, a Consent Decree between the DOE and the State of Ohio, and DOE orders.

Because of the numerous regulatory programs, the *Integrated Groundwater Monitoring Plan* (IGWMP) was developed to minimize the potential for confusion in interpreting requirements and to maximize resources for collecting the data needed for sound decision making and was designed to establish all groundwater monitoring requirements for PORTS. The IGWMP was reviewed and approved by Ohio EPA and implemented at PORTS starting on April 1, 1999. The IGWMP is revised as monitoring needs change. The latest approved version of the IGWMP was issued in January 2001.

The process of developing an integrated groundwater monitoring program at PORTS began by selecting or designating relatively large-scale contamination areas called groundwater Areas of Concern. Areas of Concern at PORTS are generally large areas containing multiple source/release sites contributing to physically contiguous or co-mingled contaminant plumes or remediation concerns that are the subject of corrective actions or RCRA closures.

In addition to the detection and assessment monitoring at PORTS, the integrated approach to groundwater monitoring includes perimeter exit pathway monitoring, sampling selected surface water locations and sampling PORTS water supply and surrounding residents' drinking water. Additional

information and monitoring results are provided in the 2000 Groundwater Monitoring Report (DOE 2001).

In general, samples are collected from wells at each area listed above and are analyzed for metals, volatile organic compounds (VOCs), and radiological constituents. Data for the X-749A Classified Materials Disposal Facility (part of the Quadrant I Groundwater Investigative Area) and the X-735 Landfills are also statistically evaluated to determine whether the areas have impacted groundwater.

Groundwater plumes that consist of VOCs, primarily trichloroethene (TCE), are found at the X-749/X-120/Peter Kiewit Landfill, Quadrant I Groundwater Investigative Area, Quadrant II Groundwater Investigative Area, X-701B Holding Pond Area, and X-740 Hazardous Waste Storage Facility Area.

Selected monitoring wells, monitoring frequency, and analytical parameters are included in the IGWMP for each of the groundwater areas of concern listed below:

Quadrant I

- X-749 Contaminated Materials Disposal Facility/X-120 Old Training Facility/Peter Kiewit Landfill,
- Quadrant I Groundwater Investigative Area/X-749A Classified Materials Disposal Facility,

Quadrant II

- Quadrant II Groundwater Investigative Area,
- X-701B Holding Pond Area,

Quadrant III

- X-616 Chromium Sludge Surface Impoundments,
- X-740 Hazardous Waste Storage Facility Area,

Quadrant IV

- X-611A Former Lime Sludge Lagoons, and
- X-735 Landfills.

Monitoring wells were selected to serve one or more of the following broad technical objectives: source/release monitoring, plume monitoring, and remedial-action-effectiveness monitoring. Source monitoring is designed to monitor as close as feasible to potential sources of groundwater contamination such as landfills and holding ponds. Plume monitoring is designed to assess the concentrations and extent of known contaminant plumes. Remedial-action-effectiveness monitoring is designed to evaluate the performance of interim remedial measures, corrective actions, or technology demonstrations. These broad technical purposes approximate the regulatory definitions of detection monitoring and assessment monitoring.

3.4.1.3 Groundwater treatment

In 2000, a combined total of approximately 20.7 million gal of contaminated groundwater was treated at the X-622, X-622T, X-623, X-624, and X-625 Groundwater Treatment Facilities. Approximately 129 gal of TCE were removed from the groundwater. All processed water is discharged through NPDES outfalls before exiting PORTS.

- X-622—TCE-contaminated groundwater from the X-231B southwest oil biodegradation plot, the X-749 contaminated materials disposal facility, and the Peter Kiewit groundwater collection system is processed at the X-622 treatment unit using activated carbon and green sand filtration.

- X-622T—At this treatment facility, activated carbon is used to treat contaminated groundwater from the X-700 chemical cleaning facility and the X-705 decontamination building. The contaminated groundwater is extracted from sumps located in the basement of each building.

- X-623—This groundwater treatment facility consists of an air stripper with off-gas activated carbon filtration and aqueous-phase activated carbon filtration. X-623 provides treatment for contaminated groundwater from the X-701B holding pond and three groundwater extraction wells in the X-701B plume area.

- X-624—TCE-contaminated groundwater from the X-237 interceptor trench associated with the X-701B plume is treated via an air stripper with off-gas activated carbon filtration, plus carbon filtration of the effluent water.

- X-625—Groundwater that is gravity fed to this facility (from a horizontal well associated with the X-749/X-120 groundwater plume and as part of an ongoing technology demonstration) is treated with various passive media such as iron fillings.

3.4.2 Surface Water

3.4.2.1 Site hydrology

PORTS is drained by several small tributaries of the Scioto River, which flows south to the Ohio River. Sources of surface water drainage include storm water runoff, groundwater discharge, and effluent from plant processes.

The largest stream on the site is Little Beaver Creek, which drains the northern and northwestern portions of the site before discharging into Big Beaver Creek. Little Beaver Creek is a small, high-gradient, unmodified stream that receives the majority of its flow from the X-230J7 East Holding Pond discharge through the East Drainage Ditch. Little Beaver Creek also receives effluent via the Northeast Drainage Ditch through the outfall from the X-230J6 Northeast Holding Pond and the North Drainage Ditch through the X-230L North Holding Pond Outfall. Substrates are predominantly slab boulders and bedrock at the upper reach to gravel and sand near the mouth. During parts of the year, intermittent flow conditions exist upstream from the X-230-J7 discharge. During these times the upstream section is composed of isolated pools with no observable flow (Ohio EPA 1998).

Big Run Creek, located in the southeastern portion of the site, receives outfall effluent from the X-230K Holding Pond at the headwaters of the stream. Big Run Creek continues southwest from the DOE property boundary until it discharges into the Scioto River, approximately 6.4 km (4 miles) from the site. The substrates are predominated by gravel and cobble, and the channel has remained unmodified. Because of the small stream size and high gradient, deep pools are absent. Big Run Creek often has intermittent flow during parts of the year (Ohio EPA 1993).

Two ditches drain the western and southwestern portions of the site; flow is low to intermittent. The West Drainage Ditch receives water from surface water runoff, storm sewers, and plant effluent. The

unnamed southwest drainage ditch receives water mainly from storm sewers and groundwater discharge. These two drainage ditches continue west and ultimately discharge into the Scioto River.

3.4.2.2 Surface water monitoring

The quality of surface waters at PORTS is affected by wastewater discharges and groundwater transport of contaminants from land disposal of waste. Although bedrock characteristics differ somewhat among the watersheds of these surface waters, the observed differences in water chemistry are attributed to different contaminant loadings rather than to geologic variation (DOE 1999a). Water quality, radioactivity, and flow measurements are made at a number of stations operated by DOE. The frequency of surface water sampling (weekly, monthly, etc.) is specific to the analytes. Routine and permitted outfall samples are tested for radiological components (gross alpha, gross beta-gamma, technetium, and uranium), pH, flow, turbidity, TCE, oil and grease, heavy metals, fluorides, and phosphates.

Most surface water sampling at PORTS for nonradiological discharges is regulated by NPDES permits enforced by the Ohio EPA. NPDES permit limitations regulate all plant process effluent discharged to the environment. The DOE-PORTS NPDES permit was issued in 1995 and modified in 1996 and 1997. The DOE-PORTS NPDES permit expired on March 31, 1999. DOE submitted a permit renewal application to Ohio EPA in 1998 in accordance with Ohio EPA requirements. The old permit will remain in effect until Ohio EPA issues a new permit. The Ohio EPA and U.S. EPA also conducted the annual inspection of all DOE-PORTS outfalls in June 2000. No problems were noted during the inspection.

DOE has six discharge points, or outfalls, through which water is discharged from the site. Three outfalls discharge directly to surface water (unnamed streams that flow to the Scioto River and Little Beaver Creek), and three discharge to the USEC X-6619 STP before leaving the site through USEC outfall 003 to the Scioto River. USEC is responsible for 11 NPDES outfalls at PORTS. Eight outfalls discharge directly to surface water (unnamed tributary to Scioto River, Little Beaver Creek, Big Run Creek, and the Scioto River). Two discharge to the X-6619 STP and outfall 003 and one discharges to the X-230K south holding pond (outfall 002).

DOE-PORTS Outfalls:

012 (X-2230M holding pond)
013 (X-2230N holding pond)
015 (X-624 groundwater treatment facility)
608 (X-622 groundwater treatment facility)
610 (X-623 groundwater treatment facility)
611 (X-622T groundwater treatment facility)

USEC Outfalls:

001 (X-230J7 holding pond)
002 (X-230K south holding pond)
003 (X-6619 STP)
004 [X-616 chromate treatment facility (inactive)]
005 (X-611B lime sludge lagoon)
009 (X-230L north holding pond)
010 (X-230J5 northwest holding pond)
011 (X-230J6 holding pond)
602 (X-621 coal pile runoff treatment facility)

604 (X-700 biodenitrification facility)
605 (X-705 decontamination microfiltration system)

Surface water monitoring of the Big Run Creek, East Drainage Ditch, Little Beaver Creek, North Holding Pond, unnamed southwestern drainage ditch, and West Drainage Ditch is conducted quarterly to assess the effect of the discharge of groundwater to streams (as base flow) at PORTS. This monitoring helps to support assessment monitoring at X-231B and X-701B and post-closure monitoring at X-616, X-735, and X-749. These surface monitoring locations are part of the Groundwater Monitoring Program and are not considered part of the PORTS NPDES sampling program (DOE 1999a).

3.4.2.3 Surface water quality

Both DOE and USEC monitor NPDES outfalls for radiological discharges by collecting water samples and analyzing the samples for radionuclides. Samples are analyzed for total uranium, isotopic uranium, gross alpha radiation, gross beta radiation, ^{99}Tc, $^{239/240}$Pu, ^{238}Pu, ^{237}Np, ^{241}Am, and ^{230}Th. In 2000, total radioactivity discharged from DOE NPDES outfalls has been estimated at 4.1mCi, and uranium discharges were estimated at 1.1 kg. Data collected by USEC and provided to DOE showed that USEC released 16.8 kg of uranium through 8 NPDES outfalls during 2000. Total radioactivity released was 31.4 mCi U and 62.5 mCi Tc.

The Ohio EPA also requires monthly collection of surface water samples from the X-745C and X-745E depleted UF_6 cylinder yards. Samples are analyzed for alpha activity, beta activity, and total uranium. During 2000, alpha activity ranged from less than 0 picocurie per liter (pCi/L) to 15 pCi/L, beta activity ranged from less than 2 pCi/L to 44.7 pCi/L, total uranium ranged from less than 0 µg/L to 12 µg/L, and maximum values for specific radionuclides detected were: 16 pCi/L Tc, 6 pCi/L $^{233/234}$U, 0.19 pCi/L ^{235}U, 0.13 pCi/L ^{236}U, and 2.7 pCi/L ^{238}U. Samples also were analyzed for total PCBs, ^{241}Am, ^{243}Am, ^{237}Np, ^{238}Pu, and $^{239/240}$Pu. These parameters were not detected at levels greater than the applicable detection limits.

Sampling of nonradioactive constituents is regulated under the NPDES permit. Analyses are performed in accordance with applicable regulations. This EA does not include results for nonradiological monitoring of USEC NPDES outfalls.

Results of the 1998 surface water monitoring conducted in conjunction with groundwater assessment monitoring are as follows. No VOCs were detected at the sampling locations in Big Run Creek, Little Beaver Creek, East Drainage Ditch, North Holding Pond, or West Drainage Ditch, with the exception of small amounts of chloroform and other trihalomethanes that are common residuals in treated chlorinated drinking water. These streams received such treated water. TCE has been detected regularly at UND-SW01 within the unnamed southwestern drainage ditch at low levels since 1990 and was detected in 1998 at 2 to 3 µg/L. TCE was also detected downstream from UND-SW01 at 2 µg/L in the second quarter of 1998. Naturally occurring Sunbury shale chips and fines in the stream sediment contain trace concentrations of uranium, and these chips might account for the low uranium concentrations that were detected below preliminary remediation goals (PRGs) at many of the sampling locations in 1998. Gross alpha and beta activity was also detected at several sampling locations, but the activity was below PRGs (DOE 1999a).

3.5 FLOODPLAINS AND WETLANDS

3.5.1 Floodplains

Floodplains consist of mostly level land along rivers and streams that may be submerged by floodwaters. The Flood Insurance Rate Map (FIRM) provided by the Federal Emergency Management Agency (FEMA) indicates that the 100-year floodplain extends on both sides of Little Beaver Creek upstream from the confluence with Big Beaver Creek to the rail spur located near the X-230 J-9 North Environmental Sampling Station (Fig. 3.2). The 100-year floodplain ranges on either side of Little Beaver Creek from 15.24 to 60.96 m (50 to 200 ft) roughly following the 174.7-m (575-ft) topographic contour. Flooding is not a problem for the majority of the site. The highest recorded flood level of the Scioto River in the vicinity of the site was 570.0 ft AMSL (January 1913), which is approximately 100 ft below the level of most PORTS facilities. No portion of the floodplain for Big Beaver Creek is located within the PORTS boundary. The FIRM map for Big Beaver Creek indicates a Zone A designation at the point where the proposed natural gas pipeline would cross Big Beaver Creek. Zone A is described in the legend of the FIRM map as "No floodplain elevations have been established." The width of the floodplain where the proposed natural gas pipeline would cross Big Beaver Creek is approximately 228.6 m (750 ft).

3.5.2 Wetlands

The U.S. Army Corps of Engineers (USACE) defines wetlands as "those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Wetlands usually include swamps, marshes, bogs, and similar areas. In identifying a wetland, three characteristics should be met. First is the presence of hydrophytic vegetation that has morphological or physiological adaptations to grow, compete, or persist in anaerobic soil conditions. Second, hydric soils are present and possess characteristics that are associated with reducing soil conditions. Third, site hydrology, meaning the area is inundated or saturated to the surface at some time during the growing season of the prevalent vegetation, must be present (USACE 1987).

PORTS contains 41 jurisdictional and 4 non-jurisdictional wetlands totaling 13.92 ha (34.36 acres) (DOE 1996b). Quadrant I has 13 jurisdictional wetlands totaling 5.22 ha (12.91 acres). Quadrant II contains three jurisdictional wetlands with a total area of 5.2 ha (12.86 acres). Quadrant III has 6 jurisdictional wetlands totaling 0.82 ha (2.02 acres), and Quadrant IV has 19 jurisdictional wetlands and 4 non-jurisdictional wetlands totaling 2.66 ha (6.58 acres). The majority of the wetlands are associated with wet fields, areas of previous disturbance, drainage ditches, or wet areas along roads and railway tracks. Table 3.2 provides information about the wetlands at PORTS. The location of all the wetlands is shown on Fig. 3.3.

3.6 ECOLOGICAL RESOURCES

3.6.1 Terrestrial Resources

The 10 terrestrial habitat types at PORTS are as follows (DOE 1997a):

- Old field areas—Early successional stage of disturbed areas dominated by tall weeds, shade-intolerant trees, and shrubs.

- Scrub thicket—Later successional stage covering old field areas dominated by dense thickets of small trees.
- Managed grassland—Open areas actively maintained and dominated by grasses.
- Upland mixed hardwood forest—Mesic to dry upland areas dominated by black walnut, black locust, honey locust, black cherry, and persimmon.
- Pine forest—Advanced successional stage following scrub thicket. The overstory is dominated by Virginia pine.
- Pine plantation—Nearly pure stands of Virginia pines.
- Oak-hickory forest—Well-drained upland soils. White oak and shagbark hickory are the most dominant of the oaks and hickories.
- Riparian forest—Periodically flooded, low areas associated with streams. Dominated by cottonwood, sycamore, willows, silver maple, and black walnut.
- Beech-maple forest—Undisturbed areas dominated by American beech and sugar maple.
- Maple forest—Dominated by sugar maple and other shade-tolerant species.

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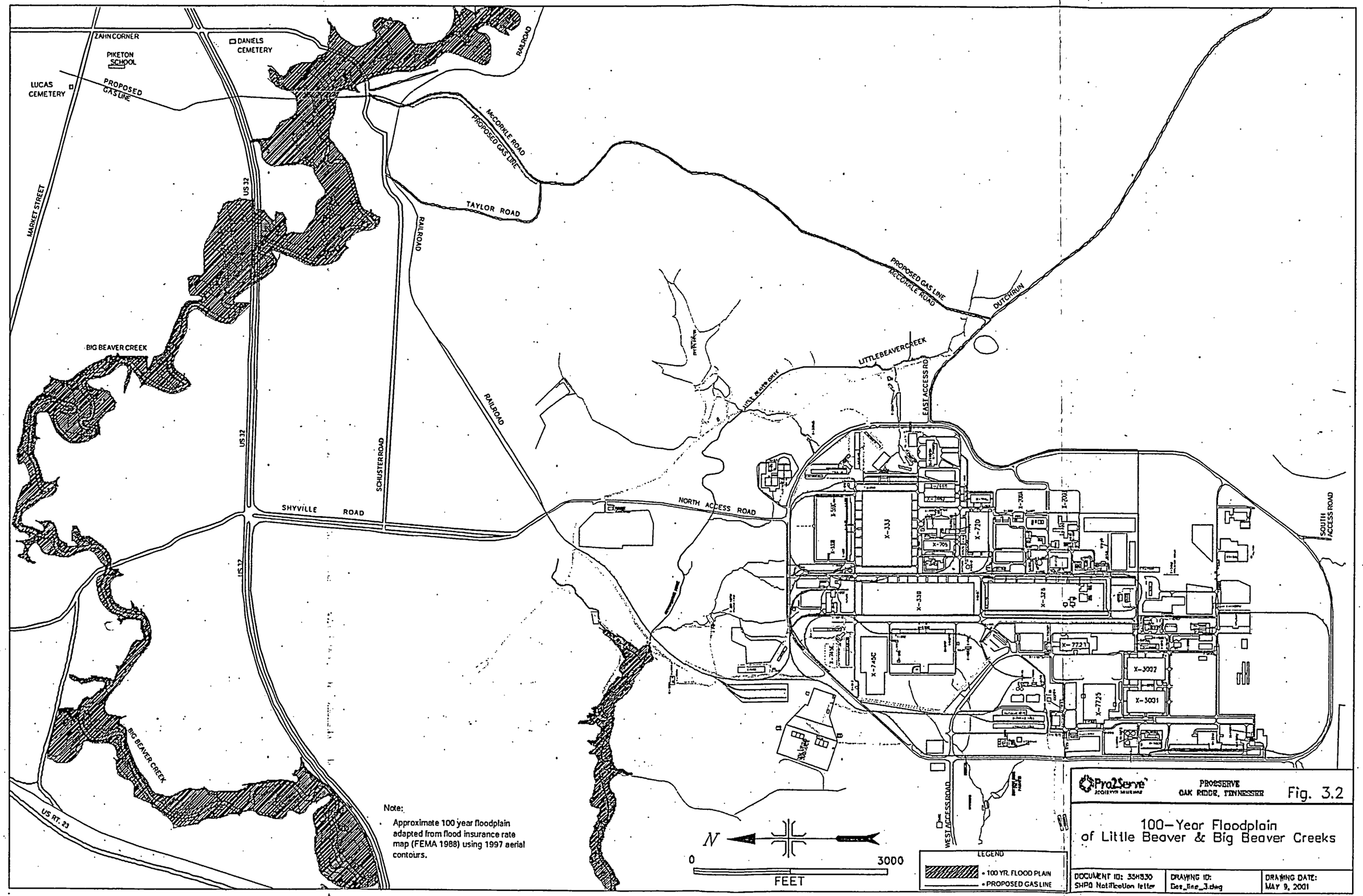


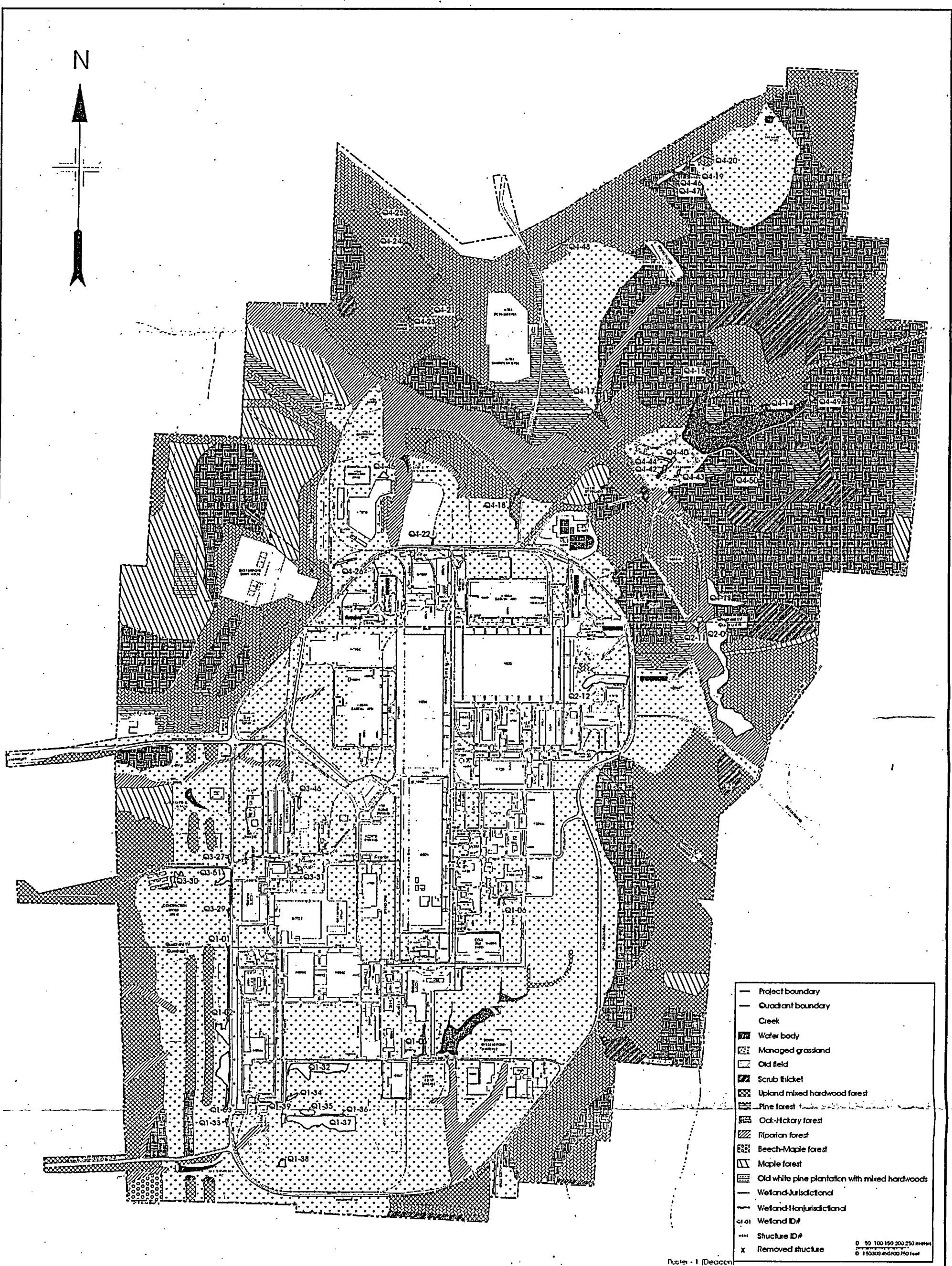
Note:

- Approximate 100 year floodplain adapted from flood insurance rate map (FEMA 1988) using 1997 aerial contours.

Table 3.2. Wetlands at PORTS

Wetland ID #	Status	ha/acre	Location	Comments
QI-01	Jurisdictional	0.133/0.328	West Perimeter Road	
QI-02	Jurisdictional	0.436/1.077	West Perimeter Road	
QI-03	Jurisdictional	0.778/1.922	West Perimeter Road	
QI-05	Jurisdictional	0.105/0.259	X-2207 parking	Drainage ditch
QI-06	Jurisdictional	0.093/0.230	X-749A landfill	Drainage ditch
QI-32	Jurisdictional	1.292/3.189	Former GCEP site	Wet field; former GCEP site
QI-33	Jurisdictional	0.012/0.029	West Perimeter Road	
QI-34	Jurisdictional	0.109/0.269	Former GCEP site	Wet field; former GCEP site
QI-35	Jurisdictional	0.151/0.374	Former GCEP site	Wet field; former GCEP site
QI-36	Jurisdictional	0.051/0.125	Former GCEP site	Wet field; former GCEP site
QI-37	Jurisdictional	1.874/4.626	Former GCEP site	Wet field; former GCEP site
QI-38	Jurisdictional	0.103/0.254	Former GCEP site	Wet field; former GCEP site
QI-39	Jurisdictional	0.092/0.228	Former GCEP site	Wet field; former GCEP site
QII-09	Jurisdictional	4.203/10.378	Little Beaver Creek	
QII-11	Jurisdictional	0.182/0.450	X-611A	Previous disturbance
QII-12	Jurisdictional	0.821/2.028	X-701B area	RAD area
QIII-27	Jurisdictional	0.047/0.117	West Perimeter Road	
QIII-29	Jurisdictional	0.015/0.036	West Perimeter Road	
QIII-30	Jurisdictional	0.194/0.480	X-744 N, P, and Q	Previous disturbance
QIII-31	Jurisdictional	0.042/0.103	X-615	RAD area
QIII-46	Jurisdictional	0.032/0.080	X-616	Drainage ditch
QIII-51	Jurisdictional	0.486/1.201	West Perimeter Road	
QIV-13	Jurisdictional	0.949/2.343	X-611A	Old borrow area
QIV-14	Non-jurisdictional	0.005/0.012	X-611B	Sludge lagoon
QIV-15	Non-jurisdictional	0.046/0.114	X-611B	Sludge lagoon
QIV-17	Jurisdictional	0.093/0.229	Fog Road	Natural area; past disturbance
QIV-18	Jurisdictional	0.130/0.322	North access road	Drainage ditch
QIV-19	Jurisdictional	0.181/0.447	North borrow area	Drainage ditch
QIV-20	Jurisdictional	0.158/0.389	North borrow area	Drainage ditch
QIV-21	Jurisdictional	0.066/0.163	X-735 landfill	Borders railroad track
QIV-22	Jurisdictional	0.007/0.018	X-7456 cylinder yard	Drainage ditch
QIV-23	Jurisdictional	0.024/0.006	Ruby Hollow	Natural area; past disturbance
QIV-24	Jurisdictional	0.018/0.044	Ruby Hollow	Natural area
QIV-25	Jurisdictional	0.038/0.094	Ruby Hollow	Natural area; past disturbance
QIV-26	Jurisdictional	0.065/0.160	X-752 Warehouse	Man-made ditch
QIV-40	Jurisdictional	0.145/0.359	X-611B	Man-made ditch
QIV-42	Jurisdictional	0.047/0.115	X-611B	Base of dam
QIV-43	Jurisdictional	0.048/0.119	X-611B	Base of dam
QIV-44	Jurisdictional	0.068/0.167	X-611B	Base of dam
QIV-45	Jurisdictional	0.08/0.201	X-747H landfill	RAD area
QIV-46	Jurisdictional	0.016/0.040	North borrow area	Borrow area
QIV-47	Jurisdictional	0.202/0.499	North borrow area	Drainage ditch
QIV-48	Jurisdictional	0.228/0.564	North borrow area	Drainage ditch
QIV-49	Non-jurisdictional	0.058/0.142	X-611B	Sludge lagoon
QIV-50	Non-jurisdictional	0.013/0.031	X-611B	Sludge lagoon

GCEP = Gas Centrifuge Enrichment Plant.
ha = hectare.
RAD = radioactive.
Source: Wetland Survey Report for the Portsmouth Gaseous Diffusion Plant, 1996b, POEF-LMES-106.



Pro2Serve

Fig. 3.3

Terrestrial and aquatic habitats (including wetlands) located at PORTS.

DOCUMENT ID:	DRAWING ID:	DRAWING DATE:
DOE/EA/1392	Fig3-3b.cdr	May 18, 2001

The habitat types covering the largest area on the reservation are managed grassland (30% of total area), oak-hickory forest (17%), and upland mixed hardwood forest (11%). The areas covered by each habitat type are listed in Table 3.3 and shown in Fig. 3.3. Several species of animals have been observed within the PORTS property boundary. A complete list of these species is presented in Appendix C and is summarized in this section.

Table 3.3. Terrestrial habitat types at PORTS

Habitat type	Approximate total area (ha/acre)	Approximate no. of communities	Percent of total area[a]
Managed grassland	446/110	Numerous[b]	30.0
Old field	170/420	10	11.4
Scrub thicket	32/79	10	2.2
Upland mixed hardwood forest	162/400	20	10.9
Pine forest	28/69	10	1.9
Oak-hickory forest	256/632	14	17.2
Riparian forest	62/153	10	4.2
Beech-maple forest	2/5	1	0.1
Maple forest	52/128	7	3.5
Old white pine plantation with mixed hardwoods	2/5	1	0.1

Source: DOE 1997a (DOE/OR/11/1668&D0).

[a]Total site area is 1486 ha (3714 acres). Approximately 252 ha (629 acres, 16.9%) of the total area are covered by buildings, parking lots, and roads. The remainder of the total site area contains aquatic habitat.

[b]This habitat is present in many areas interspersed between buildings and paved areas across the plant site.

Forty-nine mammals have ranges that include PORTS. Only 27 of those have been observed on the site. The most abundant mammals include white-footed mouse (*Peromyscus leucopus*) and short-tailed shrew (*Blarina brevicauda*). Larger mammals present include white-tailed deer (*Odocoileus virginianus*), eastern cottontail rabbit (*Sylvilagus floridanus*), and opossum (*Didelphis virginiania*) (DOE 1996c).

One hundred and fourteen bird species including year-round residents, winter residents, and migratory species have been observed on-site (DOE 1996c). The species include raptors [red-tailed hawk (*Buteo jamaicensis*)], water birds [mallard (*Anas platyrynchos*) and wood duck (*Aix sponsa*)], game birds [wild turkey (*Meleagris gallopavo*)], and non-game birds [nuthatches (*Sitta* sp.) and wrens (*Troglodytes* sp.)].

Eleven species of reptiles and six species of amphibians have been observed at the facility. The most common reptiles include eastern box turtle (*Terrapene carolina*), black rat snake (*Elaphe obsolete obsoleta*), and northern black racer (*Coluber constrictor*). The most common species of amphibians are American toad (*Bufo americanus*) and northern dusky salamander (*Desmognathus fuscus*) (DOE 1996c).

Common orders of insects found at PORTS include Homoptera (cicadas and aphids), Hymenoptera (bees, wasps, and ants), Diptera (flies), Coleoptera (beetles), and Orthoptera (grasshoppers) (Battelle 1976).

3.6.2 Aquatic Resources

Surface water aquatic resources at PORTS include creeks and drainage ditches. Little Beaver Creek and Big Run Creek provide drainage for a large portion of the facility. All aquatic resources at the facility are shown in Fig. 3.3. Sources of surface water are precipitation runoff, groundwater discharge, and

effluent from plant processes. Most of the aquatic resources include populations of fish (58 species were collected around the facility), invertebrates, and periphyton. The outflow areas also are known to adversely affect the aquatic community of organisms. Some areas of ditches are devoid of aquatic insects and fish while other areas support only the most pollution-tolerant species.

In 1997, the Ohio EPA (Ohio EPA 1998) assessed Little Beaver Creek and found that non-attainment of the Warmwater Habitat (WWH) designation occurred upstream and immediately downstream from the X-230-J7 effluent discharge. Partial attainment was reached 0.97 km (0.6 miles) downstream from the X-230-J7 discharge, and in the lower reaches the stream fully attained WWH status. The lack of stream habitat combined with low water flow was determined to be the principal cause of the non-attainment of WWH status in the upper reaches, and not the effluent. The fish communities ranged from fair to exceptional condition in the Little Beaver Creek and ranged from good to exceptional downstream from the X-230-J7 discharge. The macroinvertebrate communities ranged from poor to exceptional. Poor ratings were assigned in the upstream areas where low flow or pollution stressed the community. Downstream areas of Little Beaver Creek contained exceptional macroinvertebrate communities and included high taxa diversity and a predominance of pollution-sensitive organisms. The most abundant fish taxa were central stonerollers (*Campostoma anomalum*), creek chubs (*Semotilis atromaculatus*), and bluntnose minnows (*Pimephales notatus*).

Big Run Creek is a typical headwater stream for the area. Prior to the relocation of 304.8 m (1000 ft) of the stream channel in 1994, it contained seven species of fish dominated by creek chubs and central stonerollers (Ohio EPA 1993). Macroinvertebrates consisted of chironomids, fly larvae, mayflies, stoneflies, caddisflies, beetles, damselflies, aquatic earthworms, and planaria (ERDA 1977).

The drainage ditches have not been well studied in the past. An unnamed western tributary has three species of fish typically associated with headwaters and contains fly larvae, caddisflies, beetles, and snails (ERDA 1977). Tributaries in the northwestern and southwestern portions of the facility have not had bioassessments performed on them.

3.6.3 Threatened and Endangered Species

The U.S. Fish and Wildlife Service (USFWS) and the Ohio Department of Natural Resources (ODNR), Division of Natural Areas and Preserves, provided information regarding threatened and endangered species at PORTS. Also, a comprehensive evaluation of the site for the presence of federal- and state-listed threatened and endangered species was conducted in 1996 (DOE 1997a). The USFWS has indicated that the Indiana bat (Myotis sodalis) is the only federally listed endangered animal species whose home range includes PORTS. Information from ODNR identified several state-listed threatened, endangered, and special interest species within 1 mile of the facility; however, their database does not show any species within the property boundaries of the facility.

Surveys were conducted for the presence of the Indiana bat in 1994 and 1996. As part of the 1996 survey, potential summer habitat for the Indiana bat was identified in the Northwest Tributary stream corridor, the Little Beaver Creek stream corridor, and along a logging road in a wooded area to the east of the X-100 facility. Mist netting was conducted in those areas in June and again in August. Although 14 bats representing four common species were captured during the August survey, no Indiana bats were collected. The survey also indicated that most of PORTS has poor summer habitat for Indiana bats. The few woodlands that occur on the property are small; isolated, and not of sufficient maturity to provide good habitat. The exception is an area of deciduous sugar maple forest along the Northwest Tributary stream corridor, where several of the bats were collected (DOE 1997a). The Northwest Tributary begins just southwest of the Don Marquis substation and flows approximately 3200 ft before leaving the DOE property prior to its confluence with Little Beaver Creek.

Historically, isolated sightings and observations of threatened, endangered, or special interest species have occurred at the facility. An Ohio endangered raptor, sharp-shinned hawk (*Accipiter striatus*), has been observed at the site in the past (DOE 1993). One Ohio endangered plant species, Carolina yellow-eyed grass (*Xyris difformis*), and a potentially threatened species, Virginia meadow-beauty (*Rhexia virginica*), have been found at the facility (DOE 1993; DOE 1996c). The rough green snake (*Opheodrys aestivus*), listed as an Ohio special interest species, has been observed at PORTS (DOE 1996c).

3.6.4 Environmentally Sensitive Areas

There are several environmentally sensitive areas within PORTS. These include areas where Ohio endangered or threatened species have been observed and wetland areas and the floodplain of Little Beaver Creek. There are no exceptional warm water streams within the facility.

- The Northwest Tributary stream corridor is considered a sensitive area because it represents the best habitat for bats at PORTS.
- The area near the X-611B sludge lagoon should be considered a sensitive area due to the possible presence of Carolina yellow-eyed grass, which was observed at PORTS in 1994 (DOE 1996b). Confirmation of this species is necessary, as the original identification occurred while the plant was not flowering.
- The area near the X-611A lagoon is a sensitive area because of the presence of Virginia meadow-beauty (*Rhexia virginica*) adjacent to the base of the dike. Wetlands also are present in this area.

None of these environmentally sensitive areas would be affected by the proposed action. There are no state or national parks, forests, conservation areas, wild and scenic rivers, or other areas of recreational, ecological, scenic, or aesthetic importance within the immediate vicinity of PORTS. A PORTS site picnic area and two greenways have been licensed to local entities as part of community development and are in the planning stages.

The DOE Seal Township-Ruby Hollow Greenway is located on the northeastern quarter of the PORTS site; this greenway will not be impacted by the installation of the natural gas pipeline or by other project activities.

The DOE Scioto Township-Davis Greenway is located on the southeastern quarter of the PORTS site; the low-pressure 100-psi natural gas pipeline would be located on the western edge of the greenway property within approximately 100 ft of the center of Perimeter Road. Upon completion, the proposed pipeline route would pose no detrimental impact on the use of the property as a greenway.

The recreational park/picnic area is located south and east of the DOE Scioto Township-Davis Greenway, also in the southeastern quarter of the PORTS site. The low-pressure natural gas pipeline will not traverse the site of the recreational park/picnic area and this site will not be impacted by any other project activities.

3.7 CULTURAL RESOURCES

Cultural resources are defined as any prehistoric or historic district, site, building, structure, or object considered important to a culture, subculture, or community for scientific, traditional, religious, or any other reason. When these resources meet any one of the National Register Criteria for Evaluation (NRCE)

(36 *CFR* Part 60.4), they may be termed historic properties and thereby are potentially eligible for inclusion in the National Register of Historic Places (NRHP).

Several draft cultural resource surveys have been prepared for DOE PORTS and will be evaluated in conjunction with the Ohio State Historic Preservation Office (SHPO) to determine properties that are eligible for including in the NRHP.

3.7.1 Archaeological Resources

PORTS is located within a region where Adena and Hopewell Indian mounds have existed. Additionally, several historic Native American Indian tribes are known to have had villages nearby.

Two preliminary Phase I archaeological surveys (Dobson-Brown et al. 1996; Schweikart et al. 1997) have been completed at PORTS. The combined surveys covered 836 ha (2066 acres) in Quadrants I through IV. There are few prehistoric archaeological resources at PORTS. Whether this is indicative of the local prehistoric upland settlement pattern or is a consequence of the extensive land disturbance associated with PORTS is not known. In contrast, historic archaeological resources in PORTS are relatively abundant, conspicuous, and undisturbed due to the nature and development of the facility.

Dobson-Brown et al. (1996) developed a predictive model of archaeological resource locations at PORTS based on variations in modern plant communities, topography, and soils, and on the location of previously identified archaeological resources in a 6.5-km (4-mile) literature review study area radius around the facility.

Survey methods in Quadrants I and II included visual inspection, surface collection, and hand excavation of shallow, <13 cm (<5 in.), shovel test pits. Similar shovel test pits inside the Perimeter Road area did not identify archaeological resources and indicated that this area has been highly disturbed.

Survey methods in Quadrants III and IV consisted of visual inspection, surface collection, hand-excavated shovel tests to 30 cm (12 in.) in depth in high-probability areas lacking significant disturbance and <15% slope. Additionally, hand-excavated deep shovel tests (>30 cm or 12 in.) were accompanied by 2-cm (0.75-in.)-diameter hand-coring in three areas in Quadrant IV along Little Beaver Creek. Portions of Quadrants I and II that were not investigated during the preliminary Phase I archaeological survey were also investigated by shallow shovel tests.

The combined Phase I archaeological surveys identified 38 archaeological resources (Tables D.1, D.2, and D.3) (see Appendix D). Nine of the resources contain prehistoric components. Five are identified as prehistoric isolated finds. Two are identified as prehistoric lithic scatters. Two contain prehistoric and historic components: a prehistoric isolated find in an historic cemetery and a prehistoric lithic scatter and historic farmstead. These sites are located in Quadrants I, II, and IV. No archaeological resources have been identified in Quadrant III. Thirty of the archaeological resources are associated with historic-era properties located within PORTS. Fifteen are remnants of historic farmsteads. Seven are scatters of historic artifacts or open refuse dumps. Two are isolated finds of historic artifacts. Four are remnants of PORTS structures. Two are historic cemeteries. One of the historic cemeteries has an associated chapel and remnant of a PORTS observation tower.

The draft cultural resource report (Schweikart et al. 1977) determined that 22 of the archaeological resources do not meet the NRCE (Table D.1) (see Appendix D). Insufficient data were collected at the remaining 14 archaeological components and two historic-era cemeteries, one of which (33 Pk 189; PIK-206-9) includes an associated historic archaeological component, to determine whether they meet the NRCE (Tables D.2 and D.3) (see Appendix D).

3.7.2 Architectural Historic Resources

Two architectural historic surveys have also been completed at PORTS (Dobson-Brown et al. 1996; Coleman et al. 1997). The combined surveys covered 1501 ha (3708 acres) and identified several structures that may have historical significance at PORTS (Table D.4) (see Appendix D).

A draft historic context for PORTS has also been prepared. This historic context is broken into four development periods for PORTS: Development Period 1 (1900–51), Development Period 2 (1952–56), Development Period 3 (1957–78), and Development Period 4 (1979–85). In the draft architectural survey report (Coleman et. al. 1997), recommendations were made concerning which buildings and structures were considered contributing and noncontributing resources to the PORTS historic property. DOE will evaluate these recommendations in conjunction with the Ohio SHPO to determine which buildings and structures are considered historic properties under the National Historic Preservation Act (NHPA) and whether any of the properties are eligible for inclusion in the NRHP.

3.8 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

The region of influence (ROI) for the PORTS analysis includes Jackson, Pike, Ross, and Scioto Counties, Ohio. The ROI includes the city population centers of Portsmouth, Chillicothe, and Jackson, as well as several rural villages such as Piketon, Wakefield, and Jasper (Fig. 3.4.).

3.8.1 Demographic Characteristics

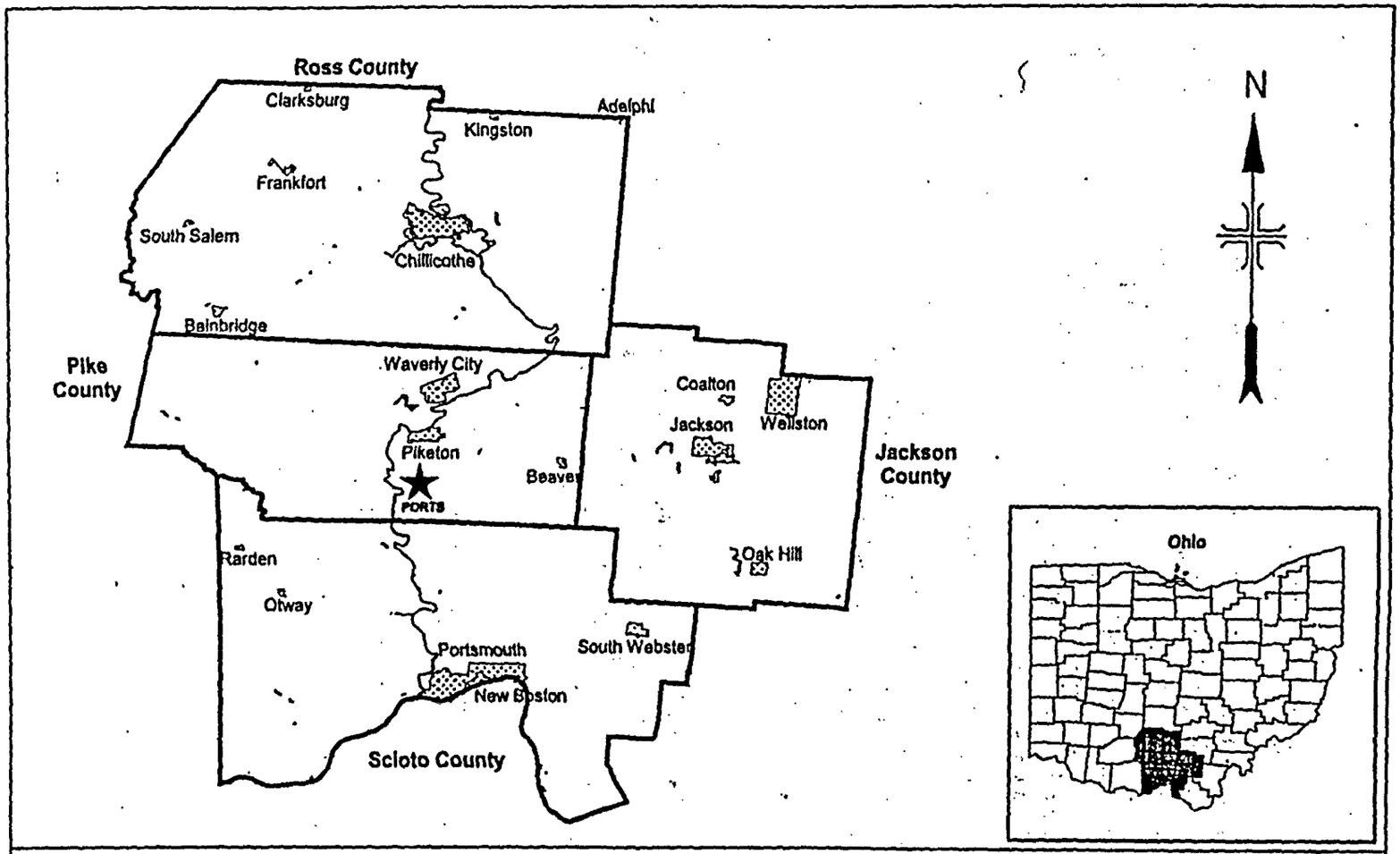
3.8.1.1 Population

Population trends and projections for each of the counties in the ROI are presented in Table 3.4. Of the four counties, Scioto and Ross Counties have the largest populations, accounting for 37% and 35%, respectively, of the region's 1997 population. Jackson County accounts for 15%, and Pike County for the remaining 13%. The Ohio Department of Development (ODOD) projects that the population in the region will grow very slowly, increasing by less than 7% between 1997 and 2010 (ODOD 1999).

Table 3.4. PORTS ROI regional population trends and projections

County	1990	1997	2000	2010
Jackson	30,238	32,455	32,900	35,000
Pike	24,362	27,530	27,140	29,380
Ross	69,455	75,168	74,800	81,700
Scioto	80,385	80,744	82,500	84,700
Region	204,440	215,897	217,340	230,780
State	10,861,801	11,237,752	11,288,760	11,738,930

Sources: Bureau of Economic Analysis, 1999; ODOD, 1999.



LEGEND:
- River, Lake, or Pond
- Municipal Boundary
- County Boundary

0 5 10 15 20 Miles

SOURCE:
Tiger Line Files downloaded from www.esri.com.

Pro2Serve Fig. 3.4	Region of Influence for PORTS.	DOCUMENT ID: DOE/EA/1352	DRAWING ID: Fig3-4a.cdr	DRAWING DATE: May 18, 2001

3.8.1.2 Minority and economically disadvantaged populations

The distribution of minority and economically disadvantaged populations was studied to address environmental justice concerns. Table 3.5 presents the distribution of minority populations by county in the four-county ROI. For the purposes of this analysis, a minority population consists of any area in which minority representation is greater than the national average of 24.2%. Minorities include individuals classified by the U.S. Bureau of the Census as Negro/Black/African-American, Hispanic, Asian and Pacific Islander, American Indian, Eskimo, or Aleut. Since Hispanics may be of any race, nonwhite Hispanics are included only in the Hispanic category, and not under their respective minority racial classifications. In all four counties, minority populations are smaller than the national average, ranging from a high of 8.9% in Ross county to a low of 1.2% in Jackson County (ODOD 1999).

Table 3.5. PORTS ROI distribution of minority populations, 1998

	Jackson		Pike		Ross		Scioto	
Race/ethnic group	Number	Percent	Number	Percent	Number	Percent	Number	Percent
White	32,159	98.8	27,185	97.9	69,246	91.7	77,647	96.6
Black	270	0.8	433	1.6	5,618	7.4	2079	2.6
Asian/Pacific Islander	74	0.2	74	0.3	420	0.6	200	0.2
American Indian	60	0.2	83	0.3	189	0.3	429	0.5
Hispanic (any race)	129	0.4	112	0.4	492	0.7	337	0.4
Total	32,563	100.0	27,775	100.0	75,473	100.0	80,355	100.0

Source: ODOD, 1999.

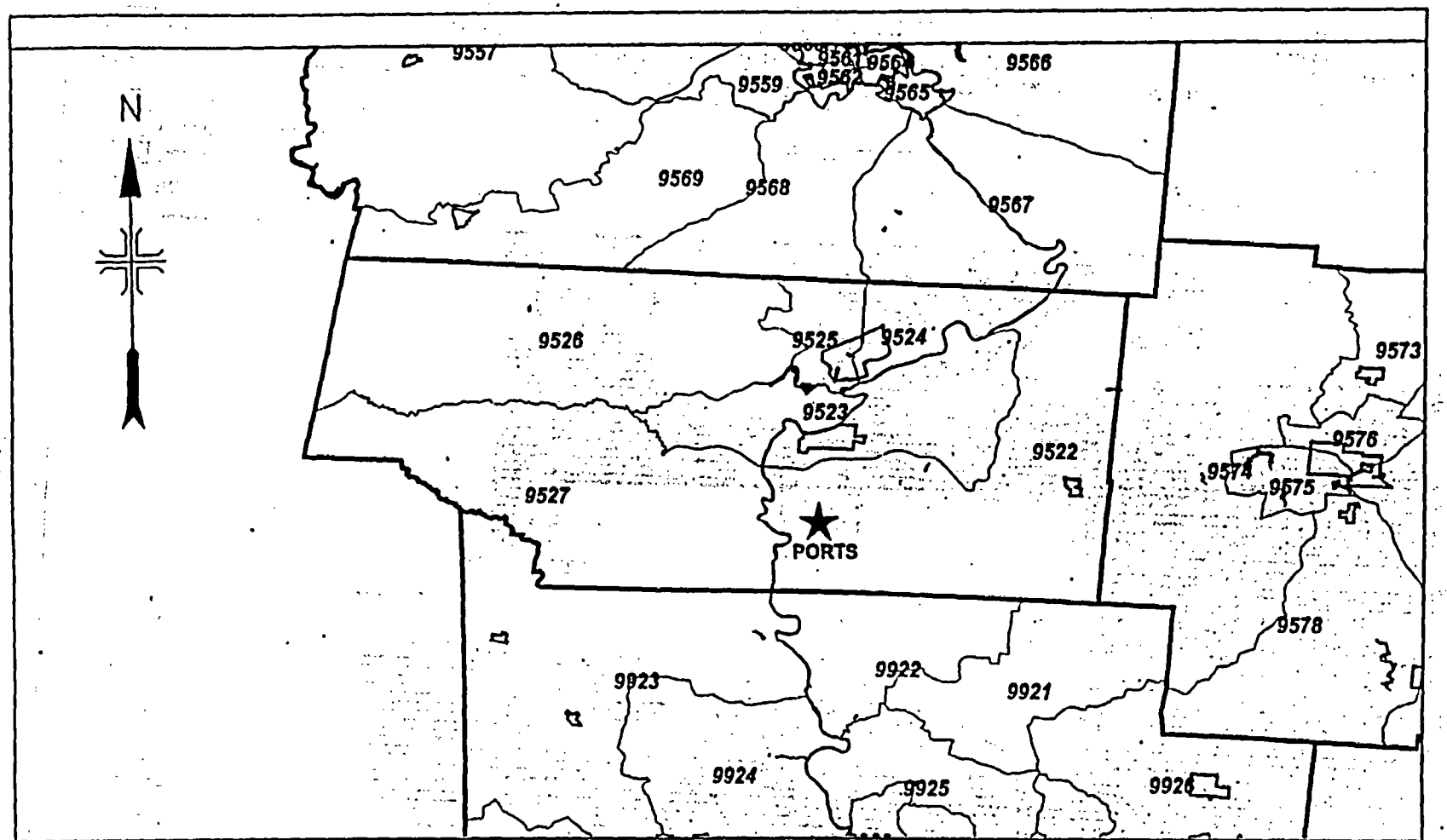
Since any adverse health or environmental effects are likely to fall most heavily on the individuals nearest PORTS, it is also important to examine the populations in the closest census tracts. Figure 3.5 illustrates the distribution of minority populations in the census tracts that immediately surround the PORTS. As of the 1990 Census, none of the tracts closest to the site had minority representation greater than the national average of 24.2% (Bureau of the Census 1990a). In Pike County, tract 9522 contained the largest proportion of minority residents at 4.9%. Only one census tract within the ROI includes a minority population; minorities represent 26.1% of the population in tract 9937 in Scioto County. This tract is near the center of the city of Portsmouth, approximately 37 km (23 miles) south of PORTS.

Table 3.6 presents the proportion of individuals with income below the poverty level, by county, in the four-county ROI. Figure 3.6 shows the location of low-income populations for the same area. In this analysis, a low-income population includes any census tract in which the percentage of persons with income below the poverty level is greater than the national average of 13.1% (Bureau of the Census 1990b). The Ohio average in 1990 was 12.5%. Nearly all (41 out of 48) of the census tracts in the four-county area qualify as low-income populations (Bureau of the Census 2000). The percent of persons below the poverty level ranges as high as 51.0% for tract 9936 in Scioto County. In Pike County, the proportion ranges from 10.8% in tract 9524 to 33.9% in tract 9527.

Table 3.6. Proportion of individuals with income below poverty level: PORTS ROI, 1989 and 1995

Area	Percent	
	1989	1995
Jackson County	24.2	17.5
Pike County	26.6	19.5
Ross County	17.7	15.1
Scioto County	25.8	21.4
State of Ohio	12.5	12.5
United States	13.1	13.1

Source: ODOD, 1999; Bureau of the Census, 1990b.

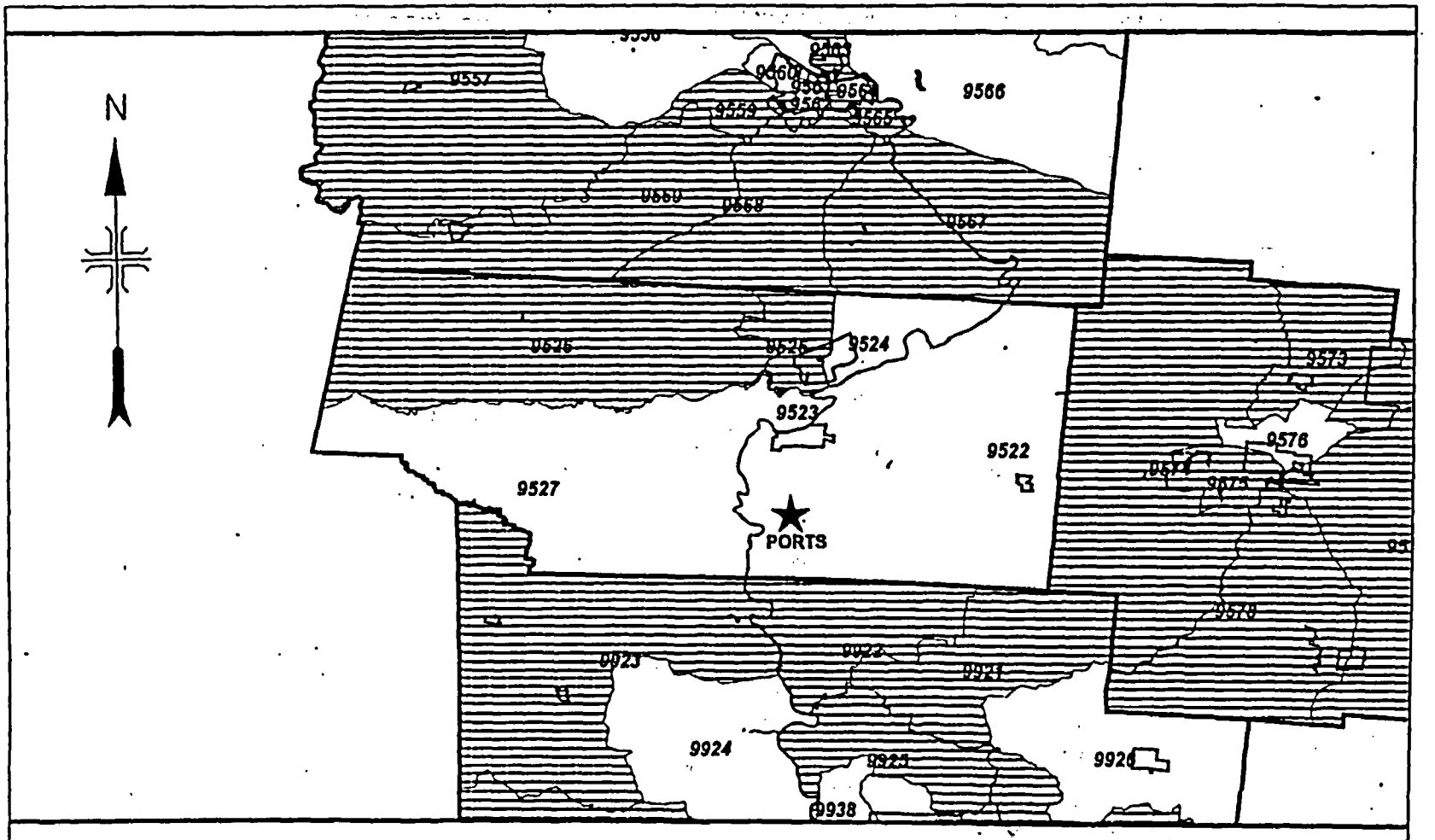


LEGEND:
- County Boundary
- Census Tract Boundary
- Census Tract >24.2 Percent Minority Population

0 5 10 Miles

SOURCE:
Tiger Line Files downloaded from www.esri.com.

Pro2Serve Fig. 3.5	Census tracts with minority population proportions greater than the national average of 24.2%.	DOCUMENT ID: DOE/EA/1392	DRAWING ID: Fig3-5a.cdr	DRAWING DATE: May 18, 2001



LEGEND:
- County Boundary
- Census Tract Boundary
- Census Tract >13.1 Percent Low-Income Population

0 5 10 Miles

SOURCE:
Tiger Line Files downloaded from www.esri.com.

Pro2Serve Fig. 3.6	Census tracts with low-income population proportions greater than the national average of 13.1%.	DOCUMENT ID: DOE/EA/1392	DRAWING ID: Fig3-6c.cdr	DRAWING DATE: May 18, 2001

3.8.2 Employment

Regional employment data for 1992 through 1997 are summarized in Table 3.7. While total employment grew more than 16% during the 5-year period, unemployment rates within the region remained high. As Table 3.8 shows, the 1999 average unemployment rate for the ROI was 7.0%, compared to a statewide average of only 4.3%. Unemployment rates for individual counties ranged from 8.5% in Scioto and Pike counties to 5.1% in Ross County (Bureau of Labor Market Information 2000). Data for previous years show a persistent pattern of high unemployment rates throughout the region.

Table 3.7. PORTS ROI employment, 1992–1997

County	1992	1997	Percent change
Jackson	12,240	14,017	14.52
Pike	10,506	13,930	32.59
Ross	29,428	33,944	15.35
Scioto	28,802	32,218	11.86
Region	80,976	94,109	16.22
Ohio	5,906,639	6,596,769	11.68

Source: Bureau of Economic Analysis, 1999.

Table 3.8. PORTS ROI annual average unemployment, 1999

County	Employed	Unemployed	Total	Unemployment rate (%)
Jackson	13,600	1,000	14,600	6.8
Pike	10,600	1,000	11,600	8.6
Ross	32,900	1,800	34,700	5.2
Scioto	30,100	2,800	32,900	8.5
Total	87,200	6,600	93,800	7.0
Ohio	5,503,000	246,000	5,749,000	4.3

Source: Bureau of Labor Market Information, 2000.

In 1997, 2340 (91%) of the 2550 DOE-related workers lived in the four-county impact region (SODI 1997). These workers represented about 2.6% of the total ROI employment shown in Table 3.7. Table 3.9 shows the distribution of DOE-related employment across the ROI counties for that year. Scioto County held the largest share of the region's DOE-related employment with 51%, followed by Pike County with 23% and Ross County with 15%. Jackson County accounted for the remaining 10%.

Table 3.9. Distribution of DOE-related employment in ROI, 1997

County	1997 Employment	Percent
Jackson	244	10
Pike	544	23
Ross	362	15
Scioto	1190	51
Region	2340	100

Source: SODI, 1997.

Currently the total site employment at PORTS is approximately 2092. USEC employs about 1725 people while DOE, BJC, and various subcontractors employ approximately 367 people.

3.8.3 Income

Between 1992 and 1997, total regional income grew by 27% from approximately $2.9 billion to nearly $3.7 billion (Bureau of Economic Analysis 1999). Per capita income data for the region and the state are shown in Table 3.10. Per capita income in all four counties was well below the state average in both 1992 and 1997, continuing a long established trend. From 1992 to 1997, per capita incomes in the relevant counties grew between 19 and 25%, compared to a statewide increase of 24%. In 1997, it was estimated that PORTS accounted (directly and indirectly) for about $185 million of that income, about 5% of the total. The share of wages and salaries in individual counties ranged from 2.4% in Ross County to 15.2% in Pike County (Henderson 1997).

Table 3.10. Measures of per capita income for the PORTS ROI

Area	Per capita income 1992 ($)	Per capita income 1997 ($)	Percent increase
Jackson County	13,245	16,392	24
Pike County	13,292	15,783	19
Ross County	14,896	17,900	20
Scioto County	13,422	16,824	25
State of Ohio	19,482	24,163	24

Source: Bureau of Economic Analysis, 1999.

3.8.4 Housing

In 1990 vacancy rates in the region ranged between a low of 7% in Ross County to a high of 10% in Jackson County (Bureau of the Census 2000). Among all occupied housing units in the region, approximately 70% were owner occupied. The median home value was similar in all four counties, ranging between $37,000 and $49,600. Rents ranged from $281 to $317 across the ROI (Table 3.11).

Table 3.11. Housing summary for the PORTS ROI, 1990, by county

	Jackson County		Pike County		Ross County		Scioto County	
	Number	%	Number	%	Number	%	Number	%
Total housing units	12,452	100	9,722	100	26,173	100	32,408	100
Occupied	11,260	90	8,805	91	24,325	93	29,786	92
Vacant	1,192	10	917	9	1848	7	2,622	8
Median home value	$38,700	NA	$42,600	NA	$49,600	NA	$37,000	NA
Gross rent	$283	NA	$297	NA	$317	NA	$281	NA

NA = Not applicable.
Sources: U.S. Bureau of the Census, 2000; U.S. Bureau of the Census, 1990a.

3.8.5 Education

Summary figures for the school districts within the four-county ROI are shown in Table 3.12. The highest per-student expenditures occur in Scioto County, which spent an average of $5849 per student during the 1997–1998 school year (ODOD 1999).

Table 3.12. Public school statistics in the PORTS ROI, 1997–1998 school year

County	Number of schools	Student enrollment[a]	Teachers[a]	Teacher/student ratio	Per-student expenditures
Jackson	17	6,020	347	1:17	$5,082
Pike	13	5,861	320	1:18	$5,385
Ross	30	12,444	691	1:18	$5,544
Scioto	37	14,549	923	1:16	$5,849

[a]Full-time equivalent figures, public schools only.
Source: ODOD, 1999.

3.8.6 Health Care

There are three general hospitals currently serving the region. Average statistics for the hospitals indicate that there are approximately 442 routine-care hospital beds in the region, about 53% of which are available on any given day. This capacity is considered adequate to serve the health needs of the local population (The American Hospital Directory 1999).

3.8.7 Police and Fire Protection

The Protective Forces at PORTS provide physical security services at the site. However, the Pike County Sheriff provides limited patrols of Perimeter Road. USEC and DOE both have mutual aid agreements for fire protection, emergency squad, and medical services, primarily with Scioto Township and Seal Township. The Seal Township fire department plans to add a second fire station to better protect the nearby Zahn's Corner Industrial Park.

3.8.8 Fiscal Characteristics

The State of Ohio imposes an income tax, and the state constitution requires that at least 50% of the income tax collected from individuals be returned to the county of origin. Transfers back to the county are distributed as follows: 4.2% to the local government fund, 0.6% to the local government revenue assistance fund, 5.7% to the library and local government support fund, and 89.5% to the general revenue fund of the county. Ohio law allows the imposition of a local sales tax on retail sales, the rental of tangible personal property, and selected services. The local permissive sales tax is 1.5% in Ross County, and 1.0% in each of the other three counties. Intergovernmental transfers back to the county in which the tax is collected are distributed as follows: 4.2% to the local government fund and 0.6% to the local government revenue assistance fund.

There is also an optional tangible personal property tax on machinery, equipment, and inventories. Revenue is distributed to the counties, municipalities, townships, school districts, and special districts according to the taxable values and total millage levied by each. For the state as a whole, school districts receive roughly 70% of the total tangible personal property tax collected (Henderson 1997).

In 1997, Henderson estimated that activities at PORTS and wages paid to its employees accounted for $3.2 million in tax revenues returned to the region, including $2 million from income taxes and $1.2 million from sales taxes (Henderson 1997).

3.9 INFRASTRUCTURE AND SUPPORT SERVICES

3.9.1 Transportation

PORTS is served by Southern Ohio's two major highways: U.S. Route 23 and Ohio State Route 32 (Fig. 1.1). These highways are located within 1.6 km (1 mile) of the site. Access is by the Main Access Road, a four-lane interchange with U.S. Route 23, and the North Access Road, two lanes transitioning to four lanes with an at-grade interchange with Ohio State Route 32. These access routes easily accommodate PORTS traffic flow. The site is 5.6 km (3.5 miles) from the intersection of the U.S. Route 23 and Ohio State Route 32 interchange. Both routes are four lanes with U.S. Route 23 traversing north–south and Ohio State Route 32 traversing east–west. Two other access routes also serve the site. The East Access Road is a two-lane county road that disperses traffic to a county road network east and southeast of PORTS. Access to Ohio State Route 32 is also available by this network. South Access Road is also a two-lane road that disperses traffic to the south and southeast. South Access Road also intersects U.S. Route 23 south of the site. Approximately 113 km (70 miles) north of the site, U.S. Route 23 intersects I-270, I-70, and I-71. Trucks also may access I-64 approximately 32.2 km (20 miles) southeast of Portsmouth.

North Access Road has a daily traffic load of approximately 2383 vehicles. East Access Road has a daily traffic load of 802 vehicles. South Access Road has a daily traffic load of 1579 vehicles. The Main Access Road has a daily traffic load of 592 vehicles. (Traffic in both directions is included in these values.) These roads are congested during shift change; however, traffic flows at posted speed limits and a projected 40% increase in vehicles are feasible without staggering shifts or upgrades to roads. These data were provided by the Pike County Engineer's office from a 1999 traffic study. Load limits on these routes are controlled by the Ohio Revised Code at 85,000-lb gross vehicle weight. Special overload permitting is available.

U.S. Route 23 has an average daily traffic volume of 13,990 vehicles. Ohio State Route 32 has an average daily volume of 7420 vehicles (traffic in both directions is included in these values). U.S. Route 23 is at 60% of design capacity with Ohio State Route 32 at 40% of design capacity. The Ohio Department of Transportation supplied this data from a 1999 traffic study. Load limits on these routes is controlled by the Ohio Revised Code at 85,000-lb gross vehicle weight. Special overload permitting is available.

The PORTS road system is in generally good condition due to frequent road repaving projects. Except during shift changes, traffic levels on the site access roads and Perimeter Road are low. Peak traffic flows occur at shift changes and the principal traffic problem areas during peak morning/afternoon traffic are at locations where parking lot access roads meet the Perimeter Road. The site has 12 parking lots varying in capacity from approximately 50 to 800 vehicles. Total parking capacity is for approximately 4400 vehicles.

PORTS has excellent rail access, and several track configurations are possible within the site. The Norfolk Southern rail line is connected to the CSX main rail system via a rail spur entering the northern portion of the site. The on-site system primarily is used for the movement of large UF_6 cylinders on flatcars. Primary tracks that handle UF_6 cylinder traffic are maintained in good condition by USEC. The secondary tracks within the site receive minimal attention. The GCEP area is also connected to the

existing rail configuration. Track in the vicinity of Piketon, Ohio, allows a maximum speed of 96.6 km/h (60 mph). The CSX system also provides access to other rail carriers.

PORTS can be served by barge transportation via the Ohio River at the ports of Wheelersburg, Portsmouth, and New Boston. The Portsmouth barge terminal bulk materials handling facility is available for bulk materials and heavy unit loads. All heavy unit loading is by mobile crane or barge-mounted crane at an open air terminal. The Ohio River provides barge access to the Gulf of Mexico via the Mississippi River or the Tennessee–Tombigbee Waterway. Travel time to New Orleans is 14 to 16 d; to St. Louis, 7 to 9 d; and to Pittsburgh, 3 to 4 d. The USACE maintains the Ohio River at a minimum channel width of 243.8 m (800 ft) and a depth of 2.74 m (9 ft).

PORTS is relatively isolated from commercial air service. There are 14 major carriers that provide 300 flights per day to 89 cities serving the Greater Cincinnati International Airport, which is 160.9 km (100 miles) to the west. The Port of Columbus International Airport (160.9 km or 100 miles north) is served by 17 airlines providing 250 flights daily. The Tri-State Airport (88.5 km or 55 miles southeast), Huntington, West Virginia, is served by 4 airlines and 18 flights per day. The Portsmouth Regional Airport, serving private and charter aircraft is 30.58 km (19 miles) southeast, near Minford, Ohio. The Pike County Airport, located near Piketon, is a small facility for private planes. The Pike County Aviation Authority has proposed a capital improvement program to improve and enhance airport services.

3.9.2 Utilities

3.9.2.1 Electricity and natural gas

PORTS is supplied electricity by the Ohio Valley Electric Corporation (OVEC) under a long-term contract that runs through 2003. OVEC operates two coal-fired power plants (Kyger Creek and Clifty Falls on the Ohio River) that were built for and dedicated to serving PORTS. According to the DOE-USEC Lease Agreement, DOE continues to administer the power contracts that supply electric service to PORTS. USEC pays DOE for purchased power, which in turn pays the power suppliers who are under an existing contract.

There are four switchyards on the site. The Don Marquis Substation, which covers approximately 10.52 ha (26 acres) on the crest of a hill northwest of Perimeter Road, is a high-voltage station operated and maintained by the OVEC. High-voltage electrical power (345 kV) is received from overhead power lines at the X-533 and X-530 switchyards. High-voltage oil circuit breakers and gas circuit breakers provide line switching capability and fault protection, and large oil-filled transformers step down the power to 13.8 kV. Air circuit breakers at the X-533 and X-530 switch houses provide protection and control for the numerous 13.8-kV distribution feeders leading to the GDP process buildings, auxiliary buildings, and substations. Construction in the GCEP area included additional 345-kV circuit breakers in the northern section of the X-530 switchyard. The newer high-voltage breakers and existing X-530 breakers feed 345 kV to the X-5000 switchyard through oil-filled 345-kV underground feeder cables. The switching arrangement provides a highly reliable source of power for GCEP. At X-5000, oil-filled 345/13.8-kV transformers feed power to the 13.8-kV air circuit breakers in the X-5000 switch house that control and protect the distribution circuits serving the GCEP area facilities.

The various high-voltage overhead power lines connecting Don Marquis, X-530, and X-533 with each other and with the external power grid are owned and maintained by OVEC. The underground high-voltage system of the underground 345-kV feeders from X-530 to X-5000 are owned by DOE and leased to USEC.

Power is distributed from X-533 to X-333 and from X-530 to X-330 through 13.8-kV distribution cables. Some cables run through underground duct banks, and some are supported by aboveground cable trays. The feeder cables from X-530 to X-326 are all located in underground duct banks. Most of the major GDP facilities receive 13.8-kV power through underground duct banks. A 13.8-kV overhead power system supported by wooden poles provides power to the well fields, sanitary landfill, X-611 water treatment plant, several warehouses, and several other facilities. A 2400-V overhead system provides power for street lighting and security fence lighting.

Natural gas is not currently provided at the plant site, and small amounts of fuel oil are used. Several outlying buildings are not supplied by the steam or RHW systems. These buildings are space heated with fuel oil. Natural gas service is available from Pike Natural Gas Company's main gas line near Zahn's Corner, Ohio, approximately 8 km (5 miles) north of the site. The proposed action would install a natural gas service that can be utilized by the PORTS site.

3.9.2.2 Steam distribution system

Steam is used in gaseous diffusion operations to vaporize UF_6, obtain UF_6 samples from cylinders, maintain process temperatures, clean equipment, heat sanitary water, and provide heat for process and support operations. During the fall and winter months, some steam also is used for space heating.

Steam is generated at the X-600 steam plant, which contains three coal-fired boilers and electrostatic precipitators, each capable of providing steam at 56,699 kg/h (125,000 lb/h) at 125 psi. The steam plant contains the normal support equipment for boiler operation such as coal and ash handling equipment and boiler feedwater treatment equipment. Coal is stored in the adjacent X-600A coal pile yard. All runoff from the coal yard and wastewater effluents from the steam plant are treated for pH adjustment and heavy metal removal at the X-621 coal pile runoff treatment facility. Treated effluent flows into the South Holding Pond. Sludge generated at X-621 is buried in the X-735 landfill. The coal supplier hauls coal ash off-site under a contractual agreement.

Steam is distributed to most major GDP facilities through aboveground insulated pipes. Parallel piping is provided to return condensate to X-600. Steam usage within the GCEP area is minimal. Steam and condensate return piping in this area is aboveground with a single 15.24-cm (6-in.) supply line tapped into both the east and west supply headers at X-600. New boilers installed as part of the proposed action would supply heating capabilities to buildings that would otherwise have no heating source subsequent to placing the PORTS facility in cold standby.

3.9.2.3 Water systems

PORTS requires a reliable supply of large amounts of water for process cooling, fire protection, and sanitary use. During plant construction, the X-605G well field and the X-605H booster station were installed to supply water for construction and for subsequent sanitary consumption. From plant startup in 1955 until 1965, water was routinely taken from the Scioto River at the X-608 pumphouse, 6.44 km (4 miles) northwest of the site, and transported through a single 120-cm (48-in.) reinforced concrete pipeline to the site.

Additional well fields were constructed to supply high-quality groundwater as a substitute for the poorer quality river water. However, the capability of pumping river water was retained for emergency use. The X-608A well field entered service in 1965, and the X-608B well field followed in 1975. Both are adjacent to the X-608 pumphouse. Water flows from these well fields to the X-611 water treatment plant on the site through the 120-cm (48-in.) concrete pipeline. Water from the original well field, X-605G, flows through a 25-cm (10-in.) plastic tie line into the 120-cm (48-in.) line.

The X-605 and X-608 well fields contain 19 wells with a total pumping capacity of almost 114 million L/d (30 MGD). However, because of aquifer condition, periodic silting and encrustation of the wells, as well as normal maintenance outages, their combined reliable pumping capacity is between 57 and 66.5 million L/d (15 and 17.5 MGD).

The X-6609 well field, constructed to support the GCEP, is composed of 12 wells with a design capacity of 32.68 million L/d (8.6 MGD). The X-6609 raw water supply is carried to the X-611 water treatment plant through a 75-cm (30-in.) line. Water from X-605 flows to X-611 through a tie line into the 75-cm (30-in.) line from X-6609. At X-611, the water is treated with lime to remove a major portion of its carbonate hardness and a polymer for coagulation of precipitated solids. Following this softening process, treated water flows directly into the basins of the GDP cooling towers to "make-up" for evaporation and blowdown losses from the RCW system. The system, which consists of seven cooling towers, three pumphouses, and supply and return headers paralleling the three process buildings, is used to remove excess heat from the diffusion process.

Within the GCEP area, the principal elements of the Cooling Tower Water System consist of a pumphouse, cooling tower, and distribution piping. The system can remove heat from the closed-loop Machine Cooling Water Systems and from air conditioning condensers in various facilities.

Following the softening process at the X-611 water treatment plant, a portion of the water receives additional treatment for use as sanitary water within the facility. At X-611, the water is chlorinated, the pH is adjusted, and the water is treated with a phosphate compound for corrosion control. Residual suspended solids and bacteria are removed in the X-611C filter house, which contains four sand filters having a combined rated capacity of approximately 15.2 million L/d (4 MGD).

At the X-611C filter house, pumps discharge filtered water into the sanitary water distribution piping system. The X-612 elevated water tank has a 950,000-L (250,000-gal) capacity. X-612 is used to maintain a stable pressure for the system (approximately 85 psi).

The fire protection sprinkler systems for all GDP facilities, except the three process buildings and their respective cooling towers, are fed from the sanitary water system. There are separate piping systems within each building for sanitary purposes and fire protection. Fire hydrants throughout the site feed directly off the sanitary water distribution piping.

The primary supply of sanitary water for the GCEP area is directly from X-611 through a pipeline that parallels Perimeter Road to the X-6644 sanitary and firewater pumphouse. The X-6613 sanitary water storage tank, one of three 7.6-million-L (2-million-gal) concrete tanks, is used for buffer capacity. Booster pumps within X-6644 supply sanitary water to the GCEP area facilities and to the GDP area through several connections with the GCEP piping system.

A separate high-pressure firewater distribution system for the sprinkler systems in the three GDP process buildings and their respective cooling towers was constructed in 1959. The system is fed from the RCW make-up water line leading from X-611 and into the X-640-1 firewater pumphouse. Pumps within X-640-1 are used to maintain an appropriate water level in the X-640-2 elevated storage tank, which has a capacity of 11.14 million L (300,000 gal). The tank has a height of 91.44 m (300 ft), which maintains the system pressure at approximately 125 psi.

The high-pressure firewater system was extended to provide fire hydrant and sprinkler system feed water for the GCEP area. Sanitary water flowing from X-611 to the X-6644 sanitary and firewater pumphouse can be valved to two firewater storage tanks that provide 15.2 million L (4 million gal) of backup capacity. Booster pumps within X-6644 feed water into the firewater distribution piping system

throughout the newer facilities. Cross-connections also exist with the GDP high-pressure firewater piping around X-326. The GDP/GCEP area high-pressure firewater system is considered one system with each site serving as a backup to the other.

3.9.2.4 Wastewater treatment

The PORTS X-6619 STP is located in Quadrant III. The plant was built in 1980 and became operational in 1981. It is comprised of four reinforced concrete buildings (screen building, sludge pumping building, filter building, and chlorine building), totaling approximately 1524 m^2 (5000 ft^2); two circular clarifiers; four aeration tanks; two aerobic digesters; and five sludge drying beds.

The PORTS sanitary sewers feed by gravity into one of six lift stations around the plant site or feed directly to the X-614A Pump Station on X-6614J Sewage Lift Station. The sewage collection system is constructed of vitrified clay tile. The lines from the Lift Stations to the X-614A Pump Station are vitrified clay pipe, and the force main from X-614A to the X-6619 Sewage Treatment Facility is cast-iron pipe. The lift stations and the pump station operate independently.

The X-6619 STP utilizes aerobic digesters, aeration tanks, clarifiers, filters, and an activated sludge process to provide adequate sewage treatment. Following post-chlorination, dechromanation, and effluent monitoring, treated wastewater flows directly to the Scioto River through a pipeline. Dried digested sludge is containerized in 209-L (55-gal) drums and is stored as low-level waste on-site pending subsequent disposal at Envirocare in Utah.

3.9.2.5 Holding ponds and lagoons

Holding ponds and lagoons are used to control plant process effluent and storm water runoff. The ponds and lagoons also promote chlorine dissipation and settling of sediment mobilized by storm water runoff. Many also serve as spill retention basins to prevent off-site migration of spills or accidental discharges until treatment or recovery can be accomplished. Several ponds were designed specifically to treat process effluent. For example, the X-611B Sludge Lagoon is used for deposition of lime sludge generated from the drinking water purification process. Table 3.13 summarizes all the holding ponds on-site, their respective uses, and the surface water bodies into which they drain.

Table 3.13. PORTS holding ponds

Pond	Location (quadrant)	Purpose/use	Discharges to
X-230J5	West (III)	Control storm water runoff/sedimentation	Scioto River
X-230J6	Northeast (IV)	Control storm water runoff/sedimentation	Little Beaver Creek
X-230J7	Northeast (II)	Control storm water runoff/sedimentation	Little Beaver Creek
X-230K	Southeast (I)	Control storm water runoff/coal pile steam plant discharge	Big Run Creek
X-230L	North (IV)	Spill retention/control storm runoff/sedimentation	Little Beaver Creek
X-611A[a]	Northeast (IV)	Lime sludge lagoons (3), water treatment effluent	Little Beaver Creek
X-611B	Northeast (IV)	Lime sludge lagoon, water treatment effluent	Little Beaver Creek
X-701B[a]	Northeast (II)	Treatment of effluent	East Drainage Ditch
X-2230M	Southwest (I)	Control storm water runoff/sedimentation from GCEP	Scioto River
X-2230N	West (III)	Control sedimentation from GCEP construction	Scioto River

Source: DOE 1999b.
[a]Converted to a prairie habitat.
GCEP = Gas Centrifuge Enrichment Plant.

3.9.2.6 Telecommunications

PORTS currently has two Fujitsu-Omni 53 telephone switches with 2300 existing line connections. The site feed lines are copper cables capable of handling analog and digital signals through the Piketon, Ohio, exchange. Long distance service is through the Federal Telephone System. Commercial phone service is available. The site distribution system contains both copper and fiber-optic units.

3.10 NOISE

Noise at PORTS is intermittent and intensity levels vary. Noise levels associated with construction and processing activities and local traffic are comparable to those of any other industrial site. No sensitive receptor sites, such as picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, or hotels, are in the immediate vicinity of PORTS.

3.11 EXISTING RADIOLOGICAL AND CHEMICAL EXPOSURES

3.11.1 Public Radiation Dose

Potential impacts on human health from PORTS operations were calculated based on environmental monitoring and surveillance data. The effect of radionuclides released to the atmosphere was characterized by calculating effective dose equivalents (EDEs) to the maximally exposed person (a hypothetical individual who is assumed to reside at the most exposed point on the plant boundary) and to the entire population (approximately 918,000 residents) within 80.47 km (50 miles) of the plant. The maximum potential EDE to an off-site individual from DOE air emission sources at PORTS in 1999 was 0.00048 millirem (mrem)/year. USEC calculated the maximum potential dose to an off-site individual in 1999 to be 0.28 mrem/year. The combined dose from USEC and DOE sources is well below the 10 mrem/year NESHAP limit applicable to PORTS and the 300 mrem/year (approximate) dose that the average individual in the United States receives from natural sources of radiation. The collective EDE to the entire population within 80.5 km (50 miles) of PORTS in 1999 was 1.0 person-rem, based on USEC calculations of 1.0 person-rem/year from USEC sources and 0.00077 person-rem/year from DOE sources. The collective EDE to the nearest community, Piketon, was calculated to be 0.15 person-rem/year, based on USEC calculations of 0.15 person-rem/year from USEC sources and 0.00014 person-rem/year from DOE sources (DOE 2000c).

Based on a person driving past the PORTS depleted uranium cylinder storage yards to and from work for a year, the maximum estimated potential exposure to a member of the public from radiation from the cylinder yards is less than 0.55 mrem/year. The average yearly dose to a person in the United States from natural and man-made radiation sources is approximately 366 mrem. The potential estimated dose from the cylinder yards to a member of the public is less than 0.2% of the average yearly radiation exposure for a person in the United States.

3.11.2 Occupational Radiation Dose

The Radiation Exposure Information Reporting System report is an electronic file created annually to comply with DOE Order 5484.1. This report contains exposure results for all monitored individuals at PORTS, including visitors, with a positive exposure during the previous calendar year. The 2000 Radiation Exposure Information Reporting System report indicated that there were no visitors with a positive exposure. The average total effective dose in 2000 for all PORTS employees and subcontractors was 0.36 mrem (DOE 2000c).

3.11.3 Public Chemical Exposures

Direct exposure to chemicals from PORTS does not represent a likely pathway of exposure for the public. For airborne releases, concentrations off-site are too small to present problems through dermal exposure or inhalation pathways. Water discharge outfalls are located within areas of the site that are not readily accessible to the general public. Public exposure to water from the outfalls on a daily basis is highly unlikely, and ingestion of water directly from the outfalls is even less likely.

3.11.4 Occupational Chemical Exposure

Historically, PORTS operations involved the use of a variety of chemicals and toxic metal hazardous materials to which workers (potentially) have been exposed. These included solvents (e.g., TCE, carbon tetrachloride, methylene chloride, and benzene), toxic materials (e.g., arsenic, mercury, lithium, chromium, nickel, and beryllium), toxic gases [e.g., fluorine, hydrogen fluoride (HF), welding fumes, hydrogen cyanide, chlorine, chlorine trifluoride and its byproducts, and ammonia], acids (e.g., nitric acid and hydrochloric acid), and biocides and fungicides. Many of these materials have been greatly reduced or eliminated from routine operations, but workers involved in environmental restoration and waste management activities continue to face potential exposures.

The Hazardous Chemical Inventory Report, which includes the identity, location, storage information, and hazards of the chemicals that exceeded threshold planning quantities, is submitted annually to state and local authorities. Twenty-one materials stored by DOE-PORTS exceeded the threshold planning quantities in 2000: aluminum oxide, diesel fuel, ethylene glycol, lithium hydroxide, PCBs, sodium fluoride, sulfuric acid, triuranium octaoxide, UF_6, uranium tetrafluoride, uranium (ingots and fuel rods), uranium trioxide, uranium dioxide, asbestos, argon, gasoline, lube oil, TCA, sodium chloride, methanol, and oxygen.

3.11.5 Occupational Health Services

Occupational health services for DOE and DOE's site management contractor employees have been arranged through a subcontract with the Southern Ohio Medical Center (SOMC), Portsmouth, Ohio. SOMC is a full-service community medical center, and its occupational health clinic offers comprehensive occupational health services, including chemical exposure screening. The SOMC occupational medical staff has some familiarity with PORTS operations from past contracts with the USEC Medical Department.

DOE's site management contractor and subcontractors are responsible for procuring their own medical services from SOMC. Some subcontractors have opted to retain the on-site medical services of the USEC Medical Department. DOE's site management contractor has mandated that the PORTS subcontractors adhere to the medical requirements in DOE Order 440.1A, Chapter 19, "Occupational Medicine," as listed in Exhibit G of their subcontracts.

3.12 ACCIDENTS

Potential accidents at PORTS are primarily associated with the approximately 13,900 DOE-managed cylinders containing depleted UF_6. The cylinders are stored in the X-745-C (C-yard) and X-745-E (E-yard) located in the northern part of PORTS just inside Perimeter Road.

The chemical and physical characteristics of depleted UF_6 pose potential health risks, and the material is handled accordingly. Uranium and its decay products in depleted UF_6 in storage emit low levels of alpha, beta, gamma, and neutron radiation. The radiation levels measured on the outside surface of filled depleted UF_6 cylinders are typically about 2 to 3 mrem/h, decreasing to about 1 mrem/h at a distance of 0.3 m (1 ft). If depleted UF_6 is released to the atmosphere, it reacts with water vapor in the air to form HF and a uranium oxyfluoride compound called uranyl fluoride. These products are chemically toxic. Uranium is a heavy metal that, in addition to being radioactive, can have toxic chemical effects (primarily on the kidneys) if it enters the bloodstream by means of ingestion or inhalation. HF is an extremely corrosive gas that can damage the lungs and cause death if inhaled at high enough concentrations.

Cylinders are stored with minimum risks to workers, members of the general public, and the environment at PORTS. DOE maintains an active cylinder management program to improve storage conditions in the cylinder yards, to monitor cylinder integrity by conducting routine inspections for breaches, and to perform cylinder maintenance and repairs to cylinders and the storage yards, as needed.

Potential accidents related to the PORTS cylinder yards have been analyzed in the Safety Analysis Report (SAR) for PORTS (LMES 1997). The SAR identified major hazards associated with confinement failures that could result in the release of UF_6—a release of solid or gaseous UF_6 to the atmosphere from cylinder failure and a cylinder yard fire. In the first case, a large spill of solid material was considered to bound all of the smaller releases that could occur. The conclusions of the SAR were that cylinder failure does not pose a severe health risk beyond approximately 200 m (656 ft). Because of the slow release rate, workers in the immediate area of the release could easily evacuate the area without being significantly exposed. On-site personnel are trained to flee areas where releases are detected by sight and/or odor (i.e., odor of HF at extremely low concentration levels is easily detectable). Beyond the 200 m (656 ft) and for the off-site public, both uranium intake and the HF exposure were estimated to be below the guideline threshold values of 10 mg uranium intake and 2.3 mg/m^3 HF exposure with no mitigation.

In the case of the cylinder yard fire, the event was not expected to occur during the life of the facility but was postulated as a worst-case scenario. The conclusions for the cylinder yard fire showed that the threshold values designed to protect public health of 30 mg uranium intake and 23.2 mg/m^3 HF exposure could be exceeded on-site out to about 275 m (900 ft) for the initial release if no mitigative actions were taken. Off-site boundaries are greater than 300 m (984 ft) from the cylinder yards. This scenario is estimated to have an extremely unlikely frequency. Primary controls to minimize the likelihood of a cylinder yard fire include preventative measures (e.g., inspection of cylinders before welding and the Fire Protection Program and its established controls). Although a cylinder yard fire case exceeds the guidelines for distances on-site, the combination of stringent controls to prevent a fire and a well-prepared emergency response plan limit the associated risk.

The disposition of the cylinders at PORTS has been addressed by DOE in the *Final Programmatic Environmental Impact Statement for Alternative Strategies for the Long-Term Management and Use of Depleted Uranium Hexafluoride* (DOE/EIS-0269). The decision to construct and operate a cylinder conversion facility at PORTS will affect the probabilities and impacts of potential accidents.

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4. ENVIRONMENTAL CONSEQUENCES

This section describes the environmental consequences associated with the proposed action and alternatives. Potential environmental impacts were analyzed for each of the primary media pathways (e.g., air, geology and soils, water resources, ecological resources). There would be no environmental impacts associated with installation of electric heaters inside the existing process buildings.

4.1 AIR QUALITY

4.1.1 X-600 Coal Fired Steam Plant

Expected air emissions would increase because additional steam generation capacity would be required. No evaluation of additional emissions estimates was performed for this alternative. It is anticipated that small increases in particulates, sulfur dioxide, and nitrous oxides would result (Tetra Tech 2000).

4.1.2 Electric Hot Water Boilers

No additional air emissions would result from the installation of electric hot water boilers.

4.1.3 New Hot Water Boiler System Supplied with Fuel Oil with the Potential for Conversion to Natural Gas and Electric Space Heaters and Vent Sealing in Process Buildings (Proposed Action)

The proposed action would require an additional air permit-to-install. The permit-to-install was submitted to the Ohio EPA for #2 fuel oil/natural gas fired boilers. Two boiler systems were evaluated which are designed to operate both on natural gas and #2 fuel oil. The boilers would operate on fuel oil initially, with conversion to natural gas by early Fiscal Year (FY) 2002. The boilers would have a flanged flue exhaust vent at the top front of the boiler. The boilers would have individual connections for exhaust stacks suitable for the boilers to which they would be attached. The stacks would project approximately 100 ft above the boilers. No ongoing stack emissions monitoring would be required. No radiological or hazardous chemical emissions would occur, and emissions would be in compliance with all applicable Federal, state, and local regulations. Since PORTS is designated as an attainment area for all of the ambient air quality standards, the Clean Air Act general conformity rules do not apply.

Emission estimates for the two boiler systems evaluated were at or below emission limits listed in the Air Permit Application that was submitted to the Ohio EPA. Boiler System 2 is the preferred boiler system for the proposed action. The proposed action would require only one new air emissions source for the new stacks associated with the oil/gas fired boilers. Potential emissions would not be expected to exceed current emissions from ongoing operations, result in a noncompliance of air quality standards, have an adverse impact on air quality, or be detrimental to human health. Potential air emissions information is summarized in Table 4.1 (Tetra Tech 2000).

Table 4.1. Potential air emissions for boilers fired with #2 fuel oil and natural gas

Types of Emissions	Boiler System 1		Boiler System 2		Emission Limits in Air Permit Application	
	Natural Gas (lb/10^6 Btu)	#2 Oil (lb/10^6 Btu)	Natural Gas (lb/10^6 Btu)	#2 Oil (lb/10^6 Btu)	Natural Gas (lb/10^6 Btu)	#2 Oil (lb/10^6 Btu)
Stack CO emissions	0.075	0.040	0.07	0.04	N/A*	0.04
Stack Particulate emissions	0.020	0.014	0.001	0.005	N/A	0.014
Stack NOx emissions	0.036	0.125	0.035	0.20	N/A	0.20
Stack Hydrocarbon emissions	0.005	0.005	0.004	0.01	N/A	0.01

*Permit currently only includes provisions for use of #2 fuel oil as fuel. Permit will be modified to include use of natural gas as fuel at a later date when natural gas becomes available.

Construction of the pipeline could cause a temporary reduction in local ambient air quality as a result of fugitive dust and emissions generated by construction equipment. The extent of dust generation would depend on the level of construction activity and on soil composition and dryness. If proper dust suppression techniques were not employed, dry and windy weather could create a nuisance for nearby residents. The emissions from construction vehicles and equipment should have little impact on the air quality of the region; however, under certain weather conditions, there might be high concentration of pollutants in the vicinity of the pipeline construction area.

4.1.4 No Action

No additional air emissions would result from the no-action alternative. Airborne emissions from ongoing uranium enrichment operations are scheduled to continue until June 2001. Some ongoing air emissions would continue from USEC transfer and shipping operations, and emissions from placing the GDP in cold standby should decrease, but may continue if DOE elects to perform cell treatments to remove deposits. Under the no-action alternative, environmental restoration and D&D activities also would continue. Air quality effects from ongoing operations and remedial actions are relatively small, and the radiological dose via the air pathway is well below applicable limits. Current emissions are discussed in Sect. 3.2.2.

4.2 GEOLOGY AND SOILS

4.2.1 X-600 Coal Fired Steam Plant

Minor excavation would be required in previously disturbed areas in order to resize pipelines and accomplish necessary reconfigurations. Impacts to geology and soils would be negligible.

4.2.2 Electric Hot Water Boilers

No excavation or disturbance of soils would be required; therefore, there would be no impact to geology and soils.

4.2.3 New Hot Water Boiler System Supplied with Fuel Oil with the Potential for Conversion to Natural Gas and Electric Space Heaters and Vent Sealing in Process Buildings (Proposed Action)

Minimal site grading and contouring may be required in the area of Building X-3002 for the installation of the #2 fuel oil tanks and access road. In addition, installation of the natural gas line would require excavation of an approximate 18-in wide trench up to 4-ft deep; however, the geologic formations underlying these areas would not be affected by the proposed action.

The Soil Survey of Pike County, Ohio, indicates that soil types that occur within the proposed pipeline route and PORTS property boundary are considered prime farmland. The Farmland Protection Policy Act requires federal agencies to consider the effects of any activity that would convert farmland. Although the proposed action would require installation of a natural gas line in some areas that are currently cultivated, the depth of the pipeline installation would not interfere with further agricultural activities. The excavated surfaces will be returned to their original condition subsequent to pipeline installation.

4.2.4 No Action

Under the no-action alternative, the PORTS site could expect major impacts to soils and subsurface geology. The freezing of fire protection water supply lines and the discharge of this water to soils, surface water, and groundwater could result in contamination, currently controlled within site structures, being released to the environment. Although monitoring and appropriate environmental restoration measures would be continued and appropriate mitigation measures would remain in place, releases could occur. Fire Protection Systems could be disabled to prevent flooding of the facilities; however, fire code violations would occur as a result of this action. Impacts to soils and subsurface geology could also occur as the result of a spill or leak from ongoing operations.

4.3 WATER RESOURCES

4.3.1 Reasonable Alternatives Evaluated

For the three reasonable alternatives evaluated, uncontrolled soil erosion would increase sedimentation and turbidity in the receiving surface waters. Spills of fuel, hazardous material, waste, or a sewer line leak could have adverse impacts on surface waters if not controlled or contained. Impacts would primarily be a change to the water quality (pH, dissolved oxygen, conductivity, etc.) which could affect vegetation and aquatic biota. Soil erosion impacts would be mitigated through the use of best management practices (BMPs) (i.e., silt fences, straw bales, and temporary sediment detention basins).

The potential for spills would be mitigated through the adherence to proper safety procedures and spill prevention plans. In the event of a spill from an accident, spill response measures (e.g., booms, berms, sorbents, neutralizers, secondary containment, and mechanical removal equipment) would minimize potential adverse impacts.

Coordination with DOE and their site management contractor's Environment, Safety, and Health organization also would be required prior to any earth-disturbing activities, changes in discharges to the storm drain system, outdoor application of herbicides and pesticides, or facility modifications.

Impacts to groundwater quality could also occur as a result of a fuel, waste spill, or a sewer line leak and subsequent migration of contaminants through the soil profile to the groundwater table. A spill directly into the surface water bodies in the vicinity also could affect the groundwater quality because of the connection between surface water and groundwater resources. The use of safety procedures, spill prevention plans, and spill response plans in accordance with state and federal laws would minimize the severity of potential impacts from accidents.

4.3.1.1 X-600 Coal Fired Steam Plant

The greatest potential impact to surface waters would originate from soil erosion, runoff, and sedimentation during modification of the steam plant heat exchangers and RHW lines. In addition, a fuel, hazardous material, waste spill, or a sewer line leak could occur during modification or operation of the steam plant.

4.3.1.2 Electric Hot Water Boilers

The greatest potential impact to surface waters would originate from soil erosion, runoff, and sedimentation during modification of the heat exchangers and RHW lines. In addition, a fuel, hazardous material, waste spill, or a sewer line leak could occur during installation or operation of electric hot water boilers.

4.3.1.3 New Hot Water Boiler System Supplied with Fuel Oil with the Potential for Conversion to Natural Gas and Electric Space Heaters and Vent Sealing in Process Buildings (Proposed Action)

The greatest potential impact to surface waters would originate from soil erosion, runoff, and sedimentation (during building modification and pipeline installation). In addition, a fuel, hazardous material, waste spill, or a sewer line leak could occur during building modification, pipeline installation, or operation of the proposed hot water boiler system.

4.3.2 No Action

Under the no-action alternative, the PORTS site could expect impacts to surface water and groundwater. The freezing of fire protection water supply lines and the discharge of this water to soils, surface water, and groundwater could result in contamination, currently controlled within these structures, being released to the environment. Although monitoring and appropriate environmental restoration measures would be continued and appropriate mitigation measures would remain in place, releases could occur. Impacts to surface water or groundwater could also occur as the result of a spill or leak from ongoing operations. Surface and groundwater protection measures, such as spill prevention and spill response plans, are already in place at PORTS for ongoing operations.

4.4 FLOODPLAINS AND WETLANDS

4.4.1 X-600 Coal Fired Steam Plant

Modifications of the X-600 Coal Fired Steam Plant, RHW lines, and heat exchanges would result in no direct impacts to floodplains or wetlands; however, potential accidental releases associated with these activities could result in contamination of wetlands, area streams, and floodplains.

4.4.2 Electric Hot Water Boilers

Installation of electric hot water boilers, heat exchangers, and modification of RHW lines would result in no direct impacts to floodplains or wetlands; however, potential accidental releases associated with these activities could result in contamination of wetlands, area streams, and floodplains.

4.4.3 New Hot Water Boiler System Supplied with Fuel Oil with the Potential for Conversion to Natural Gas and Electric Space Heaters and Vent Sealing in Process Buildings (Proposed Action)

The 6-in steel natural gas pipeline would be installed by digging a trench approximately 3-4 ft deep x 18-in wide and placing the pipe within the trench. The trench would be backfilled, reseeded, and strawed. Directional boring would also be used to go under any blue-line streams and delineated wetlands or other sensitive areas encountered along the route. There would be no disturbance of sediment or sensitive habitats. Soils resulting from the bores would be redistributed on the ground surface at the bore sites but not directly in sensitive areas. The construction contractor would coordinate boring activities with the USACE. Floodplains would not be impacted by the installation; however, potential accidental releases associated with these activities could result in contamination of wetlands, area streams, and floodplains.

No other impacts to floodplains or wetlands are expected as a result of the proposed action.

4.4.4 No Action

Under the no-action alternative, the PORTS site could expect major impacts to surface water and groundwater. Consequently, impacts to floodplains and wetlands could result from transport of contaminants through surface water and groundwater to these sensitive areas. The freezing of fire protection water supply lines and the discharge of this water to soils, surface water, and groundwater could result in contamination, currently controlled within these structures, being released to the environment. Although monitoring and appropriate environmental restoration measures would be continued and appropriate mitigation measures would remain in place, releases could occur.

4.5 ECOLOGICAL RESOURCES

4.5.1 X-600 Coal Fired Steam Plant

Activities associated with modification of the X-600 Coal Fired Steam Plant would have no direct impact on terrestrial habitats, plants, and animals present within PORTS. Since there are no construction activities associated with this alternative that are outside disturbed areas, no adverse impacts to terrestrial and aquatic ecosystems would be expected. If impacts to ecological resources at PORTS are encountered, they would be addressed by avoiding the resource, minimizing the impact, or mitigating the impact if avoidance or minimization is not possible.

No direct or indirect impacts would occur to any threatened and endangered species from completion of this alternative. No federally listed threatened and endangered plants or animals are known to exist within the boundary of PORTS. Carolina yellow-eyed grass (state-listed endangered) and Virginia meadow-beauty (state-listed potentially threatened) occur within Quadrant IV but these areas would not be affected by this alternative. The USFWS has indicated that the Indiana bat is the only federally listed endangered animal species whose home range includes PORTS, although no Indiana bats have ever been captured or observed at the site. The USFWS has recommended that if potential roost trees with exfoliating bark are encountered in any area proposed for development, they and surrounding trees should be saved wherever possible. If such trees are within the area and they require removal, they should not be cut between April 15 and September 15. If potential maternity roost trees are present, and if the above time restriction is unacceptable, mist net or other surveys should be conducted to determine if Indiana bats are present. If needed, the surveys should be conducted in June or July to coincide with the peak summer bat population. If direct impacts to potential Indiana bat habitat could not be avoided, DOE would implement the USFWS recommendations.

4.5.2 Electric Hot Water Boilers

Activities associated with installation of electric hot water boilers would have no direct impact on terrestrial habitats, plants, and animals present within PORTS. Since there are no construction activities associated with this alternative that are outside disturbed areas, no adverse impacts to terrestrial and aquatic ecosystems would be expected. If impacts to ecological resources at PORTS are encountered, they would be addressed by avoiding the resource, minimizing the impact, or mitigating the impact if avoidance or minimization is not possible.

No direct or indirect impacts would occur to any threatened and endangered species from completion of the proposed action. No federally listed threatened and endangered plants or animals are known to exist within the boundary of PORTS. Carolina yellow-eyed grass (state-listed endangered) and Virginia meadow-beauty (state-listed potentially threatened) occur within Quadrant IV but these areas would not be affected by this alternative. The USFWS has indicated that the Indiana bat is the only federally listed endangered animal species whose home range includes PORTS, although no Indiana bats have ever been captured or observed at the site. The USFWS has recommended that if potential roost trees with exfoliating bark are encountered in any area proposed for development, they and surrounding trees should be saved wherever possible. If such trees are within the area and they require removal, they should not be cut between April 15 and September 15. If potential maternity roost trees are present, and if the above time restriction is unacceptable, mist net or other surveys should be conducted to determine if Indiana bats are present. If needed, the surveys should be conducted in June or July to coincide with the peak summer bat population. If direct impacts to potential Indiana bat habitat could not be avoided, DOE would implement the USFWS recommendations.

4.5.3 New Hot Water Boiler System Supplied with Fuel Oil with the Potential for Conversion to Natural Gas and Electric Space Heaters and Vent Sealing in Process Buildings (Proposed Action)

Activities associated with modification of Building X-3002 would have no direct impact on terrestrial habitats, plants, and animals present within PORTS. Installation of the natural gas pipeline could have potential adverse impacts to aquatic resources, terrestrial habitats, plants, and animals within the affected area. Mitigation measures under this proposed action would minimize impacts. This would be accomplished by avoiding sensitive habitats, relocation of the pipeline, as necessary, and restricting installation to existing right-of-ways (ROWs) to the greatest extent possible.

Potential adverse impacts to terrestrial and aquatic ecosystems would be minor and the systems would recover through natural processes. Local terrestrial and aquatic fauna would temporarily relocate to adjacent areas and would repopulate these areas upon completion of construction activities. No permanent damage to these ecosystems would be expected.

Impacts to ecological resources at PORTS would be addressed by avoiding the resource, minimizing the impact, or mitigating the impact if avoidance or minimization is not possible. Impacts from installation of the pipeline would be considered short term and minimal.

No direct or indirect impacts would occur to any threatened and endangered species from completion of the proposed action. No federally listed threatened and endangered plants or animals are known to exist within the boundary of PORTS. Carolina yellow-eyed grass (state-listed endangered) and Virginia meadow-beauty (state-listed potentially threatened) occur within Quadrant IV but these areas would not be affected by the proposed action. The USFWS has indicated that the Indiana bat is the only federally listed endangered animal species whose home range includes PORTS, although no Indiana bats have ever been captured or observed at the site. The USFWS has recommended that if potential roost trees with exfoliating bark are encountered in any area proposed for development, they and surrounding trees should be saved wherever possible. If such trees are within the area and they require removal, they should not be cut between April 15 and September 15. If potential maternity roost trees are present, and if the above time restriction is unacceptable, mist net or other surveys should be conducted to determine if Indiana bats are present. If needed, the surveys should be conducted in June or July to coincide with the peak summer bat population. If direct impacts to potential Indiana bat habitat could not be avoided, DOE would implement the USFWS recommendations.

The proposed action for installation of the natural gas pipeline would lie within the range of the habitat for the timber rattlesnake, a large shy rattlesnake that is declining throughout its national range. No Federal listing status has been assigned to this species; however, the USFWS has initiated a pre-listing Conservation Action Plan to support state and local conservation efforts. Proactive efforts to conserve this species of rattlesnake would be taken to avoid potential impacts to the timber rattlesnake and their habitat including protection of rattlesnake winter dens which is critical to the survival of this species. Although the distribution of the timber rattler species includes the facility location, there have been no sightings at the site. Procurement documents for natural gas pipeline installation would contain provisions for the protection of sensitive wildlife populations if encountered including Indiana bats and timber rattlesnakes.

4.5.4 No Action

Environmental restoration activities under the no-action alternative could potentially impact ecological resources at PORTS, but the areas where these activities would most likely take place have been previously disturbed and contain marginal habitat and limited biota. Environmental restoration activities are evaluated under the RCRA corrective action process. If remedial actions were determined to impact ecological resources, the potential impacts and any mitigation measures would also be considered as part of the RCRA corrective action process. The potential also exists for a spill or leak from normal ongoing operations and traffic at the site. Impacts to biota could include direct mortality, injury, and degradation of the impacted habitat. Because of the limited habitat and biota at the site, these impacts would probably be minor to moderate and the resource would be expected to recover within a few months to a year depending on the severity of the spill or leak. Spills and releases to soils, surface water, and groundwater would be expected as a result of the no-action alternative. These potential spills and releases could impact the limited biota at the site.

4.6 CULTURAL RESOURCES

4.6.1 X-600 Coal Fired Steam Plant

The impact of this alternative would be similar to those expected from the proposed action.

4.6.2 Electric Hot Water Boilers

The impact of this alternative would be similar to those expected from the proposed action.

4.6.3 New Hot Water Boiler System Supplied with Fuel Oil with the Potential for Conversion to Natural Gas and Electric Space Heaters and Vent Sealing in Process Buildings (Proposed Action)

Notifications of the proposed building modification and pipeline installation have been provided to the Ohio SHPO (copies are included in Appendix A). DOE PORTS provided a determination that there would be no adverse effects on historical resources included or eligible for inclusion in the NRHP. In addition to the NHPA, cultural resources on federal lands are also protected under the Archaeological Resources Protection Act of 1979, as amended, and the Native American Graves Protection and Repatriation Act of 1990. An archaeological survey would be performed prior to installation of the natural gas line. If an unanticipated discovery of cultural materials (e.g., human remains, pottery, bottles, weapon projectiles, and tools) or sites was made during development activities, all ground-disturbing activities in the vicinity of the discovery would be halted immediately. The DOE-ORO Cultural Resources Management Coordinator would be contacted, and consultation with the Ohio SHPO would be initiated and completed prior to any further disturbance of the discovery-site area.

4.6.4 No Action

Degradation of buildings that have been tentatively identified as contributing to the PORTS historic property would be expected if no action were taken.

4.7 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

4.7.1 X-600 Coal Fired Steam Plant

The potential socioeconomic impacts of the X-600 Coal Fired Steam Plant alternative for PORTS winterization activities including demographics, employment, income, housing, public services, local government expenditures, and fiscal characteristics would be minimal. A slight increase in coal consumption could be anticipated which would result in a slight increase in truck traffic. No environmental justice impacts would be expected to occur from this alternative.

4.7.2 Electric Hot Water Boilers

The potential socioeconomic impacts of the electric hot water boilers alternative for PORTS winterization activities including demographics, employment, income, housing, public services, local government expenditures, and fiscal characteristics would be minimal. No environmental justice impacts would be expected to occur from this alternative.

4.7.3 New Hot Water Boiler System Supplied with Fuel Oil with the Potential for Conversion to Natural Gas and Electric Space Heaters and Vent Sealing in Process Buildings (Proposed Action)

This section assesses the potential socioeconomic impacts of the proposed action for PORTS winterization activities including demographics, employment, income, housing, public services, local government expenditures, and fiscal characteristics. Modifications to Building X-3002 would have minor impact on transportation; no other socioeconomic impacts would result from this action. No environmental justice impacts would be expected to occur from the proposed action.

Installation of the natural gas pipeline would result in temporary impacts to some properties along the course of the pipeline installation. These impacts would involve property disturbance during pipeline installation and associated nuisance related to construction activities. These impacts would be temporary and would be eliminated once construction activities are complete. In addition, the pipeline would be within 1000 ft of Piketon Jr. High School.

4.7.4 No Action

No socioeconomic or Environmental Justice impacts are associated with the no-action alternative.

4.8 INFRASTRUCTURE AND SUPPORT SERVICES

4.8.1 Transportation

4.8.1.1 X-600 Coal Fired Steam Plant

Under this alternative, a slight increase in coal consumption could be anticipated which would result in a minor increase in truck traffic. The number of vehicle trips to and from the site would probably be equal to or slightly greater than the current amount of traffic. Impacts to transportation in the area would not require modification of roads or other infrastructure to accommodate additional traffic.

4.8.1.2 Electric Hot Water Boilers

No transportation impacts are associated with the electric hot water boiler alternative. With the reduction in power consumption resulting from placing PORTS in a cold standby mode, excess electricity is available and no alterations to power transmission infrastructure would be required.

4.8.1.3 New Hot Water Boiler System Supplied with Fuel Oil with the Potential for Conversion to Natural Gas and Electric Space Heaters and Vent Sealing in Process Buildings (Proposed Action)

Transportation impacts associated with modification of Building X-3002 would be minimal. These impacts would result from an increase in fuel-oil tanker trucks on U.S. Route 23 and/or U.S Route 32 especially during the initial filling of the fuel oil tanks; routine delivery of fuel oil would be limited to approximately 5 fuel-oil tanker trucks per day. These minor transportation impacts would be further reduced upon completion of the natural gas pipeline. Impacts to transportation in the area would not require modification of roads or other infrastructure to accommodate additional traffic.

In addition, the proposed action would require installation of the natural gas pipeline under Market Street, Beaver Creek Road, U.S. Route 32, Schuster Road, CSX Railroad Line, McCorkle Road, East Access Road, and Perimeter Road. The impacts to traffic on these roadways would be minimal. In the case of roadways under local government jurisdiction (county and city roads) there would be minimal

interruption of traffic during pipeline construction; alternate routes are readily available for detour of traffic, if required. No impact to railways and roadways under federal jurisdiction (U.S. highways) would occur because these transportation routes would be crossed using the same directional drilling techniques utilized to install the pipeline under streams.

4.8.1.4 No Action

No transportation impacts are associated with the no-action alternative.

4.8.2 Utilities

4.8.2.1 X-600 Coal Fired Steam Plant

The potential utilities impacts of the X-600 Coal Fired Steam Plant alternative for PORTS winterization activities would be minimal. A slight increase in steam plant capabilities would be necessary and an additional temporary boiler system may be required. No additional impacts to utilities would be anticipated.

4.8.2.2 Electric Hot Water Boilers

The potential utilities impacts of the electric hot water boilers alternative for PORTS winterization activities would be minimal. Since the PORTS site is being placed in cold standby, electric power is readily available and electric power consumption would be substantially less than current power consumption at the site. Numerous modifications to power distribution systems within buildings would be required and would be costly.

4.8.2.3 New Hot Water Boiler System Supplied with Fuel Oil with the Potential for Conversion to Natural Gas and Electric Space Heaters and Vent Sealing in Process Buildings (Proposed Action)

The potential utilities impact of the proposed action would result in two additional fuel sources being available on plant site. Installation of the natural gas pipeline would supply an additional fuel source at the site that is currently not available. Natural gas is a clean, safe, and economical source of fuel. The fuel oil supply system would provide a fuel source in the event electrical supplies and natural gas supplies were interrupted.

4.8.2.4 No Action

No utilities impacts are associated with the no-action alternative.

4.9 NOISE

4.9.1 X-600 Coal Fired Steam Plant

The minor modifications of RHW line and heat exchangers that would be required to implement this alternative would result in minor, temporary increases in noise levels at the site. Noise would return to current levels after completion of construction activities.

4.9.2 Electric Hot Water Boilers

The minor modifications of RHW line and heat exchangers that would be required to implement this alternative would result in minor, temporary increases in noise levels at the site. Noise would return to current levels after completion of construction activities.

4.9.3 New Hot Water Boiler System Supplied with Fuel Oil with the Potential for Conversion to Natural Gas and Electric Space Heaters and Vent Sealing in Process Buildings (Proposed Action)

The modifications of Building X-3002 RHW lines and installation of the natural gas pipeline would result in minor, temporary increases in noise levels at the site. Noise would return to current levels after completion of construction activities.

Noise levels along the pipeline route could increase during construction activities. Impact on the local noise environment would occur during construction of the proposed pipeline. Construction would proceed progressively down the ROW in the open-trench phase of construction, which should be of short duration. Construction equipment would be operated on a random, as-needed basis during this period. Consequently, although individuals in the immediate vicinity of the work could experience temporary annoyance, the duration of the impact on the noise environment would be minimal.

4.9.4 No Action

No additional noise impacts are associated with the no-action alternative.

4.10 HUMAN HEALTH AND SAFETY

No unique occupational health and safety hazards would be posed by any of the alternatives considered, including the proposed action. Falls, spills, vehicle accidents, confined-space incidents, and injuries from tool and machinery operation could occur. Similar hazards also would be present during construction activities. Workers would be expected to receive applicable training, be protected through appropriate controls and oversight, and follow standard industrial and protective engineering practices, including the use of personal protective clothing and equipment as specified in applicable Occupational Safety and Health Act of 1970 (OSHA) regulations (e.g., 29 *CFR* 1910 and 29 *CFR* 1926).

On-site occupational radiological exposures for subcontractors implementing any modifications discussed in this EA would be similar to the doses estimated for on-site workers and would be kept below the 5000 mrem/yr limit for occupational exposure of radiation workers set by the NRC and DOE. However, DOE has established an administrative control limit of 2000 mrem/yr. BJC has adopted DOE's administrative control limit guidance as their policy. To further reduce exposures, each BJC project establishes an even lower administrative control level. PORTS follows the principles of As Low As Reasonably Achievable to further limit doses to the workers as much as possible. No unique chemical exposures would be anticipated from construction activities. Potential chemical exposures for on-site workers could include various hazardous materials and chemicals such as solvents, ketones, toluene, methanol, xylenes, formaldehyde, phenols, acids, ammonia, metals, and silicates. All activities involving chemicals would be expected to comply with applicable OSHA regulations including environmental exposure standards, applicable training requirements, hazard communication programs, engineering controls, and the use of personal protective clothing and equipment. DOE has taken responsibility for the health and safety oversight on federal property with radiological restrictions.

Activities at PORTS conducted by DOE that could impact the public are subject to DOE Orders 5400.1, *General Environmental Protection*, and 5400.5, *Radiation Protection of the Public and the*

Environment. Current chemical and radiological exposures would likely continue at low levels as they currently exist.

Occupational exposures for DOE and contractor workers follow the requirements of DOE Order 440.1A, *Worker Protection Management for DOE Federal and Contractor Employees*, and 10 *CFR* 835, *Occupational Radiation Protection*. The NRC performs regulatory oversight of USEC activities. OSHA regulates USEC occupational safety and worker health, and the State of Ohio and the U.S. EPA regulate USEC environmental activities.

4.10.1 X-600 Coal Fired Steam Plant

No additional health and safety impacts are associated with the X-600 Fired Steam Plant alternative.

4.10.2 Electric Hot Water Boilers

No additional health and safety impacts are associated with the electric hot water boilers alternative.

4.10.3 New Hot Water Boiler System Supplied with Fuel Oil with the Potential for Conversion to Natural Gas and Electric Space Heaters and Vent Sealing in Process Buildings (Proposed Action)

The proposed pipeline would be designed, constructed, operated, and maintained in accordance with the U.S. Department of Transportation (DOT) Minimum Federal Safety Standards in 49 CFR Part 192. The regulations are intended to ensure adequate protection for the public from natural gas pipeline failures. Part 192 specifies material selection and qualification, minimum design requirements, and protection from internal, external, and atmospheric corrosion.

Part 192.5 defines area classifications, based on population density in the vicinity of the pipeline, which determine more rigorous safety requirements for populated areas. The class location unit is an area that extends 220 yards on either side of the centerline of any continuous 1-mi length of pipeline. The four area classifications are defined as follows:

- Class 1 – Location with 10 or fewer buildings intended for human occupancy.
- Class 2 – Location with more than 10 but less than 46 buildings intended for human occupancy.
- Class 3 – Location with 46 or more buildings intended for human occupancy or where pipeline lies within 100 yards of any building, or small, well-defined outside area occupied by 20 or more people during normal use.
- Class 4 – Location where buildings with four or more stories aboveground are prevalent.

Class locations representing more populated areas require higher safety factors in pipeline design, testing, and operation. Pipelines constructed in Class 1 locations must be installed with a minimum depth of cover of 30 in. in normal soil and 18 in. in consolidated rock. Class 2, 3, and 4 locations, as well as drainage ditches of public roads and railroad crossings, require 36 in. in normal soil and 24 in. in consolidated rock. Class locations also specify the maximum distance to a sectionalizing block valve—10-mi in Class 1, 7.5-mi in Class 2, 4-mi in Class 3, and 2.5-mi in Class 4. Pipeline design pressures, hydrostatic test pressures, maximum allowable operating pressure, inspection and testing of welds, and frequency of pipeline patrols and leak surveys must also conform to higher standards in more populated areas. The area classification for the proposed action would be Class 3.

4.10.4 No Action

No additional health and safety impacts are associated with the no-action alternative.

4.11 ACCIDENTS

Under any of the alternatives evaluated, accidents could occur during construction activities or operation of a new or existing facility. Accidents could result from operator error, equipment malfunction, or from natural phenomena (e.g., earthquakes, tornadoes, flooding, fire, etc.). Typical accidents that could result from construction activities include falls, chemical spills, vehicle accidents, confined-space incidents, and injuries from tool and machinery operation. Potential hazards from the operation of facilities could include radiation sources, toxic/corrosive/reactive materials, flammable materials, and electrical energy. Other hazards include kinetic energy and stored energy. Examples of kinetic energy hazards include moving ventilation system components, forklifts, and other drum- or box-handling equipment. Stored energy hazards include elevated structures and equipment, stacked drums, and boxes. Consequences of these hazards could potentially include:

- internal and external radiation exposure to on-site and off-site personnel;
- exposure of on-site and off-site personnel to toxic chemicals;
- building fire resulting in the release of toxic and radioactive materials and the production of toxic gases, smoke, and/or corrosive materials;
- electrical burns, shock, and electrocution; and
- bruises, broken bones, cuts, etc.

An example of a typical accident that could potentially occur during the operation of an existing or new facility would be a building fire. The consequences of a potential fire would depend on several factors, including building construction materials and design and the types and quantities of materials used and stored within the building. Although most fires start as small, localized fires, the amounts of flammable materials and combustibles available in the facility could make a fire grow in intensity. There is the potential that a fire could spread and involve a major portion of the building, but with the proper mitigation measures in place, it is most likely that the fire would remain localized, affecting only the area where the fire was initiated.

A toxic material release could potentially occur inside a building as the result of a fire or explosion. Although the majority of the toxic material release concerns would be localized, the potential would exist for toxic gases or aerosols to be drawn into the building ventilation system and be distributed throughout other sections of the building. If the event were large enough, these gases or aerosols could be released to the outside.

The potential for fires and any resulting adverse impacts would likely be mitigated by the following: building modification materials would comply with all applicable National Fire Protection Association codes and standards; buildings would be equipped with fire detection systems and fire suppression equipment as applicable (e.g., fire alarms, portable fire extinguishers, and sprinkler systems); and appropriate fire safety and emergency policies and procedures, including proper training, would be implemented. Emergency response would be provided by the on-site Fire Services and through mutual-aid agreements with the surrounding fire departments and emergency response organizations.

Accidental spills of hazardous materials during construction activities or facility operations could cause contamination of localized areas of soil and subsequent impacts on surface waters and groundwater. Terrestrial and aquatic plants and animals in the affected areas could also be adversely impacted. Accidental releases of high concentration and/or large quantities of hazardous materials could cause water quality standards to be exceeded and result in fish kills. Impacts from accidental spills and releases would be addressed by individual operating entities through the use of safety procedures and spill prevention and response plans.

The Emergency Planning and Community Right-To-Know Act of 1986, also referred to as the Superfund Amendments and Reauthorization Act Title III, requires reporting of emergency planning information, hazardous chemical inventories, and releases to the environment. Section 304 of the Emergency Planning and Community Right-To-Know Act requires reporting of off-site reportable quantity releases to state and local authorities. Accident scenarios and consequences from ongoing operations are addressed in the SAR for PORTS (LMES 1997).

4.11.1 X-600 Coal Fired Steam Plant

Transportation accidents under the X-600 Coal Fired Steam Plant alternative would be expected to be similar to those that could potentially occur during normal operations at PORTS and would depend on the types and amounts of traffic entering and exiting the roads and highways in and around the site. The most common type of transportation accident that would be expected to occur would be vehicular accidents involving site workers or visitors. No additional accident impacts are associated with the X-600 Coal Fired Steam Plant alternative.

4.11.2 Electric Hot Water Boilers

No additional accident impacts are associated with the electric hot water boilers alternative.

4.11.3 New Hot Water Boiler System Supplied with Fuel Oil with the Potential for Conversion to Natural Gas and Electric Space Heaters and Vent Sealing in Process Buildings (Proposed Action)

Transportation accidents under the proposed action would be expected to be similar to those that could potentially occur during normal operations at PORTS and would depend on the types and amounts of traffic entering and exiting the roads and highways in and around the site. The most common type of transportation accident that would be expected to occur would be vehicular accidents involving site workers or visitors.

Under the proposed action, regular fuel oil deliveries would be expected. There is the potential for accidents involving the spill or leakage of fuel oil. However, it is expected that the quantities of this material would be transported in the proper containers and according to all applicable regulations. The use of safety procedures, spill prevention plans, and spill response plans in accordance with state and federal laws would minimize the severity of potential impacts from transportation accidents.

In addition to transportation of fuel oil, accidents related to natural gas pipeline installation and operation could be anticipated. The most common types of accidents associated with natural gas pipelines would result from accidental excavation of pipelines and ignition of gas or from a failure of the pipeline which could release natural gas into the atmosphere or structures and result in local evacuations. The minimum standards for operating and maintaining pipeline facilities, including the requirement to establish a written plan governing these activities, are specified in 49 CFR Part 192. Under Section 192.615, each pipeline operator must also establish an Emergency Plan, which provides written

procedures to minimize the hazards from a gas pipeline emergency. Key elements of the plan include procedures for

- receiving, identifying, and classifying emergency events—gas leakage, fires, explosions, and natural disasters;
- establishing and maintaining communications with local fire, police, and public officials, and coordinating emergency response;
- making personnel, equipment, tools, and materials available at the scene of an emergency;
- protecting people first and then property, and making safe from actual or potential hazards; and
- emergency shutdown of system and safely restoring service.

Each operator must establish and maintain liaison with appropriate fire, police, and public officials to learn the resources and responsibilities of each organization that may respond to a gas pipeline emergency and coordinate mutual assistance in responding to emergencies. The operator must also establish a continuing education program to enable customers, the public, government officials, and those engaged in excavation activities to recognize a gas pipeline emergency and report it to appropriate public officials (DOE 1989).

A potential of a fire could exist from malfunctioning electric heaters in the process buildings. The facilities would be operated in accordance with applicable fire protection standards and would be inspected on a regular basis to ensure equipment is operating in a safe and efficient manner.

A detailed consequence analysis has been performed for the proposed action. Potential accident scenarios are presented in Table 4.2.

Table 4.2. Accident scenarios

Area Function	Accident Situation	Frequency Category	Consequence Category
Diesel Oil	Diesel oil pool fire – The entire contents of oil storage tanks are spilled into the confined area of concrete containment.	Unlikely	Low
	Diesel oil tanker truck – An accidental spill and subsequent oil fire due to a postulated truck accident inside the site roads.	Anticipated*	Low
Natural Gas	Natural gas vapor cloud explosion – In the open ground, the natural gas pipeline is accidentally broken during digging the ground covering the pipeline.	Anticipated*	Low
	Gas leakage within Building X-3002 – Gas leaking from piping to the Boiler.	Anticipated*	Not Applicable

*"Anticipated" is a frequency definition used to evaluate the potential of an explosion. This definition derives from DOE Standard DOESTD-3009-94.

In addition, scoping calculations were performed to address postulated accident scenarios related to a natural gas vapor cloud explosion due to a digging accident of the gas main pipeline and the ignition of the vapor cloud with an external source. The probability of occurrence of this type of accident is "anticipated" even though all necessary precautions would be taken to prevent the occurrence of this accident. Bureau of Labor Statistics data on construction-related occupational injuries show that in 1996, 50 natural gas fire/explosion fatalities were attributable to excavation work. According to the Occurrence Reporting and Processing System database for reports of events that involved hitting gas lines during excavation found 35 reports. The distribution of root cause was as follows:

1. management problems accounted for 43 percent,
2. procedure problems 20 percent, and
3. personnel error 11 percent.

In most cases, trenching and excavation activities are generally performed by subcontractors which make it more important to have good communication and subcontractor control and good configuration management so that site digging permit systems can be effective.

Overpressure from vapor cloud explosion

The effects of the overpressure on health and safety of the personnel and the damage to equipment/structures due to vapor cloud explosion of natural gas is discussed below.

Table 4.3. Overpressure from vapor cloud explosion of 100 lb of natural gas due to broken pipeline

Distance from Broken Pipeline (Feet)	Overpressure (lb/in^2)	Effects
21	1.9	Rupture eardrums of 1% of exposed population
40	1.0	Partial demolition of house-like structures
80	0.5	Limited minor structural damage
260	0.15	Typical pressure for glass window breakage
386	0.10	Loud noise (143 decibels)

Table 4.4. Personnel injury data from explosion effects

Overpressure* (lb/in^2)	Physiological Effect
1.0	Personnel knocked down
1.0 – 8.0	Range for slight to serious injuries due to skin laceration from flying glass and other missiles
2.4 – 12.2	Range for 1% to 90% eardrum rupture among exposed populations
15.5 – 29.0	Range for 1% to 99% fatalities among exposed populations due to overpressure

*These are peak overpressures in excess of normal atmospheric pressure by blast and shock waves.

A postulated cloud was identified as a potential accident scenario in the scoping document. This postulated cloud was assumed to be the result of the accumulation of gas in an area associated with a breech in the pipeline. The postulated cloud scenario does not consider the drifting of the cloud because it is not reasonable to assume that a natural gas cloud would accumulate because natural gas is lighter than air, rather, it is assumed that the cloud would dissipate to a point that it would not be ignitable.

The natural gas accumulation when ignited by a spark could result in a vapor cloud explosion or deflagration. In order to estimate the energy released in an explosion, a yield factor was used for fuel air mixtures. The resulting explosion would be accompanied by a fireball and pressure wave. In the case of a deflagration, a low order subsonic explosion would result.

Engineering of the natural gas pipeline includes pressure-activated valves that close with a sudden drop in pressure associated with a leak. This specification precludes the unlimited release of a continuous supply of gas that would feed such a cloud.

Personnel outside buildings are susceptible to direct blast effects (blast overpressure) and indirect blast effects (missiles or whole body impacts). Personnel inside buildings are susceptible to indirect blast effects resulting from collapse of the building structure.

The overpressures from vapor cloud explosion of 100 lb of natural gas during a digging accident are compared to the pressures at various distances from the broken pipeline. In this postulated vapor cloud explosion (deflagration), 1% of the total number of people located at 21 ft from this explosion could experience ruptured eardrums and experience an irreversible health effect.

An overpressure of 1.9 lb/in^2 that could result in eardrum rupture in 1% of the exposed population is considered to be equivalent to Emergency Response Planning Guideline (ERPG) – 2 value; i.e., the toxicity effects of an airborne hazardous material that could result in irreversible health effects due to inhalation. In addition, the overpressures are the dominant factor in vapor cloud explosions and, therefore, the effects of thermal radiation intensity of the gas explosions are not discussed.

The potential overpressure wave from an explosion associated with the 350-psi pipeline at 200 ft would be 0.3lbs/in^2; at 1000 ft the overpressure wave would be 0.06 lbs/in^2. Qualitatively the overpressure wave at 200 ft would break a window; at 1000 ft a loud noise (140 decibels) would be experienced.

For comparison, the overpressure wave generated from the 350-psi line is approximately twice as great as the 100-psi line. The overpressure wave for the 100-psi line at 386 ft would be 0.1 lbs/in^2 and a loud noise of 143 decibels would be experienced.

The following list includes those buildings that are within the overpressure effects of the natural gas pipeline explosion.

1. Damage to equipment/structures could result from the forces produced by different pressures acting on separate surfaces of the equipment/structures. The gas pipeline is laid very close to X-622, South Groundwater Treatment Building, possibly less than 30 ft. Should a digging accident occur in the vicinity, there is a potential for damage to this building and its contents that include water treatment chemicals, such as potassium permanganate, sodium hydroxide, etc. The normal occupancy of this building is 1 to 4 persons. In the event of an explosion, damage to Building X-622 could occur and chemicals could be released to the environment resulting in potential impacts to surface water, groundwater, and soils in the immediate vicinity. All necessary precautions would be taken to prevent the occurrence of this type of accident.

2. The gas pipeline also passes approximately 120 ft from X-751, Mobile Equipment Garage, housing 3 to 5 persons belonging to Ohio National Guard. This facility is used as a general mobile maintenance area and shop. This facility has an area of approximately 16,400 ft^2 with a concrete slab floor and metal exterior walls. There are four empty underground fiberglass storage tanks adjacent to X-751 that were used to store waste oil, diesel fuel, and gasoline that were filled with inert material and closed in 1996 in accordance with applicable underground storage tank regulations. X-751 would sustain minor structural damage and broken windows. Warehouse X-744K, which was transferred empty to the Ohio National Guard, lies close to the natural gas pipeline and would be partially demolished in the event of an explosion.

3. The Emergency Operations Center (EOC) in Building X-1020 is a dedicated facility for the management of emergency response and is activated by the Plant Shift Superintendent or designee. It is located less than 200 ft from the 100 psig gas pipeline although the 30 psig natural gas line which is an extension of the 100 psig pipeline is less than 30 ft from this building. This building is of robust brick construction and has no windows on the north side facing the pipeline, but may have potential for some damage due to vapor cloud explosion. The normal occupancy in the EOC building is ~4 persons although when a site emergency is declared this building may see considerably larger number of persons. The Central Alarm Station in Building X-1020, with backup in Building X-104, monitors security-related detection and alarm equipment and is manned 24 hours per day. It provides a coordination point for the direction of security-related activities required during response to emergencies, including dispatch of protective force personnel, maintaining communications with the protective force at the incident scene, advising protective force management, and advising the EOC staff.

4. The X-1007 Fire Station, adjacent to the EOC building on the south side, contains a first aid room to treat personnel with minor injuries. Fire Service provides ambulance service with equipment and supplies to provide life support and to transport personnel with serious injuries to hospitals. Damage to the facility should be limited to cracked or broken windows.

5. Sulfuric acid, chromium oxide, chlorine, hypochlorite, and Betz® 2020 (corrosion inhibitor) are some of the chemicals housed in the X-6000, Utility Pump House. The 30 psig gas pipeline is approximately 50 ft away from Building X-6000 and around 100 ft from X-6001. Damage to these facilities should be limited to minor structural damage, and no uncontrolled release of chemicals stored in this facility would be anticipated from a typical accident scenario.

6. X-744G Bulk Non-Uranium Enriched Service Activity Storage Building, Hazard Category 2 facility (as defined in DOE G 420.1-1), is a steel framed building with a concrete floor and is used for the storage of contaminated cascade trapping materials, contaminated solid scrap from the process buildings, and uranium oxide and nitrates. The facility is equipped with storage racks and shelves. The storage containers used in the facility are (1) 5 in. diameter metal cans and (2) 55-gal metal and plastic drums. The 100-psig-gas pipeline is laid at a distance of over 300 ft from the nearest part of the facility; however, Sealand containers with depleted uranium isotopes are stored outside of X-744G within 200 ft of the pipeline. Sealands are robust, non-combustible, shipping containers expected to survive a 0.5 to 1.0-overpressure event. Damage to this facility is not expected to occur from a typical accident scenario.

The most likely scenario for explosive force generation within a structure would be associated with a boiler explosion. The potential hazards associated with a boiler explosion were analyzed in the consequences analysis as follows:

Boiler Explosion

One hazard for the recirculating hot water plant is from a boiler/furnace explosion due to operational problems or equipment malfunction. A postulated boiler explosion is most likely to be a localized event within the confines of Building X-3002. The consequences of such an explosion could cause fatality to personnel at very close distances from the occurrence and possibly could result in reversible health consequences to workers located farther away from the accident scenario. In addition, missiles and debris from the explosion could result in injuries to workers. As the Building X-3002 is currently unoccupied with other working personnel, the accident scenario could potentially involve only those personnel involved with boiler operations. A fire scenario could result due to the explosions.

Other accident scenarios that were considered are:

Diesel Fuel Oil

The fuel oil storage tanks, contained in a diked area northeast of Building X-3002, are built to meet Work Smart Standards requirements and to Uniform Building Code standards to meet the seismic criteria as well as to satisfy fire hazards analysis requirements. A facility transfer pump is used for transferring the fuel oil from the tanker truck to the storage tank via a manifold and a valve for each of the tanks through bottom fill. Neither a fire prevention/suppression system nor a fire sensing system is installed in the oil storage tank area. A 5-minute response time by the Fire Services Department for the cylinder yard fire used in the SAR is the primary credited control for fire suppression in the oil storage tank area since the Fire Services Department is located much closer to the oil storage tanks than to the cylinder yard and is staffed 24 hr of the day.

Fuel Oil Pool Fire

In the scoping calculation on diesel oil, an accident scenario was postulated for a fuel oil pool fire. The fuel oil pool fire would be contained by the concrete containment diking which would be 65 ft by 65 ft. After the oil had been released into the common concrete dike containment area, it was assumed that the oil was ignited by an external source since diesel fuel is combustible. The effects of thermal radiation intensity on the extent of personnel injury as well as on equipment/structures are discussed below. An uncontrolled fire in the fuel oil storage tanks' containment area could potentially result in the complete loss of the tanks and their contents. One possible ignition source inside the dike is the electrically powered fuel oil transfer pump when it is being used to transfer the fuel oil from the tanker truck to the storage tank.

Personnel Injury Data for Thermal Radiation Effects

FEMA presents the following data for pain thresholds and second-degree burns:

Table 4.5. Personnel injury data for thermal radiation effects

Thermal Radiation Intensity		Time-to-Pain Threshold	Time for Second-Degree
Btu/hr/ft^2	KW/m^2	(sec)	Burns (sec)
300	1	115	663
600	2	45	187
1000	3	27	92
1300	4	18	57
1600	5	13	40
1900	6	11	30
2500	8	7	20
3200	10	5	14
3800	12	4	11

The extent of personnel injury as a result of thermal radiation due to a pool fire is dependent on the incident heat and the exposure time. The thermal radiation at 20 ft from the edge of the pool fire is intense and will result in fatality to exposed personnel. As the distance from the edge of the pool fire increases, the time-to-pain threshold also increases. Burns occur relatively quickly once the pain threshold is achieved. At a distance of 200 ft, the time-to-pain threshold is only 11 seconds and the time for second-degree burns is 30 seconds. However, at a distance of 328 ft (100 meters), the time-to-pain threshold increases to over 30 seconds and the time for second-degree burns to over 2 minutes. Personnel staying in the vicinity on sections of Grebe Avenue and 2nd Street within a distance of 200 ft from the edge of a pool fire in the concrete dike could potentially suffer from second-degree burns if exposed for over 30 seconds to thermal radiation. However, in the area between 200 ft and 328 ft from the edge of the pool fire,

personnel could be exposed to less severe thermal radiation. In all cases, personnel would normally evacuate the area unless incapacitated. Such a fire could burn for greater than three hours without response. The typical response time for emergencies at PORTS is less than five minutes.

Table 4.6. Equipment/structural damage for thermal radiation effects

Thermal Radiation Intensity (Btu/hr/ft^2)	kW/m^2	Distance, Ft	Type of Damage
11,890	37.5	51	Sufficient to cause damage to process equipment
7,930	25.0	86.1	Minimum energy required to ignite wood at indefinitely long exposures without a flame
3,960	12.5	148.3	Minimum energy required to ignite wood with a flame or cause melting of plastic tubing and materials

The effect of thermal radiation resulting from the pool fire on equipment/structures depends on the nature of the material used, whether combustible or not, and the nature of fire engulfment, whether engulfed in fire or away from the flames. Wooden materials can fail due to combustion, while steel materials when exposed for long periods of time can fail due to thermal lowering of the yield stress. Steel structures under normal loads will fail rapidly when raised to a temperature range of 930°F to 1110°F (about 500°C to 600°C). Pipelines and the pipe rack structures running along sections of Grebe Avenue and 2nd Street could potentially be exposed to the effects of thermal radiation and could possibly result in damage to pipes and the structural supports. The exterior of the closest structure of Building X-3002 could potentially be exposed to thermal radiation intensity greater than 6 kW/m^2 but not exceeding 12.5 kW/m^2. The thermal radiation on facilities should not be severe. No occupied structure would be exposed to thermal radiation intensity of 12.5 kW/m^2. The nearest occupied structure, Portal X-1107 BV, could be exposed to 2 to 3 kW/m^2 of thermal radiation intensity and would probably not autoignite.

Fuel Oil Pool Fire with Tank Intact

The secondary containment concrete tank that includes the spills from the three storage tanks could potentially pose a problem. In the event a leak or spill from one storage tank becomes ignited, then the contents of the remaining two storage tanks in a given period of time could be subjected to the effects of heating due to the oil fire. A conservative calculation gives 10.32×10^7 Btu required to heat the 40,000 gal of diesel in an intact tank from 60°F to 450°F, the boiling point of fuel oil, whereas the total heat energy from the ruptured tank oil fire is approximately equal to 5.36×10^9 Btu (see Attachment A) or approximately 50 times as much heat energy as is needed to boil the oil in an intact tank. Theoretically, this heating could potentially produce a situation where the diesel oil contained inside the storage tanks could reach its boiling point with the possibility of a phenomenon known as Boiling Liquid Expanding Vapor Explosion (BLEVE). This scenario could potentially result in more severe consequences than those due to an oil pool fire alone.

However, the three storage oil tanks are built as single-wall steel structures with pressure relief capability or vented to atmosphere and will not be capable of achieving any large build up of internal pressure inside the tanks. Therefore, in the event of a failure of one of the tanks leaking oil into the dike and its eventual ignition resulting in a pool fire in the dike, it is reasonable to assume that oil in the other intact tanks will be heated building pressure inside that would vent or relieve at relatively low pressures, or ultimately result in failure of the other intact tanks. This process precludes the potential for occurrence

of a BLEVE. However, the possibility of failure of all the three tanks would result in the ultimate failure of oil supply to the boilers reducing ability to heat the facilities that need to be maintained in a standby situation during the cold months.

Tanker Truck Spill/Fire

The postulated scenario of a trailer truck loaded with fuel oil #2 meeting with an accident inside the site road is "anticipated" for a frequency of up to 8 truck deliveries per day. The effects of this scenario depend on the exact location of the accident on the road. If the oil spillage were to occur at Portal E or near Building X-7721, the potential for personnel injury and damage to equipment/structures exists. Apart from the fact that the spillage of diesel fuel oil is an environmental hazard, the ignition of the diesel oil by an external source is a cause for concern. It is estimated that the thermal flux at a distance of 50 ft away from the edge of the fire is about 10.5 kW/m^2. Personnel exposed to this thermal radiation intensity could potentially experience a time-to-pain threshold of about 5 seconds and a second-degree burn in about 14 seconds. Also, this thermal radiation intensity has the potential to cause some light damage to equipment and/or structures and could certainly include melting of thermoplastic materials. Along the projected tanker truck paths, the following facilities are located within 50 ft.

1. Security Portal X-1107EV,
2. Security Portal X-1107EP,
3. Security Portal X-1107DV, and
4. Training Building X-7721

If a tanker truck accident involving a spill with or without fire were to occur in the vicinity of any of these facilities, prompt evacuation away from the scene would be expected.

Potential accidents associated with offsite breeches in the natural gas pipeline could also result in human injury. The natural gas pipeline will be installed in accordance with all applicable requirements set forth in 49 CFR 192. The most significant offsite building adjacent to the proposed pipeline route is Piketon Jr. High School. This building is approximately 1000 feet from the proposed pipeline route; grounds associated with the school are approximately 400 feet from the proposed pipeline route. Pipeline mains such as the 350 psi line that will be installed to supply the DOE PORTS site and other customers are commonplace. Accident scenarios that could result in explosions associated with the onsite portion of the natural gas pipeline could also occur in association with the proposed gas main. Engineered controls that preclude the continuous feed of gas within these pipelines are required for gas main installations.

4.11.4 No Action

NCS problems could result from the uncontrolled release of water from fire protection systems caused by freezing of sprinkler system lines in areas where UF_6 is present at various levels of enrichment.

Freezing of facilities and systems would likely result in substantial and costly damage from freezing of fire protection systems; potential RCRA waste storage permit noncompliances due to lack of heat; and the potential for generating contaminated water or other materials requiring cleanup, processing, storage and/or disposal. Other impacts include lack of heating for facilities housing DOE and contractor staff, disruption of the RCRA Corrective Actions Program, possible concerns with facilities containing HEU, and extensive damage to the enrichment process equipment to the extent to prohibit restart of enrichment operations. In addition, NCS problems could result from the "uncontrolled" release of water from fire protection systems caused by freezing of sprinkler system lines in areas where UF_6 is present at various levels of enrichment.

4.12 WASTE MANAGEMENT AND WASTE MINIMIZATION

It is anticipated that only minor quantities of solid waste and construction debris would be generated as part of any of the alternatives evaluated. Waste generation and handling, including any pollution prevention and waste minimization practices, would be accomplished in accordance with established procedures and regulations.

4.12.1 X-600 Coal Fired Steam Plant

Excavation of soils required to modify RHW supply lines and accomplish installation of heat exchangers that would be accomplished in the upper 10 ft of soil would be returned to the excavated area. Because the PORTS corrective actions program is managed in accordance with RCRA regulations and because groundwater has been designated as containing listed hazardous waste, any soils generated from excavations greater than 10 ft in depth would require further analysis and handling as hazardous waste. In most cases, excavations less than 10 ft can be returned to the excavated area and do not require handling as hazardous waste. If contamination would be encountered, either through visual observation or other means, sampling and analysis would be completed and disposal of waste would be accomplished in an appropriate manner. This method of operation, reviewed on a case specific basis, was reached with regulatory agencies in order to allow routine maintenance and repair of underground appurtenances without generation of large volumes of uncontaminated soil that would require management as hazardous waste. No additional waste management and waste minimization impacts are associated with the X-600 Coal Fired Steam Plant alternative.

4.12.2 Electric Hot Water Boilers

Excavation of soils required to modify RHW supply lines and accomplish installation of heat exchangers that would be accomplished in the upper 10 ft of soil would be returned to the excavated area. Because the PORTS corrective actions program is managed in accordance with RCRA regulations and because groundwater has been designated as containing listed hazardous waste, any soils generated from excavations greater than 10 ft in depth would require further analysis and handling as hazardous waste. In most cases, excavations less than 10 ft can be returned to the excavated area and do not require handling as hazardous waste. If contamination would be encountered, either through visual observation or other means, sampling and analysis would be completed and disposal of waste would be accomplished in an appropriate manner. This method of operation, reviewed on a case specific basis, was reached with regulatory agencies in order to allow routine maintenance and repair of underground appurtenances without requiring generation of large volumes of uncontaminated soil that would require management as hazardous waste. No additional waste management and waste minimization impacts are associated with the electric hot water boiler alternative.

4.12.3 New Hot Water Boiler System Supplied with Fuel Oil with the Potential for Conversion to Natural Gas and Electric Space Heaters and Vent Sealing in Process Buildings (Proposed Action)

Excavation of soils required to modify RHW supply lines and install the natural gas pipeline that would be accomplished in the upper 10 ft of soil would be returned to the excavated area. Because the PORTS corrective actions program is managed in accordance with RCRA regulations and because groundwater has been designated as containing listed hazardous waste, any soils generated from excavations greater than 10 ft in depth would require further analysis and handling as hazardous waste. In most cases, excavations less than 10 ft can be returned to the excavated area and do not require handling as hazardous waste. If contamination would be encountered during excavation for the natural gas pipeline on DOE property, either through visual observation or other means, sampling and analysis would be

completed and disposal of waste would be accomplished in an appropriate manner. If contamination would be encountered during excavation for the natural gas pipeline off the DOE property, excavation would cease and appropriate notifications would be made to state and local authorities prior to resumption of excavation. This method of operation, reviewed on a case specific basis, was reached with regulatory agencies in order to allow routine maintenance and repair of underground appurtenances without requiring generation of large volumes of uncontaminated soil that would require management as hazardous waste. No additional waste management and waste minimization impacts are associated with the proposed action.

4.12.4 No Action

If no action was taken, freezing of facilities and systems during periods of cold weather would likely have the following waste management and waste minimization impacts:

- substantial and costly damage from freezing of fire protection systems,
- potential RCRA waste storage noncompliances,
- the potential for generating contaminated water or other materials requiring cleanup, processing, storage and/or disposal; and
- potential impact on surrounding environment (soils, streams, groundwater, etc.).

4.13 CUMULATIVE IMPACTS

Cumulative impacts are those that may result from the incremental impacts of an action considered additively with the impacts of other past, present, and reasonably foreseeable future actions. Cumulative impacts are considered regardless of the agency or person undertaking the other actions (40 *CFR* 1508.7, CEQ 1997) and can result from the combined or synergistic effects of individually minor actions over a period of time. This section describes past and present actions, as well as reasonably foreseeable future actions, that are considered pertinent to the analysis of cumulative impacts for the proposed action.

The DOE-PORTS Environmental Restoration Program was developed in 1989 to find, analyze, and correct site contamination problems as quickly and inexpensively as possible. This task may be accomplished by removing, stabilizing, or treating hazardous wastes. As of December 31, 1998, certification of closure had been received from Ohio EPA for 15 RCRA facilities:

- X-744G(U) container storage facility,
- X-735 landfill (cells 1 through 6),
- X-616 surface impoundments,
- X-705A incinerator,
- X-749 landfill (northern portion),
- X-750 waste oil tank,
- X-752 container storage facility,
- X-700 tank 6 generator closure,
- X-700 chromic acid tank 7,
- X-700 tank 8 generator closure,
- X-744G(R) container storage facility,
- X-344A settling tank,
- X-740A waste oil facility,

- X-740 tank, and
- X-326 trap material storage area (DMSA #7).

The Ohio EPA has designated five RCRA units at PORTS as "integrated units." They include:

- X-231B biodegradation plot,
- X-744Y container storage,
- X-701B surface impoundments,
- X-701C neutralization pit, and
- X-230J7 holding pond.

Preliminary remedial action at these sites has been completed as required by closure plans and as directed by the Ohio EPA.

The DOE-PORTS Technology Applications Program was established in 1993 to facilitate the introduction of innovative or experimental environmental technology into the DOE-PORTS Environmental Restoration Program. The primary function of the technology program is to identify, evaluate, and test/demonstrate innovative advancements in environmental characterization and cleanup. Projects have included:

- X-231A soil fracturing demonstrations,
- X-231B in situ soil mixing with thermally enhanced vapor extraction,
- X-625 passive groundwater treatment through reactive media,
- X-749/X-120 vacuum-enhanced recovery wells,
- X-701B in situ chemical oxidation and recirculation,
- X-701B oxidant injection using the horizontal well,
- X-701B oxidant injection using lance permeation,
- X-701B vacuum-enhanced recovery using the five-spot configuration,
- 5-Unit Area (Quadrant I groundwater investigative area) oxidant injection, and
- X-701B underground steam stripping and hydrous pyrolysis/oxidation.

The DOE-PORTS Waste Management Program directs the safe storage, treatment, and disposal of waste generated by past and present operations and from current Environmental Restoration projects. DOE-PORTS also stores USEC-generated waste in the RCRA Part B permitted storage areas. During 2000, approximately 8 million pounds of waste from PORTS were recycled, treated, or disposed.

Current activities include obtaining certification for the completed cap on the X-734 landfill, the ongoing cleanup of the X-747H scrap metal yard, and the demolition and remediation of the X-701A lime house and X-701C neutralization pit. Five groundwater treatment facilities have also been constructed and are operational.

Planned environmental management activities include:

- complete corrective measures for Quads I and II,
- upgrade capacity/efficiency of X-622 groundwater treatment facility,
- disposal of 11,764 PCB/low-level waste containers in process buildings and outside storage areas, and

- disposal of 3877 containers of RCRA low-level waste.

Long-term environmental management milestones include:

- by the end of 2002, assessments and agency-required remedial actions completed;
- by the end of 2006, all DOE-PORTS environmental management waste shipped for final disposition; and
- beyond 2006, continued operations of active and passive groundwater treatment systems, site-wide groundwater protection program ongoing, and long-term surveillance and maintenance of remedial action and D&D facilities.

4.13.1 Proposed DOE Program to Secure Supply of Enriched Uranium

On October 6, 2000, Energy Secretary Bill Richardson announced a plan to further protect U.S. energy security by placing the GDP at PORTS in cold standby.

On March 1, 2001, Energy Secretary Spencer Abraham announced that DOE would provide $125.7 million for winterizing, cold standby, and worker transition programs related to the ongoing transition at PORTS. In general, the $125.7 million will be broken down over two years; $59.2 million for FY 2001 and $66.5 million for FY 2002. The money will support placing the facility in cold standby mode, winterizing steps to protect the facility, and worker transition programs for displaced workers once the facility is placed into cold standby mode.

Cold standby involves placing those portions of the GDP needed for 3 million separative work units per year production capacity in a non-operational condition and performing surveillance and maintenance activities necessary to retain the ability to resume operations after a set of restart activities are conducted. Feed and withdrawal systems would also be in standby. A cadre of cascade operators, utilities operators, and maintenance staff would be retained and would form the basis for future restart, operations, and maintenance. The power load would decrease to about 15 MW. Specific steps to go into cold standby include:

- removing uranium deposits in certain portions of the cascades,
- buffering of process cells with dry air to prevent wet air in-leakage,
- installing cell buffer alarms to assure that proper integrity of the system is maintained, and
- revising operating and maintenance procedures.

Other issues related to cold standby include the need to dispose of all HEU-contaminated equipment (potential need for disposal cell at PORTS), state regulatory issues and interface, nuclear safety regulatory strategy, and contracting arrangements.

4.13.2 Depleted UF_6 Conversion Facility

In April 1999, DOE issued a *Final Programmatic Environmental Impact Statement for Alternative Strategies for the Long-Term Management and Use of Depleted Uranium Hexafluoride* (DOE/EIS-0269) that described the preferred alternative for managing depleted UF_6. The Record of Decision (ROD) was issued in August 1999.

DOE has proposed to design, construct, and operate conversion facilities at PORTS and the Paducah Gaseous Diffusion Plant (PGDP) in Kentucky. These facilities would convert DOE's inventory of

depleted UF_6 now located at PORTS, PGDP, and the East Tennessee Technology Park in Oak Ridge, Tennessee, to triuranium octaoxide, uranium dioxide, uranium tetrafluoride, uranium metal, or some other stable chemical form acceptable for transportation, beneficial use/reuse, and/or disposal. A related objective is to provide cylinder surveillance and maintenance of the DOE inventory of depleted UF_6, low-enrichment UF_6, natural assay UF_6, and empty and heel cylinders in a safe and environmentally acceptable manner.

Although no site has been selected until a separate NEPA review has been conducted and a ROD has been issued, the candidate site for the conversion facility at PORTS is the lithium warehouse area. This is an area surrounding and including warehouses X-744S, -T, and -U. The candidate site, in general, is bounded on the west side by an unnamed road west of X-744T; on the north and east side by a truck access road; and on the east and south side by a dirt construction road. Excluded from this area are Buildings X-616, X-106B, and X-106C.

The proposed action would have no impact on the conversion facility. The proposed locations being considered for the facility are located on the far southern, west and northwest portions of the site. The pipeline route chosen would avoid the cylinder lots and potential sites for the proposed conversion facility.

4.13.3 Reindustrialization Program

Several ongoing initiatives are underway at PORTS in coordination with SODI, the recognized community reuse organization for PORTS. DOE's Office of Worker and Community Transition established community reuse organizations to minimize the negative effects of workforce restructuring at DOE facilities that have played an historic role in the nation's defense. These organizations provide assistance to the neighboring communities negatively affected by changes at these sites.

SODI was established in August 1995 and was incorporated as a non-profit organization in July 1997. The purpose of the organization is to create job opportunities within the four counties most affected by PORTS downsizing—Pike, Ross, Jackson, and Scioto. SODI members represent business, industry, education, economic development, government, DOE, BJC, and USEC. A Community Transition Plan was completed in 1997 and contains a series of initiatives designed to create the human and physical infrastructure necessary to decrease dependency on the DOE facility, diversify the economy, create high-wage jobs, strengthen the tax base, and improve the quality of life in the area.

DOE has provided $10 million dollars through grants to SODI for economic development projects and has committed an additional $2.95 million for FY 2000–2001. SODI has invested this money primarily in the development of industrial parks in each of the four counties. In addition, SODI actively promotes the reuse of DOE property by private industry. The first lease between DOE and SODI was signed on April 1, 1998, for 2.4 to 3.2 ha (6 to 8 acres) of land on the north side of the PORTS property. The tract was used as a ROW for a railroad spur to connect with the existing DOE north rail spur. A portion of this property was then subleased by SODI to the Mead Corporation for access to the rail line for a new wood grading operation. This action was covered under a NEPA Categorical Exclusion (CX) No. CX-POR-522 completed in 1997. A second lease between DOE and SODI was signed on October 13, 2000, for 4.9 ha (12 acres) of land adjacent to the area of the first lease. This tract will be used for additional railroad spurs and use of existing rail facilities. This action was covered under CX-PORTS-538.

Additional DOE real estate outgrants that have recently occurred at PORTS include the following:

- ROW easement for a waterline and sewer line,
- license for non-federal use of property for concurrent road usage,
- recreational license to Scioto Township for development of a community park,
- greenway licenses to Scioto Township and Seal Township, and
- lease/license (short-term) for use of parking lots by SODI.

4.13.4 Other Regional Industrial Developments

There are several other industrial parks in the area that, if successful, may increase employment in the ROI (Table 4.7). Most of these parks are relatively new, and their potential for new job creation is unknown. The cumulative impact would depend on the total number of jobs created throughout the region and on the type of wages paid by the industries that located there. If all of these parks developed rapidly within the next 10 years, there could be a large cumulative impact on employment and income. However, such rapid development in a chronically depressed region would be highly unusual.

Table 4.7. Additional industrial parks in the PORTS ROI

County	Site name	No. of acres
Jackson	Jackson Area Industrial Park	200
	Gettles Site	75
Pike	Zahn's Corner	376
	Scioto Township Industrial Park	200
Ross	Gateway	90
Scioto	New Boston	70
	Haverhill	1065
	522 Site	172

Source: Chandler 2000, Justice 2000, and ODOD 1999–2000.

The high-pressure gas line that would be installed off-site for Pike Gas Company would be controlled and managed by Pike Gas Company. Pike Gas Company has had numerous inquiries from local residents regarding the potential to gain natural gas service. The decision to supply natural gas service to these customers would be controlled by Pike Gas Company and would be subject to Public Utilities Commission standards and requirements.

4.13.5 Impacts

Potential cumulative impacts that could occur from the proposed action to provide an alternate heating system to accomplish winterization of PORTS facilities following placement of the gaseous diffusion plant in cold standby and the other actions described previously are presented in the following sections.

4.13.5.1 Land and facility use

Impacts from the other actions described in the previous sections have the potential to affect land and facility use at PORTS. Placing the GDP in cold standby and construction and operation of the depleted UF_6 conversion facility would potentially limit (at least in the short term) the land and facilities that could be developed or reused under the proposed reindustrialization program. Direct incremental impacts of the proposed action on the development of other industrial properties in the region are unlikely. Installation of the natural gas line is not expected to result in changes to existing land use.

4.13.5.2 Air quality

The proposed action would have minimal impacts on local or regional air quality. The existing air quality of the region is considered to be good and is in attainment for all of the NAAQS. Air emissions from the other actions described previously would only be expected to have minor impacts and not violate any of the NAAQS. Fugitive dust emissions from construction activities would be temporary and controlled by mitigation measures (e.g., watering and covering exposed soil piles).

4.13.5.3 Soil and water resources

Construction-related disturbance of natural soils would occur under the proposed action. These types of impacts would be temporary and mitigated through the use of BMPs. Accidental spills and releases of hazardous materials could also potentially impact soils. Impacts to surface water and groundwater resources could also occur during construction activities, but they also would be mitigated. None of the actions discussed previously would be expected to have major discharges of industrial effluents that could adversely impact water resources.

4.13.5.4 Ecological resources

Construction activities associated with the proposed action could result in minor, temporary disturbance to existing habitats and biota. However, no federal- or state-listed threatened and endangered species are known to exist in the area of the proposed action. Emissions and effluents from the operation of the proposed actions should not be of sufficient quantity to have major adverse impacts (e.g., stress, impairment, injury, or mortality) on existing habitats and biota. Accidental releases from ongoing and proposed operations could impact ecological resources if adequate mitigation measures were not in place and implemented.

4.13.5.5 Socioeconomics and environmental justice

No cumulative socioeconomic impacts are expected to occur from the proposed action.

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, requires agencies to identify and address disproportionately high and adverse human health or environmental effects their activities may have on minority and low-income populations. As discussed in Sect. 3.8, only one census tract (9937) in the ROI includes a minority population, and this population is located several miles south of PORTS in the city of Portsmouth. Therefore, there would be no disproportionate impact on minority populations. Many of the tracts in the ROI meet the definition of low-income populations, especially the tracts nearest the site in Pike County. However, no disproportionately high and adverse human health or environmental impacts to these low-income populations are expected to result from the implementation of the proposed action. No cumulative environmental justice impacts would be expected to occur from the proposed action. Environmental justice and census tract data for the PORTS region are presented in Sect. 3.8.

4.13.5.6 Infrastructure and support services

No cumulative transportation impacts are expected from the proposed action. Implementation of the proposed action discussed previously would not require any major upgrades to existing transportation systems or major new construction of roads or rail facilities. A small increase in truck traffic could be expected during construction activities. An increase in fuel-oil tanker trucks on U.S. Route 23 and/or U.S Route 32 would occur especially during the initial filling of the fuel oil tanks; routine delivery of fuel oil would be limited to approximately 5 fuel-oil tanker trucks per day. These minor transportation impacts

would be further reduced upon completion of the natural gas pipeline. Impacts to transportation in the area would not require modification of roads or other infrastructures to accommodate additional traffic.

Associated with increases in traffic is the potential for an increased number of accidents, additional noise and air pollution, and road deterioration and damage. The increase in average daily traffic volumes could result in inconveniences for other vehicles (personal and commercial) on affected routes and connecting roads. Increased pavement deterioration and damage could increase costs associated with maintaining or resurfacing roads and highways. Although noise associated with increases in traffic is normally not harmful to hearing, increased traffic noise is considered by the public to be a nuisance. Increased accidents put an additional strain on local emergency response personnel. Increased vehicular traffic also has the greatest potential to increase air pollution in the local area because emissions from motor vehicles are poorly regulated.

4.13.5.7 Human health and accidents

Cumulative public and occupational health impacts would be expected to be equal to or less than those that currently exist in and around PORTS. Additional potential accidents resulting from tenant use of natural gas would be evaluated against the DOE and USEC safety basis on a request basis.

5. REGULATORY COMPLIANCE

During the NEPA process, DOE contacts the USFWS to obtain the latest information on threatened and endangered species or designated critical habitats that could occur in the vicinity of the proposed action. If DOE determines that any threatened and endangered species or critical habitat could be adversely impacted by the proposed action, informal or formal consultation with the USFWS is initiated under Section 7 of the Endangered Species Act (16 U.S.C. 1531 et seq.). Threatened and endangered species at PORTS are discussed in Sects. 3.6 and 4.6.

DOE is also required under Section 106 of the NHPA to consult with the SHPO regarding the presence of archaeological and historic sites and the potential for adverse impacts at a proposed project site. Consultation with the Ohio SHPO is discussed in Sect. 4.7.3. Also, under the Farmland Protection Policy Act, DOE consults with the Natural Resource Conservation Service regarding the presence and future use of prime farmland soils at a proposed site. The pipeline installation (depth of 4 ft) will be below the tillable depth for agricultural use and will result in no conversion of prime farmlands; therefore, the National Resource Conservation Service was not contacted concerning the proposed action.

DOE activities at PORTS are required to operate in accordance with environmental regulations established by federal and state laws, executive orders, DOE orders, and compliance agreements. Most DOE-PORTS cleanup activities are conducted under a Consent Decree with the State of Ohio and an Administrative Consent Order with the Ohio EPA and U.S. EPA. While environmental restoration activities are implemented in accordance with the RCRA Corrective Action Program, the Administrative Consent Order cites CERCLA as a governing authority in addition to RCRA. CERCLA establishes many requirements for transfer of federally owned property, including property that has been contaminated or property that can be identified as uncontaminated.

Relevant DOE orders pertain to the proposed action include DOE Order 430.1A, *Life Cycle Asset Management*; DOE Order 5400.1, *General Environmental Protection Program*; and DOE Order 5400.5, *Radiation Protection of the Public and the Environment*. Regulations implementing the CAA, CWA, NRC rules, RCRA, Safe Drinking Water Act, TSCA, Emergency Planning and Community-Right-to-Know Act, and others may apply.

Table 5.1. List of Agencies and Persons Contacted

The following agencies and persons were contacted for information and data used in the preparation of this EA (copies of correspondence are provided in Appendix A).

Name	Affiliation	Location	Topic
Pat Jones	Ohio Department of Natural Resources	Columbus, Ohio	Threatened and Endangered Species
Kent Kroonemeyer	U.S. Fish and Wildlife Service	Reynoldsburg, Ohio	Endangered Species Act, Section 7 Informal Consultation
David Snyder	Ohio Historic Preservation Office	Columbus, Ohio	National Historic Preservation Act, Section 106 Compliance

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APPENDIX A

COPIES OF CONSULTATION LETTERS

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Department of Energy
Portsmouth Site Office
P.O. Box 700
Piketon, Ohio 45661-0700
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March 8, 2001
UE-54-9949

RECEIVED
MAR 15 2001

Mr. David Snyder
Archeology Reviews Manager
Resource Protection and Review
567 East Hudson Street
Columbus, Ohio 43211-1030

Dear Mr. Snyder:

NATIONAL HISTORIC PRESERVATION ACT, SECTION 106 COMPLIANCE, INSTALLATION OF OIL FIRED BOILERS IN X-3002 FACILTIY AT THE PORTSMOUTH GASEOUS DIFFUSION PLANT (PORTS) IN PIKETON, OHIO

As required in 36 CFR Part 800, this letter provides official notification to the Ohio Historic Preservation Office of proposed modifications of X-3002 Facility of the Gas Centrifuge Enrichment Plant (GCEP) portion of the Department of Energy's Portsmouth Gaseous Diffusion Plant (PORTS). The X-3002 Facility was originally intended to be a gas centrifuge processing facility; however, no process equipment was installed and the facility has been used as a warehouse. This facility is proposed to be the location developed for installation of oil fired boilers to supply heat for site buildings following cessation of operations of the gaseous diffusion processes at PORTS. In addition, fuel storage tanks would be installed at the site to manage sufficient quantities of fuel oil to fire the boilers.

The following are Section 106 requirements pertaining to the proposed activities:

DOE's designated Agency Official responsible for this planned undertaking:

Ms. Sharon Robinson, Site Manager, Portsmouth Site Office
U.S. Department of Energy
Post Office Box 700
Piketon, Ohio 45661

Area of Potential Effect (APE):

The area of potential effect would result from internal modifications and minor exterior alterations to X-3002 Facility. Internal modifications would include installation of the boilers inside the building. External modifications would include construction of an opening in the building to allow for venting stacks for fumes generated from combustion of fossil fuels (these vent stacks would result in minor visible alteration of the facility but would not adversely affect the building's appearance). The X-3002 Facility was originally intended to be a gas centrifuge processing facility; however, no process equipment was installed. Since completion of construction, the X-3002 Facility has been used only as a warehouse.

Identification of Consulting Parties:

The consulting party recommended by DOE for this project is the Ohio State Historic Preservation Office (SHPO). The APE is within the previously disturbed area of the operating PORTS plant. In addition, the APE is within areas disturbed during construction of the GCEP facility and therefore should not result in any additional impact to Native American Indian tribal, religious, or cultural sites.

Public Participation:

The proposed undertaking will be addressed during the DOE public meeting in the spring of 2001, prior to initiation of building modifications. At this meeting DOE will solicit and respond to public concerns related to this proposal.

Assignment of Section 106 Review Responsibilities:

DOE is the sole agency responsible for the Section 106 review process for this project.

Incorporation of Section 106 in Environmental Documents:

A National Environmental Policy Act review of this action is being prepared. When completed this CX will address any Section 106 requirements.

DOE PORTS has determined that the proposed project would not have adverse effects on historical resources included or eligible for inclusion in the National Register of Historic Places (National Register). The proposed alterations to X-3002 Facility are minor and would result in only slight alteration of the external appearance of the building (vent stacks may be noticeable from some locations). Internal alterations to the structure would involve installation of oil fired boilers and appurtenances necessary to operate the boilers and heating system. This will result in minimal impact to the building's interior since no equipment was placed in the facility and no operational activities occurred. In addition, the proposed alterations to X-3002 Facility would not impact on the historical integrity of the PORTS core plant since all of the GCEP Facilities were constructed from the late1970s through early 1980s in a location separate from the Gaseous Diffusion Plant. Furthermore, the X-3002 Facility was not completed, gas centrifuge equipment was not installed, and gas centrifuge operations were not functional at this facility.

DOE PORTS requests your concurrence with DOE's determination of no adverse effects on cultural resources. Please provide written conformation of the Ohio SHPO's determination.

If you have any questions or require additional information related to this proposed process please call Ray Moore at (865) 576-9574 or Kristi Wiehle at (740) 897-5020.

Sincerely,

Sharon J. Robinson
Site Manager
Portsmouth Site Office

cc:
Tom McCulloch
Advisory Council on Historic Preservation
1100 Pennsylvania Avenue Northwest 803
Washington, DC 20004

Lois Thompson, EH-232/FORS
Skip Gosling, HR-76/FORS
Bob Poe, SE-30/ORO
Harold Monroe, SE-30/ORO
David Allen, SE-32/ORO
Ray T. Moore, SE-32/ORO
J. King, BJC/PORTS

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Ohio Historic Preservation Office

567 East Hudson Street
Columbus, Ohio 43211-1030
614/ 298-2000 Fax: 614/ 298-2037

Visit us at www.ohiohistory.org/resource/histpres/

OHIO HISTORICAL SOCIETY
SINCE 1885

April 23, 2001

Sharon Robinson
Site Manager
Portsmouth Site Office
U.S. Department of Energy
P.O. Box 700
Piketon, Ohio 45661

Dear Ms. Robinson:

Re: Installation of Oil-Fired Boilers, Facility X-3002,
Portsmouth Gaseous Diffusion Plant, Piketon, Ohio

This is in response to your correspondence, received on March 16, 2001, regarding the project referenced above. The Portsmouth Gaseous Diffusion Plant was previously determined to be eligible for the National Register of Historic Places. My comments are made pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, and the associated regulations at 36 CFR Part 800.

Facility X-3002 was one of several facilities constructed in the 1970s and 1980s as part of the Gas Centrifuge Enrichment Plant. Although Facility X-3002 was intended to be a gas centrifuge processing facility, no process equipment was installed and the building functions as a warehouse. Based on the information submitted, it is my opinion that the proposed work, if completed as described, will have no adverse effect on historic properties listed in or eligible for the National Register of Historic Places.

If you have any questions concerning this review, please contact David Snyder or Sandra Davies at the address listed above. Thank you for your cooperation.

Sincerely,

Mark J. Epstein, Department Head
Resource Protection and Review

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649001015

Department of Energy
Portsmouth Site Office
P.O. Box 700
Piketon, Ohio 45661-0700
Phone: 740-897-5010

April 25, 2001
EM-97-0014

RECEIVED
APR 30 2001

Mr. David Snyder
Archeology Reviews Manager
Resource Protection and Review
567 East Hudson Street
Columbus, Ohio 43211-1030

Dear Mr. Snyder:

NATIONAL HISTORIC PRESERVATION ACT, SECTION 106 COMPLIANCE, INSTALLATION OF A NATURAL GAS PIPELINE FROM ZAHNS CORNER TO THE X-3002 BUILDING AT THE PORTSMOUTH GASEOUS DIFFUSION PLANT (PORTS) IN PIKETON, OHIO

As required in 36 CFR Part 800, this letter provides official notification to the Ohio Historic Preservation Office of the proposed installation of a natural gas pipeline from Zahns Corner to the X-3002 Building of the Gas Centrifuge Enrichment Plant (GCEP) portion of the Department of Energy's Portsmouth Gaseous Diffusion Plant (PORTS) in Piketon, Ohio. The X-3002 Facility was originally intended to be a gas centrifuge processing facility; however, no process equipment was installed and the facility has been used as a warehouse. The purpose of the natural gas pipeline is to supply fuel for the recirculating hot water plant to be installed at the X-3002 Building. The boilers for the recirculating hot water plant will be operated with No.2 fuel oil until the natural gas pipeline installation is complete. The route of the pipeline will follow existing right-of-ways to the extent possible.

The following are Section 106 requirements pertaining to the proposed activities:

DOE's designated Agency Official responsible for this planned undertaking:

Ms. Sharon Robinson, Site Manager, Portsmouth Site Office
U.S. Department of Energy
Post Office Box 700
Piketon, Ohio 45661

Area of Potential Effect:

The area of potential effect (APE) is presented in Figure 1. This proposed route roughly approximates the location of the natural gas pipeline. Currently there is no natural gas supply line for the PORTS site. Internal and external modifications to the X-3002 Building were discussed in a prior notification letter in March 2001.

Identification of Consulting Parties:

The consulting parties recommended by DOE for this project are the Ohio State Historic Preservation Office (SHPO) and the Pike County Chamber of Commerce. The APE is in an area adjacent to the PORTS reservation. The pipeline route will follow existing right-of-ways to the extent practicable; easements through private property, US Route 32 and other roadways will be required for sections of the pipeline external to the PORTS reservation. The APE should not result in any additional impact to Native American Indian tribal, religious, or cultural sites because most of the areas in the path of the proposed pipeline have been previously disturbed by residential or commercial development and any artifacts encountered can be easily avoided by alteration of the proposed path of the pipeline. However, if any Native American Indian tribal, religious, or cultural sites are encountered, work will be halted and an investigation of all findings will be conducted. A preliminary walkover by DOE of the proposed right-of-way will be conducted once final easements are negotiated and a final location for the pipeline is determined.

Public Participation:

The proposed undertaking will be addressed during the DOE public meeting on May 15, 2001, prior to obtaining easements for the pipeline route. At this meeting DOE will solicit and respond to public concerns related to this proposal.

Assignment of Section 106 Review Responsibilities:

DOE is the sole agency responsible for the Section 106 review process for this project.

Incorporation of Section 106 in Environmental Documents:

A National Environmental Policy Act review of this action is being prepared. When completed this document will address any Section 106 requirements.

DOE PORTS does not believe that the proposed project would have adverse effects on historical resources included or eligible for inclusion in the National Register of Historic Places (National Register) because most of the areas in the path of the proposed pipeline have been previously disturbed by residential or commercial development and any historically significant site encountered can be easily avoided by alteration of the proposed path of the pipeline. The proposed alterations to X-3002 Facility were addressed in a prior notification letter in March 2001.

DOE PORTS requests your concurrence with DOE's determination that no adverse effects on cultural resources will result from this action. Please provide written confirmation of the Ohio SHPO's determination.

If you have any questions or require additional information related to this proposed process please call Ray Moore at (865) 576-9574 or Melda Rafferty at (740) 897-5521.

Sincerely,

RWhanecon FOR

Sharon J. Robinson
Site Manager
Portsmouth Site Office

Enclosure

cc w/enclosure:
Tom McCulloch
Advisory Council on Historic Preservation
1100 Pennsylvania Avenue Northwest 803
Washington D C 20004

Lois Thompson, EH-232, FORS
Skip Gosling, HR-76, FORS
Bob Poe, SE-30/ORO
Harold Monroe, SE-30/ORO
David Allen, SE-32/ORO
Ray T. Moore SE-32/ORO
Administrative Records
Jim King, BJC/PORTS

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Department of Energy

Oak Ridge Operations Office
P.O. Box 2001
Oak Ridge, Tennessee 37831—

May 3, 2001

Ms. Patricia Jones
Ohio Department of Natural Resources
Heritage Program
1889 Fountain Square, Bldg. F-1
Columbus, Ohio 43224

Dear Ms. Jones:

LETTER OF CONSULTATION FOR THE PROPOSED TRANSFER OF LAND AND FACILITIES AT THE PORTSMOUTH GASEOUS DIFFUSION PLANT

The U.S. Department of Energy (DOE) is preparing an Environmental Assessment (EA) for the Portsmouth Gaseous Diffusion Plant (PORTS) located at Piketon, Ohio, in accordance with the National Environmental Policy Act (NEPA). The proposed action is to conduct winterization activities in preparation for cold standby for facilities at PORTS.

Winterization of PORTS is necessary because of DOE's decision to place the plant in cold standby, and facilities and systems must be protected from freezing. Freezing of facilities and systems would likely have the following results:

- substantial damage from freezing of fire protection systems;
- potential RCRA waste storage permit violations due to lack of heat, and
- generation of large amounts of contaminated water or other materials requiring cleanup, processing, storage and/or disposal.

Other impacts include lack of heating for facilities housing DOE and contractor staff and possible concerns with facilities containing highly enriched uranium.

Proposed winterization activities include installation and operation of a hot water heating facility with associated recirculating water pumps in an existing vacant structure and installation and operation of a series of electric heaters in PORTS process buildings. The hot water boilers would initially operate on oil, but would likely be converted to natural gas in the future. Since use of natural gas would require running an approximate five-mile natural gas line to the site (see enclosure), the impact of the new gas line would also be addressed in the EA. Alternatives to the proposed action which would be considered include the "No Action Alternative" required by NEPA.

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This letter is intended to serve as informal consultation regarding protected or rare species that may be on or near the site. In this regard, DOE requests an updated list of protected species and habitats on the DOE/PORTS property and solicits your recommendations and comments about the potential effects of this proposed action. Your input will be used in the preparation of the EA. Because of the urgent need to initiate winterization activities as soon as possible, we would appreciate a reply to this letter by May 11, 2001.

If you need further information on this request, please do not hesitate to call me at (865) 576-0938.

Sincerely,

James L. Elmore

James L. Elmore, Ph.D.
Alternate NEPA Compliance Officer

Enclosure

cc:
D. Allen, SE-30-1
G. Hartman, EM-912

Department of Energy

Oak Ridge Operations Office
P.O. Box 2001
Oak Ridge, Tennessee 37831—

May 3, 2001

Mr. Kent Kroonemeyer
Field Supervisor
U.S. Fish and Wildlife Servic
6950-H Americana Parkway
Reynoldsburg, Ohio 43068-4127

Dear Mr. Kroonemeyer:

INFORMAL CONSULTATION UNDER SECTION 7 OF THE ENDANGERED SPECIES ACT FOR THE PROPOSED TRANSFER OF LAND AND FACILITIES AT THE PORTSMOUTH GASEOUS DIFFUSION PLANT

The U.S. Department of Energy (DOE) is preparing an Environmental Assessment (EA) for the Portsmouth Gaseous Diffusion Plant (PORTS) located at Piketon, Ohio, in accordance with the National Environmental Policy Act (NEPA). The proposed action is to conduct winterization activities in preparation for cold standby for facilities at PORTS.

Winterization of PORTS is necessary because of DOE's decision to place the plant in cold standby, and facilities and systems must be protected from freezing. Freezing of facilities and systems would likely have the following results:

- substantial damage from freezing of fire protection systems;
- potential RCRA waste storage permit violations due to lack of heat, and
- generation of large amounts of contaminated water or other materials requiring cleanup, processing, storage and/or disposal.

Other impacts include lack of heating for facilities housing DOE and contractor staff and possible concerns with facilities containing highly enriched uranium.

Proposed winterization activities include installation and operation of a hot water heating facility with associated recirculating water pumps in an existing vacant structure and installation and operation of a series of electric heaters in PORTS process buildings. The hot water boilers would initially operate on oil, but would likely be converted to natural gas in the future. Since use of natural gas would require running an approximate five-mile natural gas line to the site (see enclosure), the impact of the new gas line would also be addressed in the EA. Alternatives to the proposed action which would be considered include the "No Action Alternative" required by NEPA.

PRINTED ON RECYCLED PAPER

This letter is intended to serve as informal consultation under Section 7 of the Endangered Species Act. In this regard, DOE requests an updated list of protected species and habitats on the DOE/PORTS property and solicits your recommendations and comments about the potential effects of this proposed action. Your input will be used in the preparation of the EA. Because of the urgent need to initiate winterization activities as soon as possible, we would appreciate a reply to this letter by May 11, 2001.

If you need further information on this request, please do not hesitate to call me at (865) 576-0938.

Sincerely,

James L. Elmore, Ph.D.
Alternate NEPA Compliance Officer

Enclosure

cc:
D. Allen, SE-30-1
G. Hartman, EM-912

Ohio Department of Natural Resources

BOB TAFT, GOVERNOR SAMUEL W. SPECK, DIRECTOR

Division of Natural Areas & Preserves
Stuart Lewis, Chief
1889 Fountain Square, Bldg. F-1
Columbus, OH 43224-1388
Phone: (614) 265-6453; Fax: (614) 267-3096

May 7, 2001

James L. Elmore
Department of Energy
Oak Ridge Operations Office
P.O. Box 2001
Oak Ridge, TN 37831

Dear Dr. Elmore:

The Ohio Natural Heritage Database contains no records for rare species or unique natural features on the Portsmouth Gaseous Diffusion Plant property located near Piketon, Pike County on the Piketon, Waverly South, Wakefield and Lucasville quads. The records listed below are for rare plant species and a significant plant community at sites east of the proposed natural gas line. The numbers on the list correspond to the numbered locations on the accompanying map. The potentially threatened status is not a legal designation. Because of the distance of these records from the pipeline route we do not anticipate adverse impacts to these species and community.

Waverly South Quad:

1. *Scutellaria integrifolia* - Hyssop Skullcap, potentially threatened, 1981

2. *Gratiola viscidula* - Short's Hedge-hyssop, potentially threatened, 1981
   Rhexia virginica - Virginia Meadow-beauty, potentially threatened, 1981

3. *Gratiola viscidula* -Short's Hedge-hyssop, potentially threatened, 1981

4. Mixed Emergent Marsh plant community - 1981 survey, Given's Marsh, a well defined 4 acre cattail marsh in the main Teays River valley. Wool-grass and rice cutgrass are secondary dominants. Considered a good local example of this community type.

OFFICIAL FILE COPY
AMESQ
Log No. 18630
Date Received MAY 11 2001

Our primary concern would be potential impacts to Big Beaver Creek as a result of the pipeline crossing. This needs to be addressed in your environmental assessment for this project. You may wish to contact Mr. Edward Rankin at the Ohio EPA to determine if there are any fish data available for this stream. His phone number is (614) 836-8772.

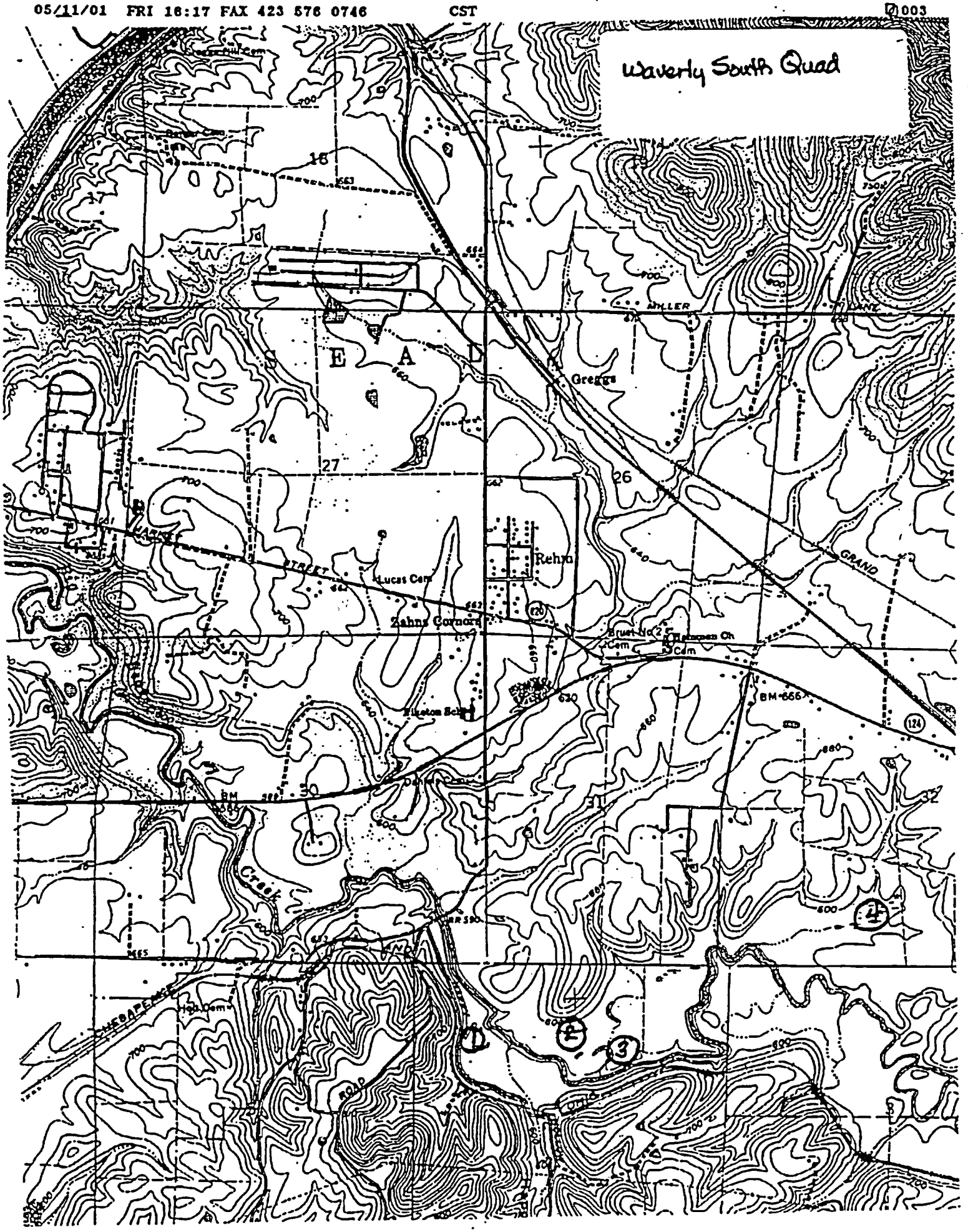
Please contact me if I can be of any further assistance.

Sincerely,

Patricia D. Jones

Patricia D. Jones
Data Services Administrator
Support Services Group

Enclosure


Waverly South Quad
S E A D
Greggs
Rehna
Lucas Cem
Zahns Corners
Bruce No 2 Cem
Johnson Ch Cem
BM 666
Fikston Bch
Creek
High Cem
GRAND
STREET
WILLER
CHESAPEAKE
ROAD
1
2
3
4

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
6950 Americana Parkway, Suite H
Reynoldsburg, Ohio 43068-4127
(614) 469-6923
Fax: (614) 469-6919

June 11, 2001

Mr. James L. Elmore
Department of Energy
Oak Ridge Operation Office
P.O. Box 2001
Oak Ridge, TN 37831

Dear Mr. Elmore:

This is in response to your May 3, 2001 letter requesting information we may have regarding the occurrence or possible occurrence of Federally-listed threatened or endangered species within the vicinity of the proposed site. The project involves the winterization of the Portsmouth Gaseous Diffusion Plant, located at Piketon, Pike County, Ohio. Proposed winterization activities include installation and operation of a hot water heating facility with associated recirculating water pumps in an existing vacant structure and installation and operation of a series of electric heaters in the process buildings. The hot water boilers would initially operate on oil, but would likely be converted to natural gas in the future. Since use of natural gas would require running an approximate five-mile natural gas line to the site, the impact of the new gas line would also be addressed in the EA. There are no Federal wildlife refuges, wilderness areas, or Critical Habitat within the vicinity of this project.

ENDANGERED SPECIES COMMENTS: The proposed project lies within the range of the Indiana bat, a Federally listed endangered species. Summer habitat requirements for the species are not well defined but the following are thought to be of importance:

1. Dead trees and snags (especially those with exfoliating bark) which may be used as maternity roost areas along riparian corridors.

2. Live trees (such as shagbark hickory) which have exfoliating bark.

3. Stream corridors, riparian areas, and nearby woodlots which provide forage sites.

Considering the above items, we recommend that if trees with exfoliating bark (which could be potential roost trees) are encountered on the proposed site, they should be saved wherever possible. If they must be cut, they should not be cut between April 15 and September 15.

If desirable trees are present and if the above time restriction is unacceptable, mist net or other surveys should be conducted to determine if bats are present. The survey should be designed and conducted in coordination with the endangered species coordinator for this office. The survey should be conducted in June or July since the bats would only be expected in the project area from approximately April 15 to September 15.

The project lies within the range of the timber rattlesnake, a large shy rattlesnake that is declining throughout its national range. No Federal listing status has been assigned to this species. Instead, the U.S. Fish and Wildlife Service has initiated a pre-listing Conservation Action Plan to support state and local conservation efforts. Your proactive efforts to conserve this species now may help avoid the need to list the species under the Endangered Species Act in the future. The timber rattlesnake is protected throughout much of its range and listed as endangered by the State of Ohio. Due to their rarity and reclusive nature, we encourage early project coordination to avoid potential impacts to timber rattlesnakes and their habitat.

In Ohio, the timber rattlesnake is restricted to the un-glaciated Allegheny Plateau and utilizes the specific habitat types, depending upon season. Winters are spent in dens usually associated with high, dry ridges. These dens may face any direction, but southeast to southwest are most common. Such dens usually consist of narrow crevices in the bedrock. Rocks may or may not be present on the surface. From these dens, timber rattlesnakes radiate throughout the surrounding hills and move distances as great as 4.5 miles. In the fall, timber rattlesnakes return to the same den. Intensive efforts to transplant timber rattlesnakes have not been successful. Thus protection of the winter dens is critical to the survival of this species. Some project management ideas include the following:

1) At a minimum, project evaluations should contain delineations of timber rattlesnake habitat within project boundaries. Descriptions should indicate the quality and quantity of timber

rattlesnake habitat (den sites, basking sites, and foraging area, etc.) that may be affected by the project.

2) In cases where timber rattlesnakes are known to occur or where potential habitat is rated moderate to high, timber rattlesnake surveys may be necessary. If surveys are to be conducted, it may be helpful to inquire about timber rattlesnake sightings with local resource agency personnel or reliable local residents. In addition, local herpetologists may have knowledge of historical populations as well as precise knowledge of the habits, and especially the specific, local types of habitats that may contain timber rattlesnakes. Surveys should be performed during the periods of spring emergence from dens (usually a narrow window in April or May) and throughout the active season until October. The species is often easiest to locate during the summer months when pregnant females seek open areas in early morning, especially after cool evenings.

3) In portions of projects where timber rattlesnakes will be affected, clearing and construction activities should occur at distances greater than 100 feet from known dens. Most importantly, tops of ridges and areas of exposed rock should be avoided.

4) In areas where timber rattlesnake dens are known or likely to exist, maintenance activities (mowing, cutting, burning, etc.) should be conducted from November 1 to March 1, when timber rattlesnakes are hibernating.

This technical assistance letter is submitted in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C.661 et seq.), the Endangered Species Act of 1973, as amended, and is consistent with the intent of the National Environmental Policy Act of 1969, and the U.S. Fish and Wildlife Service's Mitigation Policy.

If you have questions, or if we may be of further assistance in this matter, please contact Megan Sullivan at extension 16 in this office.

Sincerely,

Kenneth C. Lammers

Kenneth C. Lammers
Acting Supervisor

cc: DOW, Wildlife Environmental Section, Columbus, OH

APPENDIX B

PHASE I ARCHAEOLOGICAL SURVEY OF THE PROPOSED GAS PIPELINE FROM ZAHNS CORNER TO A TAP NEAR THE PORTS FACILITY, SCIOTO & SEAL TOWNSHIPS, PIKE COUNTY, OHIO

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PHASE I ARCHAEOLOGICAL SURVEY OF THE PROPOSED GAS PIPELINE FROM ZAHNS CORNER TO A TAP NEAR THE PORTS FACILITY, SCIOTO & SEAL TOWNSHIPS, PIKE COUNTY, OHIO.

June, 2001

DuVall & Associates

Archaeological & Historical Services/ Franklin, Tennessee

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PHASE I ARCHAEOLOGICAL SURVEY OF THE PROPOSED GAS PIPELINE FROM ZAHNS CORNER TO A TAP NEAR THE PORTS FACILITY, SCIOTO & SEAL TOWNSHIPS, PIKE COUNTY, OHIO.

prepared by:

Christopher M. Hazel *supervising archaeologist*
Glyn D. DuVall *principal investigator*
DuVall and Associates, Inc.
1242 Old Hillsboro Road
Franklin, Tennessee 37069
(voice) 615/ 791-6450
(fax) 615/ 791-5833

prepared for:

Pro2Serve Technical Services, Inc.
Professional Project Services
410 Cedar Bluff Rd. Ste.102
Knoxville, Tennessee 37923
(voice) 740/897 4586

Glyn D. DuVall
Principal Investigator

Lead Agency:
U.S. Department of Energy
Oak Ridge Operations
P.O. Box 2001, EM-912
Oak Ridge, Tennessee 37831

June, 2001

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MANAGEMENT SUMMARY

A Phase I archaeological survey was conducted along the proposed three mile (4.76 km) route of a gas pipeline, in the central portion of Pike County, Ohio. The survey was conducted by DuVall & Associates, Inc., on the 15th of May, 2001 for Pro2Serve, Inc., Oak Ridge, Tennessee. The primary goal of the survey, pursuant to the provisions of the National Historic Preservation Act and Executive Order 11593, was to identify historic and prehistoric archaeological resources within the project area and make a preliminary assessment of their potential eligibility for inclusion in the National Register of Historic Places.

The area of potential effect along the narrow (50') pipeline route consists of approximately 18 acres of land within the right-of-way (ROW) traversing along an existing road, open fields, and the flood-plain of the Big Beaver Creek. The pipeline extends NNE from the intersection of McCorkle & Dutch Run Roads to a gas pipeline tap adjacent to Zahn's Corner within Seal and Scioto Townships in the central portion of Pike County, Ohio. The project area is located within the southwest corner of the Waverly South, Ohio, U.S.G.S. Quadrangle Map.

The project area lies within the Omulga or Coolville-Blairton soil association in the Unglaciated Plateau Physiographic Provenance and characterized by moderately deep soils underlain by Mississippian age shale, sandstone, and siltstone. The terrain consists of broad ridges and moderate slopes in pasture or forest, and pasture or forested areas within minor flood-plains with scattered swampy areas.

The tract was archaeologically surveyed in anticipation of the construction of a three mile long, fifty foot wide gas pipeline. The archaeological survey consisted of an Ohio Historic and Archaeological Inventory site records and USGS maps search and literature review, shovel testing and limited pedestrian reconnaissance. Approximately 60% of the pipeline was examined through shovel test units. The remainder was surveyed using pedestrian reconnaissance. The investigations resulted in the recording of one completely disturbed 20th century house site (33Pk245) located outside the area of potential effect (Appendix B). The site appeared to have been pushed down and burned, but the cellar and remnants of outbuildings may be intact. As the site is outside of the area of impact, no further investigations are recommended for Site 33Pk245. The potential for intact features within the house site indicate eligibility for inclusion in the National Register of Historic Places under Criterion D. No cultural resources were encountered within the primary or secondary areas of impact along the pipeline corridor. No further investigations are recommended within the corridor.

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INTRODUCTION

This report describes the results of a Phase I archaeological survey of a three mile long gas pipeline serving the Portsmouth Gaseous Diffusion Plant (PORTS Faciltiy) crossing Sections 5, 8 and 17 in Scioto Township and Sections 27 and 30 in Seal Township, Pike County, Ohio (Figure 1). The archaeological investigations were conducted in compliance with Section 106 of the 1966 National Historic Preservation Act (Public Law 89-665; 16 USC 470; 80 Stat. 915) and federal implementation procedures 36CFR60 and 36CFR800.4b. The project was also conducted under "Archaeology Guidelines" implemented by the Ohio State Historic Preservation Officer in 1994.

The project area was surveyed in anticipation of the construction of a three mile section of a gas pipeline extending from an existing Gas Pipeline Tap near the community of Zahn's Corner within Seal Township to the intersection of McCorkle Road and Dutch Run Road in Scioto Township in a SSW trending alignment (Figure 2). The project area is within the Schlocta-Blairton and Omulga soil associations in the Shawnee-Mississippi Unglaciated Plateau Physiographic Provenance. The terrain consists of broad ridges and moderate slopes in pasture or forest, and pasture or forested areas within minor flood-plains with scattered swampy areas.

The archaeological survey was conducted by DuVall & Associates, Inc., for Pro2Serve Technical Services, Oak Ridge, Tennessee and the U.S. Department of Energy, Oak Ridge Operations Office, Oak Ridge, Tennessee. Field investigations were conducted on the 15th of May, 2001 by Glyn DuVall, Jeremy Galbraith, and Chris Hazel. Field investigations primarily consisted of a pedestrian survey of the project area and the excavation of 32 shovel test units (Figure 3,4,and 5). The field work was limited only by the absence of landowner permission to conduct investigations on a small portion (200 meters) of the northern third of the corridor.

The immediate project area has had no known previous archaeological investigation except for a small portion of the pipeline corridor at the intersection with US Route 32 surveyed by David Bush in 1987. No previously identified sites were located within the pipeline corridor. A disturbed historic house site, 33Pk245, was identified outside of the area of potential effect during the field work phase of the present investigations. No diagnostic artifacts were recovered. Subsurface investigations were not permitted on USDOE land outside of the pipeline ROW. Architectural debris within the site and the review of documents at the OSHPO indicate that 33Pk245 was a small farmstead dating to the first half of the 20th century. The house site has been in disuse since the USDOE acquired the land in 1952. Though all of the structures have been pushed down there is the potential for intact cultural features within 33Pk245. As the site is outside of the area of potential effect for the pipeline no further investigations are recommended. Due to the possible presence of intact features and/or deposits, the site maybe eligible for nomination to the National Register of Historic Places (36CFR60: Criterion D). No cultural resources were encountered within the area of potential effect. Based on the results of this Phase I survey, the proposed gas pipeline will have no effect on the archaeological resources in the area. No further investigations are recommended within the corridor.

No artifacts were collected during the field survey. All materials associated with this project, including field notes, maps, photographs, and negatives will be curated at the R.M.D.C. Facilities, PORTS Facility, U.S. Department of Energy, 3930 U.S. Route 23 South, Piketon, Ohio (45661).

Project Area Description

The proposed gas pipeline extends for three miles (4.79 km) within a fifty foot wide ROW, covering a total area of 18 acres. The pipeline will be located within Sections 5, 8 and 17 in Scioto Township and Sections 27 and 30 in Seal Township in the central portion of Pike County, 2.3-3.8 miles east and southeast of Piketon, Ohio. The pipeline originates at an existing gas pipeline tap located within Zahn's Corner Industrial Park, 200 meters west of Schuster Road and 215 meters northeast of Zahn's Corner Road (Figure 2). The pipeline follows a small intermittent drainage to the south for 550 meters, passing under Zahn's Corner Road. The pipeline continues due south for 1.46 km (.91 miles) across pastureland, diverging from the drainage, passing 190 meters west of Piketon Middle School, crossing under US Route 32 and Brookside Drive, continuing down to the floodplain of the Big Beaver Creek and up to the junction of Schuster and McCorkle Roads. The pipeline then continues within the ditch along the east side of McCorkle Road up to the railroad spur for the PORTS Facility where it crosses under the railroad bed over to the west side of McCorkle Road. The pipeline continues within the west ditch of the road for 920 meters up to the junction with Taylor Hollow Road where the pipeline crosses under the road to the east ditch of McCorkle Road. The pipeline follows within the east ditch of McCorkle Road for 3.1 km (2 miles) across a ridgetop, and the floodplain for Little Beaver Creek to the terminus of the project at the northeast corner of the junction of McCorkle and Dutch Run Roads.

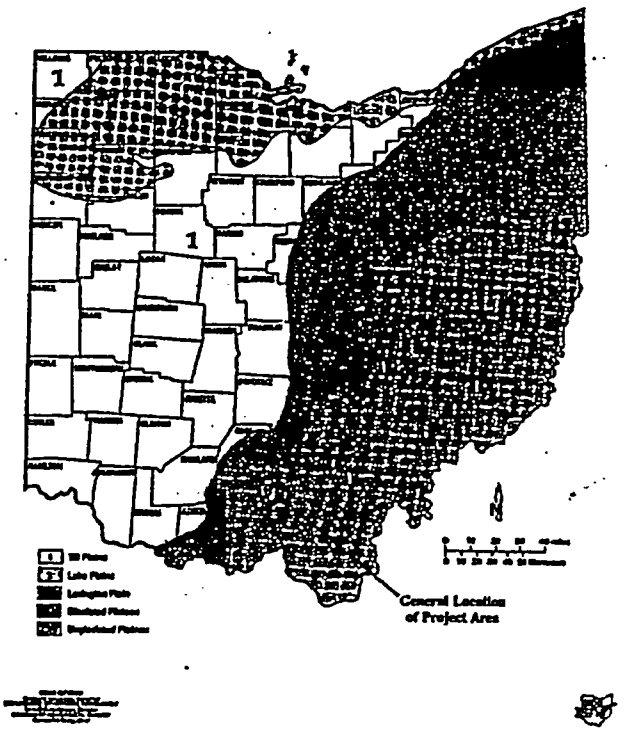

Figure 1: Physiographic Map of Ohio.

Figure 2: Plan of Proposed Gas Pipeline Showing Site Locations.

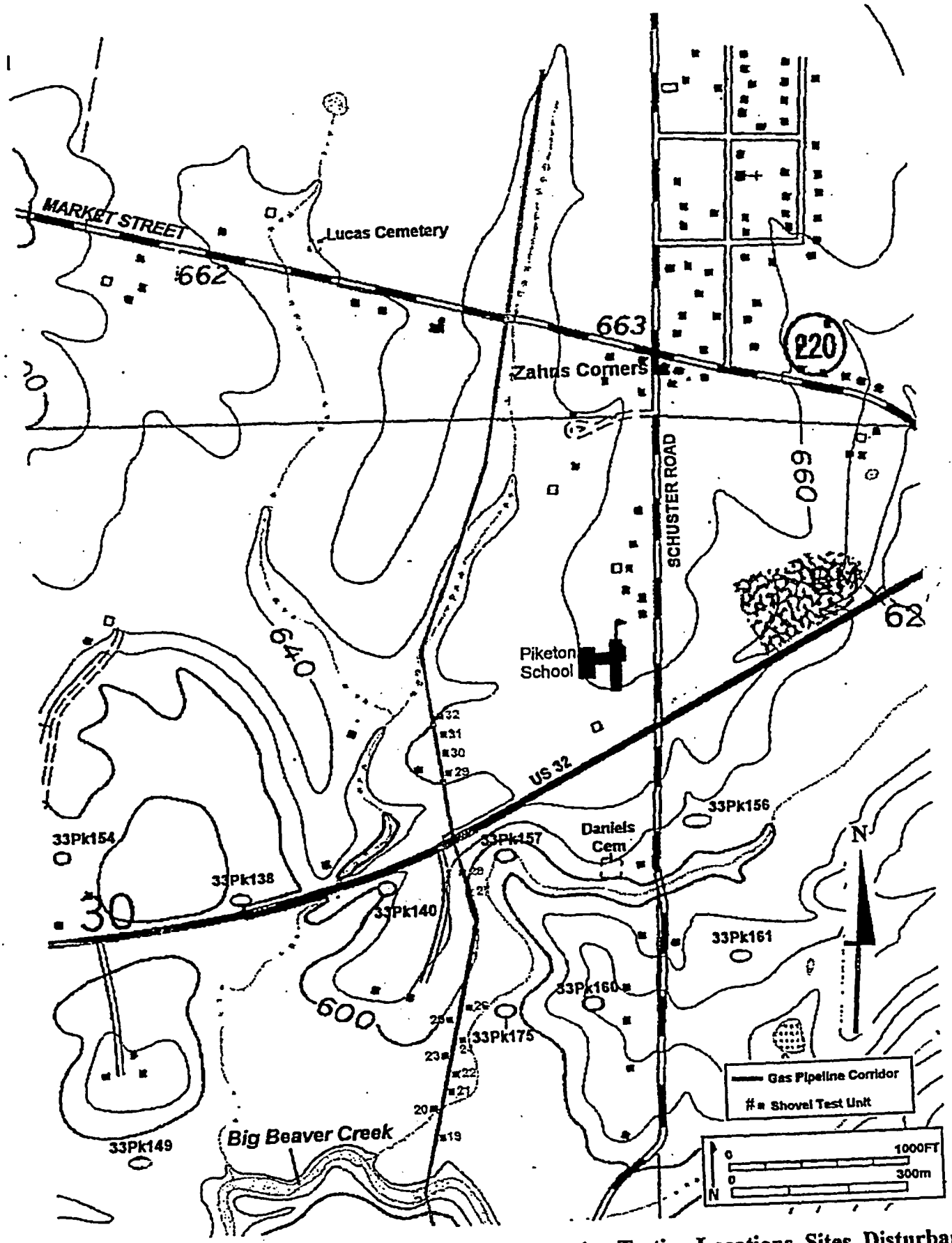

Figure 3: Plan of Northern Portion of Project Area Showing Testing Locations, Sites, Disturbances.

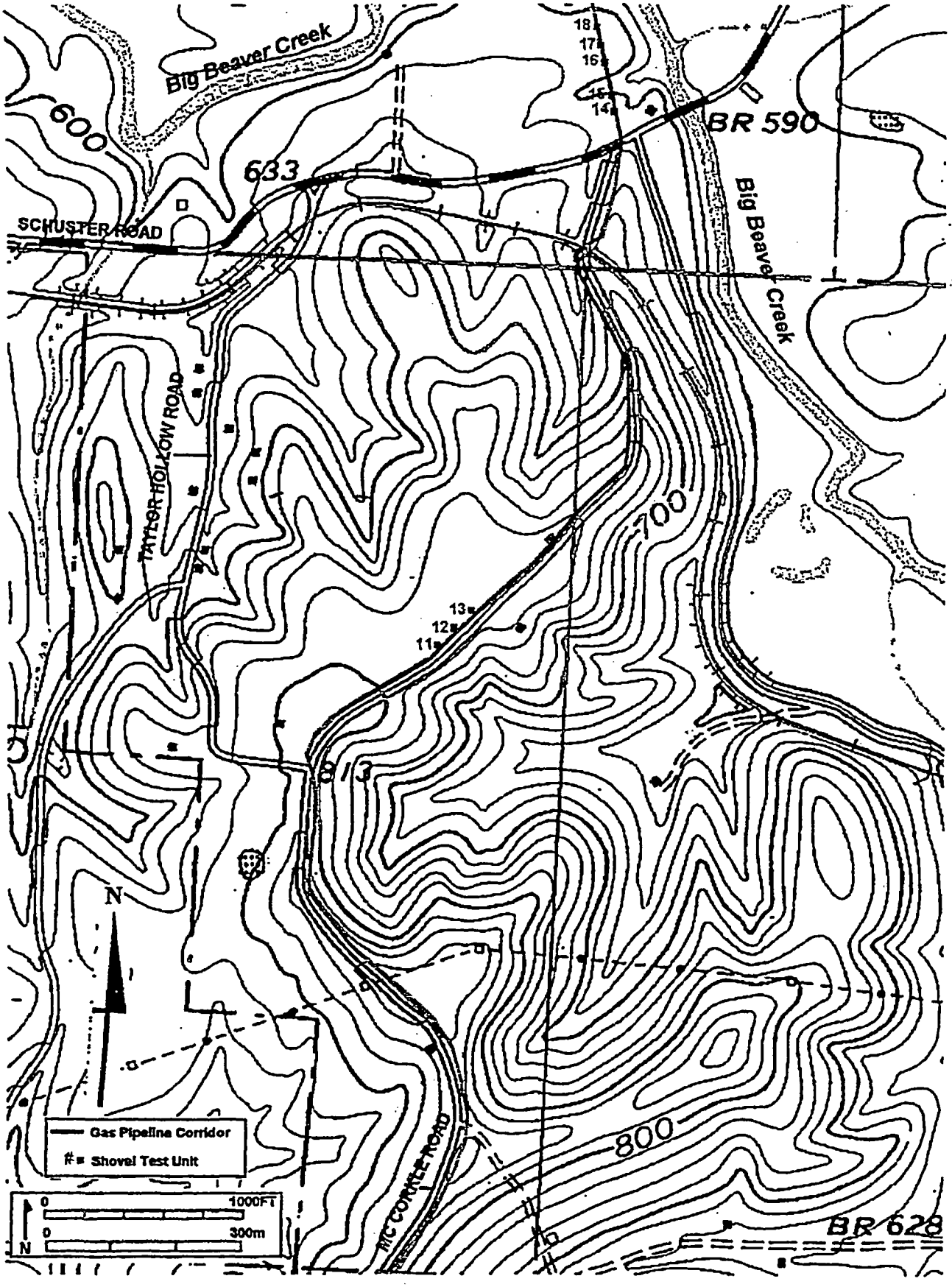

Figure 4: Plan of Central Portion of Project Area Showing Testing Locations, Sites, Disturbances.

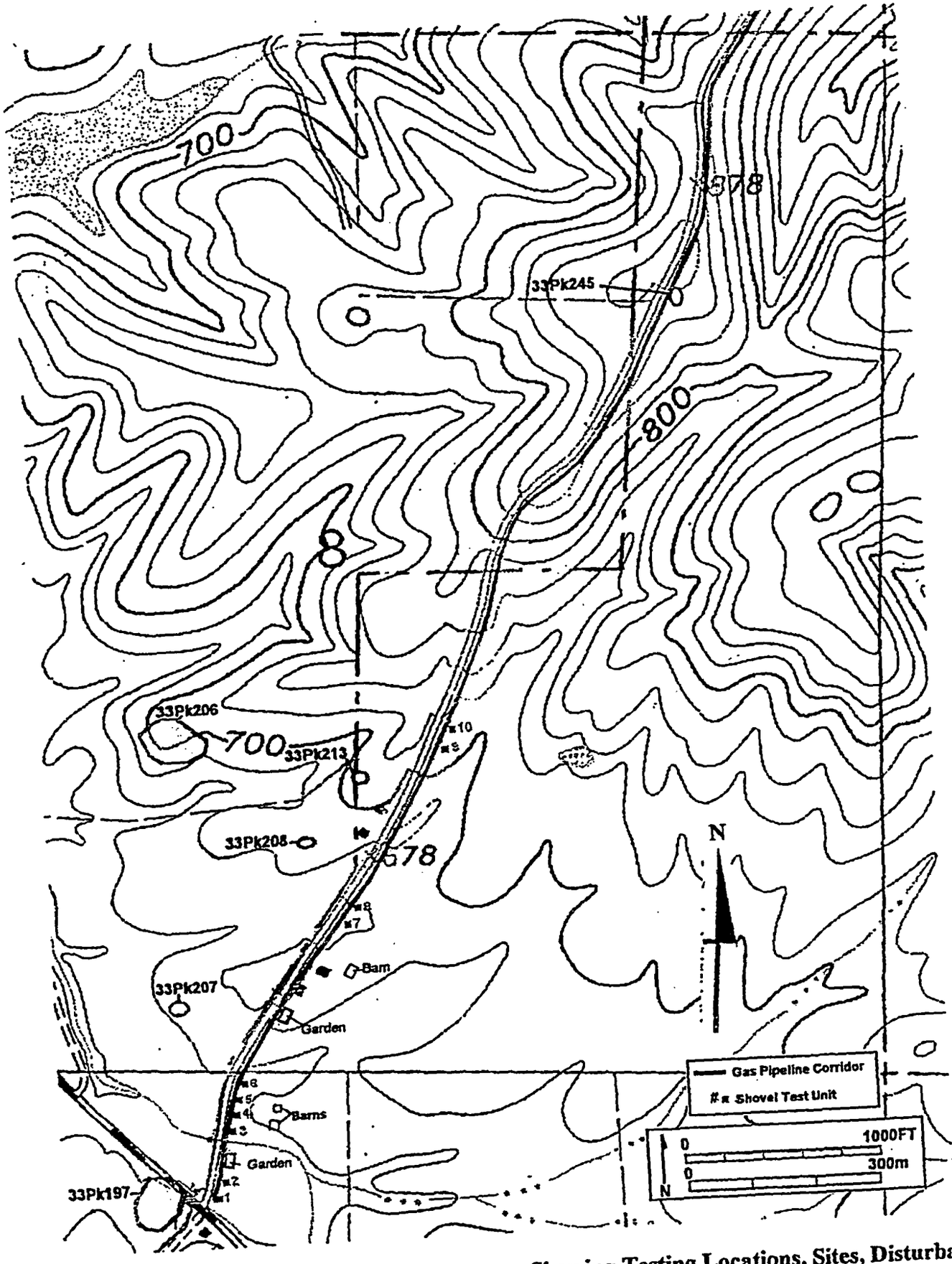

Figure 5: Plan of Southern Portion of Project Area Showing Testing Locations, Sites, Disturbances.

RESEARCH DESIGN

The purpose of the cultural resource survey for the proposed gas pipeline was to identify any prehistoric or historic cultural features potentially affected by the proposed construction. To this end, three hypotheses were formulated.

1-Considering the resource rich environment in the vicinity of the project area and previous surveys of central Pike County, it was assumed that there was a possibility for discovering prehistoric campsites, quarries, long-term occupation areas, or earthworks either on high spots on the slopes above the floodplain or along secondary terraces along the two creeks. The presence of prehistoric occupation sites is particularly dependant on the proximity of a permanent water source.

2-Historic European occupation extends back to the 17th century including a long history of agriculture within Pike County. There was the potential to encounter historic farmsteads along the ridgetop crossed by McCorkle Road and on secondary terraces of the two creeks.

3-The majority of the project area was assumed to be unsuitable for habitation prehistorically or historically. These uninhabitable areas include the steep slopes leading up to or along the sides of the ridgetop, the areas within the low floodplain of Big Beaver Creek, and the marshy area near Zahn's Corner where the pipeline follows the course of a small drainage/swampy area. A 200 meter section of the project area was assumed to be disturbed by the expansion of PIK-SR 32-13 to a four-lane highway (Bush 1987).

Prior to the field phase of the survey, the files at the Ohio State Historic Preservation Office will be reviewed in order to determine if previously identified sites have been recorded either within or adjacent to the project area. In order to locate any potential cultural resources the entire pipeline corridor will be examined via a pedestrian survey with particular attention paid to areas with a higher potential to contain cultural resources. These areas will include the ridgetop, flat areas along the slopes, the terraces along the creeks, and the preglacial valley within the northern third of the project area. Areas with the potential for cultural resources and with 50% or more surface exposure, including plowed fields and dirt roads will be systematically surface collected with transects spaced at five meter intervals. The remaining portions of the tract with potential for cultural resources will be tested with 50 x 50 cm units excavated in natural levels or at 10cm arbitrary levels within natural levels to a depth of at least 50 cm or until culturally sterile soils or bedrock are exposed.

Prehistoric and demolished historic sites will be identified via the presence of any artifacts visible on the surface or from within screened test units. Disturbed historic sites (farmsteads, mills, etc.) and prehistoric earthworks will be identified from above ground features. Previously identified prehistoric sites located on landforms similar to those within the present project area were primarily identified through the presence of lithic tools and debitage (Bush,et.al. 1987). Previously identified historic sites within the vicinity of the project area were primarily identified through the presence of kitchenware (ceramics, glass) and/or above ground features (Schweikart,et.al 1997).

FIELD VISIT

The field visit indicated that pasture, vegetable gardens or maintained yards incorporated portions of a preglacial valley, the terraces of the Big and Little Beaver Creeks and a ridgetop. The majority of the ridgetop was forested with oak-hickory mixed deciduous trees except for a 200 meter section within the center of the ridgetop which was covered in young white pine trees grown by the Mead Corporation. Sycamore and black willow with a dense understory of brambles were observed within the low floodplain of the Big Beaver Creek.

Any potential cultural resources within significant portions (250 meters) of the pipeline corridor have been destroyed by the construction of roadways, the railroad spur for the PORTS Facility, and the High Tension Transmission Line on the Ridgetop. A pasture on the ridgetop along the west side of McCorkle Road 185 meters northeast of Taylor Hollow Road has been used as a soil borrow (possibly for phosphates) and is completely disturbed, with sterile subsoil and standing water visible at the surface

ENVIRONMENTAL SETTING

Geography

Pike county is found in the dissected part of the Allegheny plateau within the Shawnee-Mississippi Unglaciated Plateau physiographic province. Drainages have greatly segmented the county. Elevations within the project area range between 560 ft AMSL at the shoreline to 878 ft AMSL atop the highest part of the ridgetop. The county can be geologically divided into major valley floors or bottomland, minor valley floors, and dissected uplands (USDA 1990). Dissected uplands are characterized with strong relief and intermittent streams. Minor valley floors are relatively narrow with a low gradient and have local fluvial and colluvial deposits. Major valley floors display mature streams between glacio-fluvial terraces.

The main valleys in the county contain either mature streams of low gradient or small misfit streams in wide valleys which they could not have cut, such as, Big Beaver Creek Valley. Pleistocene events have created these streams, however glaciation did not directly affect this region (Goldthwait et al. 1961). Two million years ago, before glaciation, the county was associated with the Teays drainage system. The Teays River mainstem had at one time passed through the county. The Teays River valleys were blocked by glacial advance from 2 million to 690,000 years ago. It created Lake Tight which had an elevation up to 900 feet. The Teays system valleys were eventually filled by clay and silt. Abandoned sections of the Teays River valley that were filled with silt and clay can be traced through Pike county. The modern course of Big Beaver Creek and the Scioto River follow along this abandoned section today. The Scioto River Valley is located in the central part of the county. It has broad undulating peneplain that possesses some monadnock hills.

Most of the county remains wooded. Farming is geographically limited to the wider valleys and ridgetops. These areas can be used for cultivated crops, hay and pasture. The main crops are corn, tobacco, and small grains. Some of the hillsides are used for unimproved pasture (USDA 1990).

Geology

The underlying sedimentary bedrock in Pike County is of the Mississippian age. The exposed rocks are composed of clastic sediments of marine origin. Marine sandstone and shales are among the most common sedimentary rocks. Chert is a rare element in the sedimentary rock regionally. Outwash terraces in areas along the Scioto River were known to contain easily accessible nogular chert.

Soils

The project area is comprised of two soil complexes. In the uplands, the Shelocta-Latham complex was encountered. This complex accounts for 57.37% of the project area and consists of the Shelocta-Latham, Coolville-Blairton, Coolville, and Rarden silt loams. These deep and moderately deep, strongly sloping to steep, and well to moderately well drained soils are formed in colluvium and residuum derived from shale, siltstone, and sandstone on hillsides and ridgetops. Colors ranged from dark grayish brown to light yellowish brown on top, with red, strong brown to yellowish brown subsoil.

The second soil complex, encompassing the bottom lands, is the Omulga complex. This group is comprised of Wilbur, Wyatt, Doles, Omulga, Rarden, and Melvin silt loams. These deep, gentle to moderate sloping, moderately well drained soils are formed in loess colluvium and old alluvium in preglacial valleys. Colors range from brown to light yellowish brown on top with strong brown to light gray subsoil (USDA 1990).

Climate

Pike County is hot in the summer and cold in the winter. It snows regularly, which creates soil moisture in the summer for most soils. The total annual precipitation is about 40 inches. Over half of the precipitation occurs between April and September. The average temperature in the winter is 32 degrees F and the average in the summer is 72 degrees F (USDA 1990).

Flora

The prehistoric environment can be described as a mixed deciduous forest (Core 1966). Common species such as oaks, hickories, and chestnuts were found in the locale. Near the river banks canopy trees like the sycamore, beech, sweet gum, silver maple, river birch, and black willow were abundant. In the low-lying areas there were mixed forests that surrounded the more mesic species. These mixed forests species grew in the drier areas like ridgetops and slopes.

Fauna

In the upper Ohio River basin, the faunal elements would have been varied and abundant because of the mixed oak forests in the region. The white-tailed deer, black bear, and elk were among the fauna in the area. Of the avifauna the wild turkey was of greatest economic importance and the passenger pigeon was highly utilized until its extinction. Other animals located in the region were beavers, muskrats, wild goose, and wood duck. The loon, common merganser, trumpeter swan, great blue heron, kingfisher, and sandhill crane were also among the animals that lived in the Ohio River basin. Upland reptiles included the copperhead, hognose snake, black snake, garter snake, and box turtle (King 1979). Some amphibians included the hellbender salamander, green frog, and the tree frog. Aquatic reptiles included the snapping turtles and water snakes. Ohio Muskellunge, pike, catfish, sturgeon, white carppie, and yellow perch would have been available in the Ohio River and its larger tributaries (Trautman 1981). The shell fish species were fresh water mussels such as the Ohio naiad mollusc and cob shell.

The abundant wildlife originally available to the prehistoric inhabitants of Ohio have since been limited due to the effects of historic human populations. Many animals such as the river otter, black bear, panther, bobcat and gray and red wolves have been driven out (Barbour and Davis 1974).

CULTURAL SETTING

The Paleoindian Period (12,000? B.P.-10,000 B.P.)

The first inhabitants of this area probably began to move in between 10,000 to 12,000 years ago (Chapman et al. 1985). The mouths of some of the valleys drained into glacially fed rivers. The mouths of these valleys became plugged by outwash deposits from the rivers swollen with the melting glaciers. As a result these plugged valleys contain elevated benches of outwash. Areas like this tended to contain a large variety of natural resources which would allow for a broad range of sources for resource exploitation. Because paleoindian subsistence was based on hunting and foraging, this type of environment would have been a perfect locale. Large Pleistocene megafauna such as mastodon, bison, and stag moose would have been readily available. Paleoindians are considered to be nomadic, optimizing their ability to hunt these animals.

The most common artifacts from this time period are lancolite projectile points. These points were probably fluted in order to remove a face from the base and aid in hafting. Other artifacts include backed knives, unifacial end scrapers, bipolar flakes, burins, and pitted stones.

There have been few paleoindian sites recorded in Pike County. In fact Seeman and Prufer's (1982.165) survey and the original study of Ohio's Paleoindian by Prufer and Baby(1963.26) identify a total of 5 fluted points in the whole county. This is probably due to the intensity of current land use and artifact collectors (Lepper 1986), this is evidenced by the higher frequencies of fluted points found in surrounding counties.

The Early Archaic Period (10,000 B.P. - 6,500 B.P.)

In the Early Archaic Period the environment became more arid. It is believed that, in Ohio this opened more areas for habitation. During this period Subsistence was mainly focused on animals such as elk, deer, and caribou. The megafauna form the Pleistocene were extinct by this time. There was still nomadic seasonal foraging but it was focused on smaller land areas. There was also a population increase. Artifacts were more diverse in variety and they were found

frequently over diverse geographic areas. For the first time, there was the appearance of ground stone and slate tools. Examples of artifact assemblages from this period include: beveled and serrated knives, unifaces, gravers, end scrapers, and side and corner notched projectile points. Local chert resources were used regularly with some exotic materials used as well.

The Middle Archaic Period (6,500 B.P.-5,000 B.P.)

In Tennessee and the Carolinas there is a distinct manifestation of the Middle Archaic Period (Coe 1959). In Ohio however, this is not the case. There is very little to distinguish the Middle Archaic from the Early or Late archaic Period. This might be in part because there is no evidence for a change in the environment.

The Late Archaic Period(5,000 B.P.-3000B.P.)

In the Late Archaic Period, there is evidence of long distance trade. Groups began to show regional expressions. These groups focused more on exploiting the environment in their own region. Plants become more important to the diet. Focused resource procurement may have been the result of intra-regional resource competition, an increase in population, environmental stress, or refined economical resource exploitation(Pratt 1981). The sites are larger and have evidence of rehabitation. There is also evidence of at least semi-permanent settlement in the form of structures and large midden deposits. Utilitarian tools were still composed of local chert. Burial goods however showed evidence of long distance trade. There was increased variation in projectile point styles with side corner notched becoming more common. Slate was used to produce ornamental goods. Ground polished stone artifacts such as celts and axes were common during this period. Pottery first appeared in this period as well.

The Early Woodland Period(3,000B.P.-2,200B.P.)

In the Early Woodland Period cultures become more and more focused on local environments. Big circular houses and villages existed and it's possible these villages were permanent. There was still evidence of seasonal campsites and rockshelters however. During this period it's possible that the stable subsistence of hunting and gathering and some horticulture allowed for the rise of the Adena complex.

The Adena complex were the first people in the area to build burial mounds. In some areas, circular earthworks or enclosures were built around the mounds. Grave goods were placed with the burials. Grave goods included: mica cutouts, copper bracelets, beads, gorgets, celts, effigy and tubular pipes, and marine shells. Non-mortuary artifacts include: weak-shouldered lobate-stemmed spear or dart points, possibly propelled by atlatls weighed with bar or keel-shaped gorgets. End and side scrapers, drills, splinter awls, and flat-bottomed ceramics of several varieties are also associated to this period (Tuck 1978).

The Middle Woodland Period (2,200 B.P.-1,400 B.P.)

The Middle Woodland Period or Hopewell culture saw a marked population increase. There is evidence for more complex levels of organization. The sites seem to reflect seasonal exploitation of their environments. They also may have revolved around large earthen ceremonial centers. The Hopewellians also built burial mounds. Their mounds were generally more extensive than the Adena and had distinct geometric figurations. The main difference the Hopewell had from previous cultures was that they had a very organized long distance exchange system. The items they were trading were more exotic and specialized than before. Some of the trade items are to believed to be from as far away as present day Wyoming, Virginia, and the Gulf of Mexico.

The Late Woodland Period and Mississippian (1,400 B.P.-400 B.P./1600 A.D.)

During this time certain areas and regions were the major focus of certain groups. By this time there is no longer any evidence of the large scale trade network that existed in the Middle Woodland Period (Braun 1988). A significant part

of the diet was made up of corn and other cultivated plants (curbits, legumes, etc.). The Late Woodland people usually lived in large and sometimes palisaded villages which were usually associated with areas of regional focus like Fort Ancient or Monongahela. There is evidence of residential sedentariness and increase in pottery production. There was a sharp increase in population density as new means of resource procurement and land development were utilized. Some common artifacts from this period include: unifacial and bifacial knives and scrapers. Also were small, triangular points, celts, mortar and pestels, hoes ,and pottery.

Most of these large settlements were in and around major stream and river valleys. Social organization appears to have become more complex, moving towards a chiefdom level society.

Historic Period (1600 A.D. to Present)

The Historic Period of Pike County can be represented by two separate factions: that of the Native American and Euro-American. Proto-historically, Native Americans utilized the region of Southern Ohio until their subsequent defeat at Fallen Timbers and their removal from the region provided for in the Treaty of Greenville in 1795 (Wheeler-Voggelin 1974). Prior to this treaty, the Native American influence was heavily felt throughout the area in the form of raiding excursions undertaken by the Iroquois which subsequently eliminated any and all other tribal competition by the latter 1600s. Used primarily for hunting and trapping, the vicinity of Pike County also acted as a form of "demilitarized zone" between warring Iroquois and Western Algonkian nations.

With the development of multi-cultural communities during the 1720s as well as the introduction of the fur trade, many Native Americans began to settle along the secondary rivers of Upper and Middle Ohio. Along the Scioto River the Delaware and Shawnee tribes co-existed until intense tribal warfare and the intrusion of Euro-Americans forced the tribes to relocate to parts of the Muskingum River (Wheeler-Voggelin 1974). By 1795, with the acceptance of the terms of the Treaty of Greenville, the Native American influence in Southern Ohio was all but negated.

The early history of Pike County is developed by the introduction of a Euro-American agrarian society (McCormick 1958). Pike County was attached to the Virginia Military District with acreage allocation belonging to Virginia's American Revolutionary War veteran's. The county was formed from portions of Adams, Scioto and Ross Counties in 1815. The first county seat of Piketon was officially organized in 1815 and took its name from Zebulon Pike the American Revolutionary War hero and explorer. The town of Waverly located along the Portsmouth-Columbus railway line became the county seat in 1861 (Brill 1947).

With the focus of the community on agriculture, farming remained an economic mainstay. Wheat and corn production provided a strong economic base while a general focus on the extraction of natural resources pushed the Industrial Revolution during Post Civil War 19TH Century. By developing the Ohio River and Ohio-Erie Canals in 1831 as means of import/export avenues, Pike County would soon launch a full blown industrial boom that would solidify the community as a trading and shipping center.

From the use of the regions waterways as an aide to its trading and shipping industry, the creation of the railroad as a viable means of transportation was inevitable. A more efficient travel method presented itself with the creation of the overland railway in the 1870s. Where the Ohio-Erie Canal had provided employment and communal growth, the Scioto Valley Railroad provided efficiency and expediency in travel, thus becoming the catalyst for the demise of the Ohio-Erie Canal by 1912.

While the importance of agriculture and the trading/shipping industry were important to the settlement of Pike County, the use of the region's natural resources aided in the creation of a common populace. As these resources were identified and exploited, population in that area increased. Salt deposits as well as the production of salt and brine became a communal thread in Pike County from 1795 until its economic downturn in 1815. The extraction of charcoal

and sulfur was also important to the area especially in reference to its impact in the creation of gunpowder. Coal mining and processing (developed in aiding the now booming Iron industry) also became an important thread in binding these population centers together. Southern Ohio's Hanging Rock Iron Furnaces became an intregal part of this region for nearly 100 years (ODOT 1992). By way of re-invention and keeping in step with an ever progressing attitude towards resource conservation, the Atomic Energy Plant was built in 1952 by the U.S. government and by 1976 was the county's biggest employer (Ricky 1983).

In summary, Pike County and it's surrounding communities has retained its agrarian flavor. Calling on the regions natural resources as well as its agricultural abilities, this area has retained its original identity and rural timbre.

BACKGROUND RESEARCH RESULTS

A literature review can be used as an instrument to become familiar with the recorded prehistoric and historic archaeological record around a project area. The resources available from the Ohio Historic Preservation Office, the Ohio Historical Society and all the sites recorded in the region were helpful in making hypotheses about the cultural resources in the project area. The following resources were utilized for the literature review: United States Geological Survey (USGS) 7.5' series topographical maps, the Ohio Archaeological Inventory (OAI) files, Ohio Historic Inventory (OHI) files, National Register of Historic Places (NRHP) files, and Cultural Resource Management (CRM)/ contract archaeology files at the OHPD.

United States Geological Survey 7.5' series topographical maps and National Register of Historic Places Files

A review of the USGS topographical maps and National Register of Historic Places files showed that there were prehistoric sites and historic structures in the vicinity of the project area. There are three Nationally Registered Historic Places in Jasper, four in Piketon, and five in rural locations north and west of Piketon. The NRHP also recorded a small group of mounds, which are also located in Piketon.

Ohio Archaeological Inventory Files

The Ohio Archaeological Inventory files were examined to determine if there were any previously recorded sites or structures located in the vicinity of the project area. The OAI files listed 23 lithic scatters and two Adena mound sites in the vicinity of the project area (Table 1).

Ohio Historic Inventory Files

An examination of the Ohio Historic Inventory and files was performed to ascertain whether any structures or sites have been noted in the vicinity of the project area. Four houses, a church and cemetery, and a farmstead were discovered to be in the vicinity of the project region (Table 1).

Cultural Resource Management/ Contract Archaeology Files

The Cultural Resource Management files contained several archaeological surveys from around the project area. The following is a list of the CRM reports used in this literature review:

Bush, David R., Frank J. Cantelas, and Jare Cardinal
1987 *The Phase II Cultural Resource Report for the Proposal PIK-SR.32-13.55 Project in Pike County, Ohio.* David R. Bush, Inc. Submitted to Burgess and Niple, Limited, Columbus.

1989 (rev.) *The Phase II Cultural Resource Report for the Proposal PIK-SR.32-13.55 Project in Pike County, Ohio.* David R. Bush, Inc. Submitted to Burgess and Niple, Limited, Columbus.

1992 *The Phase III Investigations of the Proposal PIK-SR.32-13.55 Project in Pike County, Ohio.* David R. Bush, Inc. Submitted to Burgess and Niple, Limited, Columbus.

Fowke, Gerard

1891 Mound Excavations in Pike County, Ohio. *Bureau of American Ethnology 12th Annual report, 1890-1891,* pp.491-492. Washington D.C.

1902 *Archaeological History of Ohio.* Ohio State Archaeological and Historical Society, Columbus.

1928 Excavation of a Mound in Pike County, Ohio. *Bureau of American Ethnology 44th Annual Report, 1926-1927,* p.498

Ohio Department of Transportation, Bureau of Environmental Services (ODOT-BES)

1991 *A Preliminary Archaeological Investigations Along the Proposed PIKE-220-12.60 Bridge Replacement and Re-alignment in Seal Township, Pike County, Ohio.* Submitted by the Cultural Resources Unit Bureau of Environmental Services Ohio Department of Transportation, Columbus. Copy available for review at the Ohio Historic Preservation Office, Columbus

1992 *Preliminary Archaeological Investigations Along the Proposed Widening of Pike U.S. 23-5.23 in Pee Pee and Seals Townships, Pike County, Ohio.* Submitted by the Cultural Resources Unit Bureau of Environmental Services Ohio Department of Transportation, Columbus. Copy available for review at the Ohio Historic Preservation Office, Columbus.

Squier, E.G. and E.H.Davis

1884 *Ancient Monuments of the Mississippi Valley Comprising the Results of Extensive Original Surveys and Explorations.* Smithsonian Institution Publications No.1., Washington D.C.

Weller Von Molsdorff, Ryan J. and Craig s. Keener

1997 *Phase I Cultural Resource Management Survey for a proposed 1524m (5,000') Sewwer Line and 488m (1,600') Water Line in Seal Township, Pike County ,Ohio.* Submitted to APPLIED Archaeological Services, Inc., Dayton, Ohio.

White, C.F.

1978 *An Evaluation of the Scientific Potential of 33Pk35, An archaeological Site to be Impacted by the Construction of the Piketon Hills Apartments, Piketon, Pike County, Ohio.* Submitted to Robert A. Falk by Claude F. White. Copy available for review at the Ohio Historic Preservation Office, Columbus.

1979 *An Archaeological Impact Assessment of Pike Turkey Housing (FAL001), Piketon, Pike County,Ohio.* Submitted to Weatherby-Goodman, A.I.A. by Claude F. White. Copy available for review at the Ohio Historic Preservation Office, Columbus.

Table 1: Inventory of Previously Identified Sites Within the Vicinity of the Project Area.			
Site No	Cultural Affiliation	Type of Site	References
33Pk1	Adena	Mound	Squiver/Davis 1846
33Pk30	Unassigned	Lithic Scatter	R.E. Riggs 1977
33Pk31	Unassigned	Lithic Scatter	R.E. Riggs 1977
33Pk35	Early Archaic-Mississippian	Lithic Scatter	Claude White 1978
33Pk36	Unassigned	Light Lithic Scatter	Claude White 1978
33Pk46	Adena	Mound	Claude White1979
33Pk47	Late Archaic-Early Woodland	Lithic Scatter	Claude White1979
33Pk48	Unassigned	Lithic Scatter	Claude White1979
33Pk49	Unassigned	Lithic Scatter	Claude White1979
33Pk50	Unassigned	Lithic Scatter	Claude White1979
33Pk93	1900-1940	House	OHI Files
33Pk94	1849	Church and Cemetery	OHI Files
33Pk95	1884	House	OHI Files
33Pk96	1911	Farmstead	OHI Files
33Pk97	Early 20th century	House	OHI Files
33Pk98	Early 20th century	House	OHI Files
33Pk138	Unassigned	Light Lithic Scatter	Dale Bush 1987
33Pk140	Unassigned	Light Lithic Scatter	Dale Bush 1987
33Pk141	Unassigned	Light Lithic Scatter	Dale Bush 1987
33Pk147	Unassigned	Light Lithic Scatter	Dale Bush 1987
33Pk149	Unassigned	Light Lithic Scatter	Dale Bush 1987
33Pk150	Unassigned	Light Lithic Scatter	Dale Bush 1987
33Pk154	Early Archaic-Middle Woodland	Lithic Scatter	Dale Bush 1987
33Pk157	Unassigned	Light Lithic Scatter	Dale Bush 1987
33Pk160	Unassigned	Light Lithic Scatter	Dale Bush 1987
33Pk161	Unassigned	Light Lithic Scatter	Dale Bush 1987
33Pk172	Unassigned	Light Lithic Scatter	Dale Bush 1987
33Pk175	Unassigned	Light Lithic Scatter	Dale Bush 1987
33Pk177	Unassigned	Lithic Scatter	Bruce Aument 1993
33Pk243	Unassigned	Lithic Scatter	Jim Heefrech 1988

METHODS & MATERIALS

Field Methods

Methods employed in the field investigation were relatively straightforward. DuVall and Associates, Inc., was provided with an accurate plan for the proposed construction of the gas pipeline (Figure 2).

The pipeline corridor was surveyed on foot with three crew members walking within the areas of potential effect. This type of survey provides excellent coverage of all available surface exposures and was sufficient to identify all obtrusive, above ground remains such as structures, building rubble, etc., in most areas. Approximately 60% of the tract was in pastured fields, vegetable gardens, or maintained yards. These areas were either shovel tested or surface collected. Pedestrian survey was also employed within the wooded portions (30%) of the project area (Figures 3-5). Areas with 15 degrees or more slope, areas which were inundated with water, or disturbed by soil borrowing or the construction of a high tension powerlines, roadways or railroads were not tested. The shovel testing employed throughout the project area consisted of a standardized 50x50 centimeter unit excavated at least to the interface with the subsoil (Figure 6). All displaced soils were screened through 0.25inch (0.64 cm) hardware cloth to insure a systematic recovery of artifacts.

The locations of shovel tests, gardens, pastured and wooded areas, piles of structural debris, swampy areas, transmission lines, recent homes, and disturbances associated to the existing roadways and railroads will were recorded on a USGS map (Figure 2). Photographs were taken of representative shovel test pits, the general terrain and vegetation, areas of disturbance, and the historic site identified within the project area.

Artifact Processing & Curation

No artifacts were recovered from the survey area. All artifacts, field notes, maps, photographs, and negatives from this project will be permanently curated at the R.M.D.C. Facilities, PORTS Facility, U.S. Department of Energy, 3930 U.S. Route 23 South, Piketon, Ohio (45661).

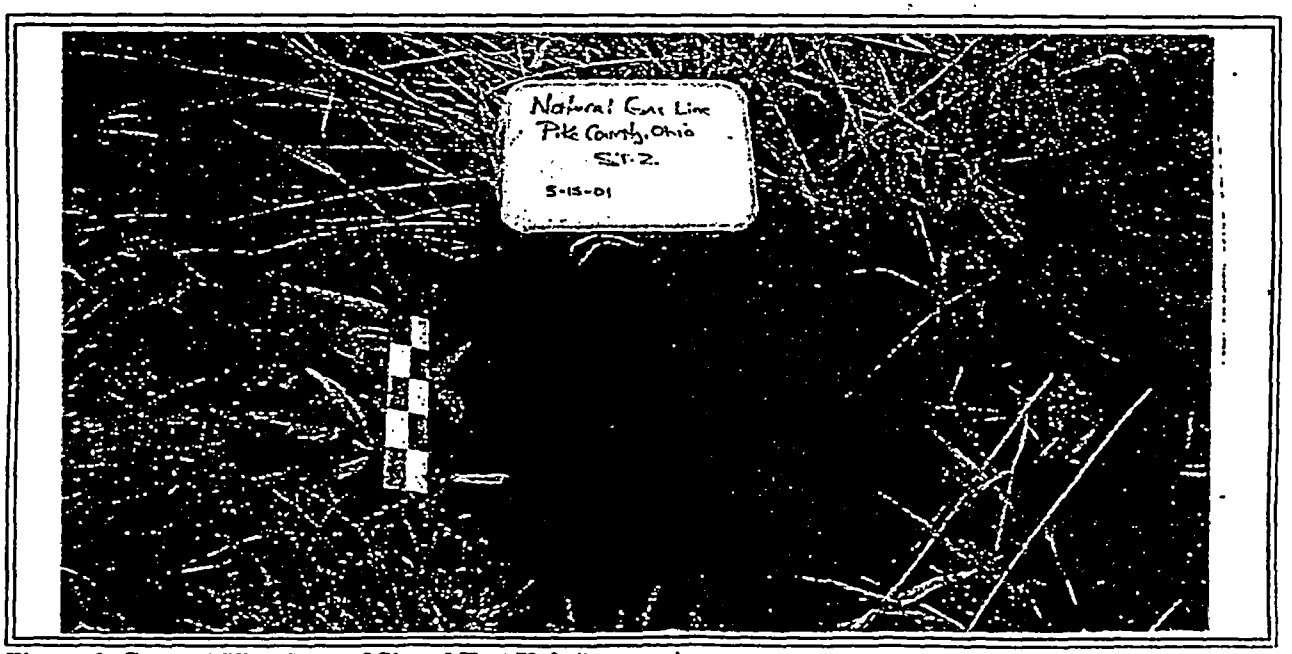

Figure 6: General View East of Shovel Test Unit #2.

RESULTS OF FIELD STUDY

Field work for the proposed gas pipeline took place on the 15th of May, 2001. The field crew consisted of Glyn DuVall, Chris Hazel, and Jeremy Galbraith. At the time of the field investigations, the weather was fair with temperatures between 60-75 degrees Fahrenheit with partly cloudy skies along the project area. Trees were in full leaf with a developed understory of brambles, wild roses, and succulents. The grasses within the pastures were high with patches of thistle and various wildflowers. Surface visibility was adversely affected by late spring plant growth in both wooded and pasture portions of the project area, except where the grasses had been recently mown (maintained yards) where surface visibility was approximately 50%. All drainages which crossed the project area contained flowing water. There was no flooding within the floodplains of the two creeks. However, a pasture on the ridgetop north of Taylor Hollow Road and the pasture along the small drainage in the north end of the project area near Zahn's Corner were marshy. Cattails and marsh grasses scattered within these two areas attested to their longterm innundation.

Approximately 30% of the corridor was in forested ridgetops, slopes, and floodplain bottoms (within Big Beaver Creek). Approximately 60% of the corridor was in pasture with poor to fair soil exposure (Figure 7). These portions of the corridor were suitable for shovel testing with supplemental surface collection survey. The remaining 10% of the corridor had been disturbed by roads, a railway and a soil borrow or was situated within the drainages. A total of 32 shovel test pits were excavated along the pipeline corridor. All test pits were excavated within the pasture either on the ridgetops, valleys, or terraces along the drainage of the corridor. All shovel test pits were excavated to the interface with sterile subsoil. This was generally at a depth of 20-30 centimeters. The wooded areas of the tract could not be shovel tested or surface collected due to steep slopes, the presence of roadways, or soil borrow/swampy areas, including an area north of Taylor Hollow Road.
With the exception of building materials observed at the historic house site (33Pk245), no archaeological materials were observed or recovered.

Stratigraphy

Throughout the project areas soils were well drained silty clay or silty loams, evidenced by surface exposures, shovel testing, and the examination of drainages (Figure 6). Soil texture and coloration conform to descriptions of the various soil complexes and series within the "Soil Survey of Pike County, Ohio" (USDA, 1990). All shovel test units contained relatively shallow natural levels, precluding the use of 10cm arbitrary levels in most cases. Soil stratigraphy was composed of a thin topsoil, a 10-20 cm deep plowzone, followed by sterile subsoil. A "transition" level composed of a mix of plowzone and the subsoil was also observed within half of the test units. These units were located in areas which had been cultivated suggesting the use of a chisel-plow (Shovel Test Units 1-8, 16, 20-22, 25, and 32). The observed stratigraphy of all shovel test units are presented in Table 2.

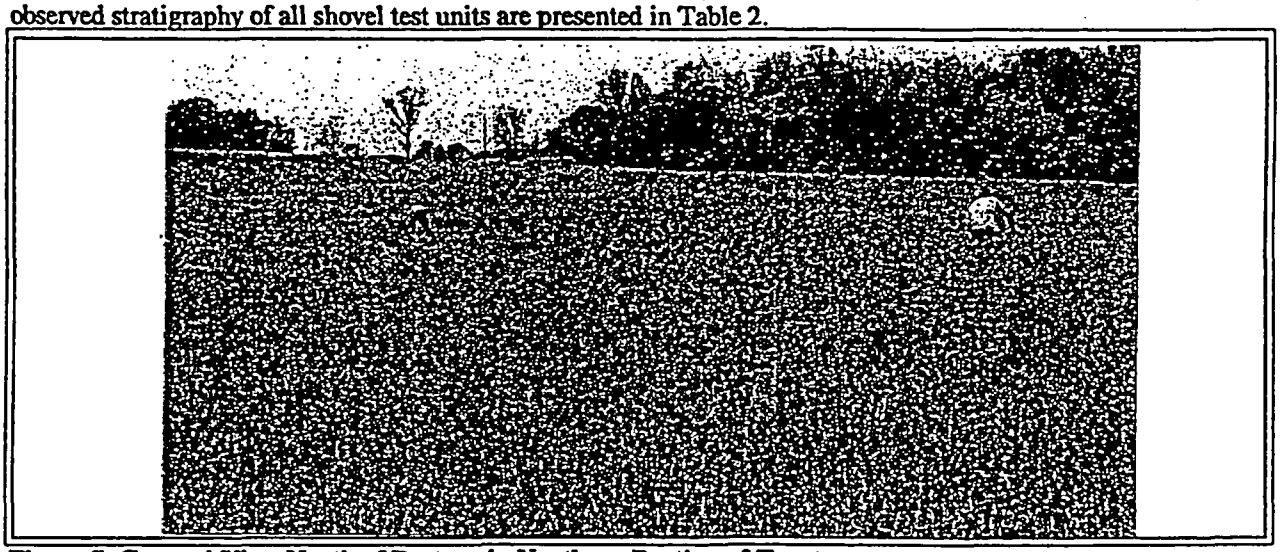

Figure 7. General View North of Pasture in Northern Portion of Tract.

Table 2: Inventory of 50 x 50 cm Shovel Test Units 1-32.					
Shovel Test No.	Depth	Artifacts	Level 1	Level 2	Level 3
1	36 cm +	Negative	0-32cm 10YR4/4 silty loam (clay) with pebbles	32-36cm 10YR4/4 - (5/4) silty clay	36 cm+ 10YR5/4 clay loam
2	27 cm +	Negative	1-23 cm 10YR4/4 silty loam (clay) with pebbles	23 - 27cm 10YR4/4 - (5/4) silty clay	27 cm+ 10YR5/4 clay loam
3	18 cm +	Negative	0-15 cm 10YR4/4 clayey silty loam with pebbles	15-18 cm 10YR4/4 - 4/6 dry clay loam with pebbles	18 cm + 10YR4/6 dry clay loam
4	18 cm +	Negative	0-15cm 10YR4/4 clayey silty loam with pebbles	15-18 cm 10YR4/4 - 4/6 dry clay loam with pebbles	18 cm + 10YR4/6 dry clay loam
5	17 cm +	Negative	0-15 cm 10YR4/4 silty clay with pebbles	15-17 cm 10YR4/4 - 5/6 silty clay	17 cm+ 10YR5/6 clay with pebbles
6	10 cm +	Negati ve	0-7 cm 10YR4/4 silty clay with pebbles	7-10 cm 10YR4/4 - 5/6 silty clay	10 cm + 10YR5/6 clay
7	10 cm +	Negative	0-8 cm 10YR4/4 silt with gravels	8-10cm 10YR4/4 - 5/6 silty clay with gravels	10 cm + 10YR5/6 silty clay
8	10 cm +	Negative	0-8 cm 10YR4/4 silt with gravels	8-10 cm 10YR4/4 - 5/6 silty clay with gravels	10cm + 10YR5/6 clay
9	21 cm	Negative	0-15 cm 10YR4/4 clayey silty loam with gravels	15-21cm 10YR4/6 dry clayey loam with gravels	
10	32 cm +	Negative	0-25 cm 10YR4/4 clayey silty loam	25 cm + 10YR4/6 dry clayey loam with gravels	
11	30 cm +	Negative	0-27 cm 10YR4/4 clay	27 cm + 10YR4/6 clay	
12	19 cm	Negative	0-15 cm 10YR4/4 clay	15-19 cm 10YR4/6 clay	
13		Negative	terminated, deflated, clay		
14	25 cm +	Negative	0-22 cm 10YR5/3 silty clay loam with gravel	22 cm + 10YR5/6 clayey loam	
15	30 cm +	Negative	0-25 cm 10YR5/3 dry w/ gravel	25 cm + 10YR5/6	
16	34 cm	Negative	0-18 cm 10YR4/2 clayey silty loam with gravel	18-29 cm 10YR5/3 silty clay	29-34 cm 10YR5/6 clay loam
17	28 cm	Negative	0-24 cm 10YR5/3 clayey silty loam with gravel	24-28 cm 10YR5/6 silty clay	
18	22 cm +	Negative	0-17 cm 10YR5/3 clayey silty loam with gravel	17cm + 10YR5/6 silty clay	
19	35 cm +	Negative	0-22 cm 10YR4/4 silty clay	22 cm+ 10YR5/6 clayey loam	
20	52 cm	Negative	0-26 cm 10YR4/4 silt	26-39 cm 10YR5/3 silty clay	39-52cm 10YR5/4 clay

21	45 cm	Negative	0-14 cm 10YR4/4 silt	14-29 cm 10YR5/3 silty clay	29- 45 cm 10YR5/4 clayey loam
22	27 cm	Negative	0-14 cm 10YR4/4 silt	14-22 cm 10YR5/3 silty clay	22-27 cm 10YR5/4 clayey loam
23	29 cm	Negative	0-21 cm 10YR5/3 silty clay	21-29 cm 10YR5/4 clayey loam	
24	29 cm	Negative	0-17 cm 10YR5/3 silty clay	17-29 cm 10YR5/4 clay	
25	32 cm	Negative	0-12 cm 10YR5/3 silty clay	12-20 cm 10YR5/3 - 5/4 silty clay	20-32 cm 10YR5/4 clay
26	22 cm	Negative	0-10 cm 10YR5/3 silty clay	10-22 cm 10YR5/4 clay	
27	25 cm	Negative	0-15 cm 10YR5/3 silty clay	15-25 cm 10YR5/4 clayey loam	
28	25 cm	Negative	0-20 cm 10YR5/3 silty clay with pebbles	20-25 cm 10YR5/4 clay	
29	25 cm	Negative	0-12 cm 10YR5/3 clayey silt with gravels	12-25 cm 10YR5/6 clayey loam	
30	25 cm	Negative	0-12 cm 10YR5/3 clayey silt with gravels	12-25 cm 10YR5/6 clayey loam	
31	25 cm	Negative	0-10 cm 10YR5/3 clayey silt with gravels	10cm + 10YR5/6 clayey loam	
32	40 cm	Negative	0-15 cm 10YR5/3 clayey silty loam with gravels	15-25 cm 10YR5/3 - 5/6 clayey silty loam	25-40cm 10YR5/6 clayey loam

Cultural Resources

The Phase I archaeological survey of the proposed Zahn's Corner gas pipeline identified the historic house site 33Pk245. This site is located on the eastern edge of the broad ridgetop outside of the area of potential effect. In the following site description, the State of Ohio site number is accompanied (in parentheses) by the temporary site designation that was assigned in the field (Site H-1 was a late 20th century house). This will facilitate future use of archived field notes, photograph log, and other documentation from that phase of the project. No artifacts diagnostic of a particular historic time period were identified.

The site descriptions contain the following information: UTM coordinates, topographic setting, soil association and percent slope (USDA 1990), parent material, mean elevation (in feet, from USGS quadrangles), drainage, distance and direction from drainage, surface visibility, ground cover, suggested cultural affiliation, and current land use. Since the site lies outside of the gas pipeline's area of potential effect, it is not recommended for further testing as part of this project. However, the site has the potential for yielding additional information concerning function or cultural affiliation due to the presence of a possible filled-in cellar amid piles of building rubble despite evidence for disturbance of the above ground structures.

SITE DESCRIPTION:

33Pk245 (Field Site #H2)

UTM Coordinates: 329160 E 4327320 N
Topographic Setting: Ridgetop
Soils Association: Coolville Silt Loam
Parent Material: Shale, Siltstone, Sandstone Bedrock
Slope: 2-6%
Area: 35 m^2
Elevation: 870 ft.
Drainage: Unnamed drainage of Big Beaver Creek
Distance to Drainage: 1,040 meters
Direction to Drainage: ENE
Surface Visibility: 0%
Ground Cover: Brambles, Vinca Minor, Oak
Cultural Affiliation: Demolished Early 20th Century Historic House Site
Land Use: Wooded
Recommendation: No further work

This is an early 20th century demolished house site composed of four piles of sandstone foundation rubble and a sandstone-lined well identified during pedestrian survey. No other types of architectural debris or other material remains were collected or observed on the site. A review of USGS maps on file at the OSHPO from the 20th century revealed no structures at the location of the site prior to 1900 or after 1960. A similar house site on nearby Dutch Run Road (33Pk193) was dated to this time period using the same methods (Schweikart, et.al. 1997). The absence of 33Pk245 from the 1960 USGS map photo revisions is not surprising considering that the USDOE acquired the land in 1952 and probably razed the structure at that time.

The site is located within the northeast quadrant of Section 8 within Scioto Township, Pike County, Ohio. The site is on the east side of McCorkle Road 1.7 km from the junction of the road and Dutch Run Road. The western edge of the site is ten meters from the edge of the road on the east side of a gently sloping north-south ridgetop with severe slope along the eastern boundary of the site. The nearest drainage is an intermittent stream off of Big Beaver Creek located over a kilometer to the east-northeast. The primary water source for the occupants would have been the fresh water well located in the center of the site.

The site was covered a dense bramble and vinca minor underbrush. Mature oaks and maples grow adjacent to the collapsed foundations along the western boundary of the site. The site area was defined by the presence of building rubble which was scattered over an area of thirty five square meters (paced). A semi-rectangular sandstone rubble pile measuring 10 meters (32.8') north-south by 9 meters (29.5') east-west forms the western boundary. This probable collapsed house had no evidence for a chimney fall but may have a filled-in cellar within the northern half. Immediately to the east of this pile is a sandstone lined well with a one meter diameter opening which has been partially filled with rubble. The well contained fresh water at the time of the survey but this may be associated to recent heavy rains. The well is at the center of the site. Three amorphous sandstone rubble piles with diameters of three to five meters (10-16') form the northern, eastern and southeastern boundaries of the site. These three piles are located ten meters north of the well, fifteen meters east of the well, and ten meters southeast of the well, respectively. Sandstone rubble is diffuse throughout the site area.

The location of the site is outside the area of potential effect for the proposed gas pipeline to be located under the ditch on the east edge of the road. At the time of the survey the field crew had permission from the USDOE to use subsurface testing only in areas within the fifty foot ROW of the corridor. Therefore no shovel test units could be excavated within site 33Pk245 outside of the ROW.

As the site will not be impacted by the proposed gas pipeline no further work is recommended on this site in conjunction with this project. However, the cellar and other historic features potentially located below the dense underbrush may be intact and contain valuable information concerning the exact time of occupation for the house as well as information about the lifestyle of the occupants. Surface inspection of the site area after the clearance of underbrush and excavation of the cellar are two possible methods for further study of the site. As other cultural resource assessment in the vicinity of 33Pk245 have noted, there is a paucity of information on the history of upland farming in Pike County (Schweikart, et.al., 1997). Therefore, site 33Pk245 is considered eligible for nomination to the National Register of Historic Places under Criterion D.

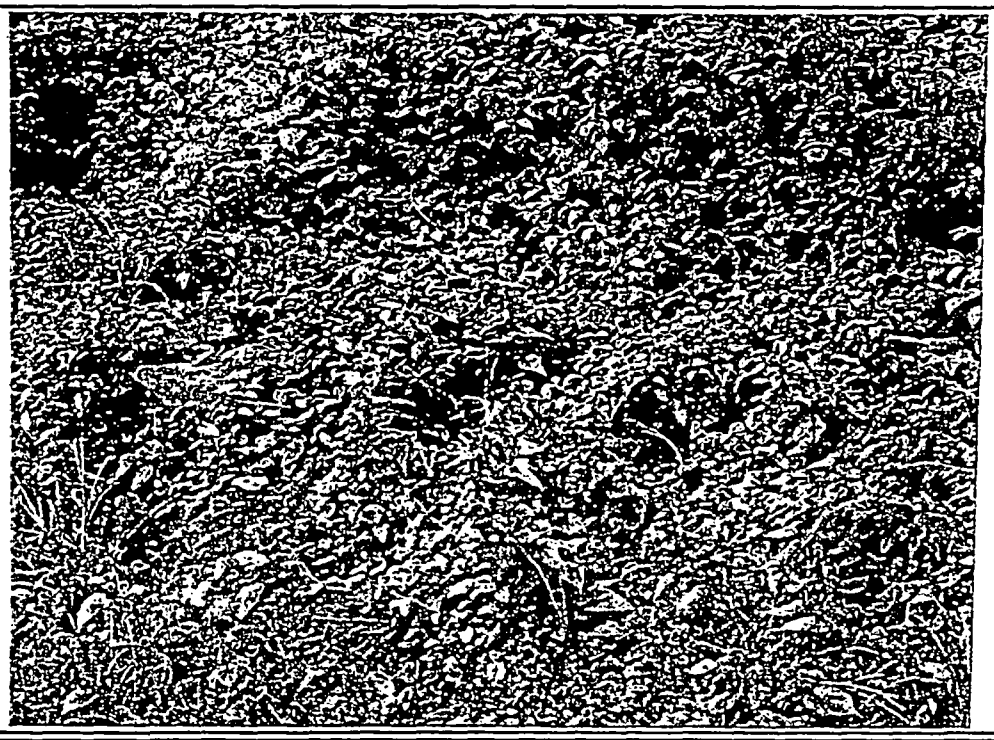

Figure 8: General View West of Building Rubble Within Site 33Pk245.

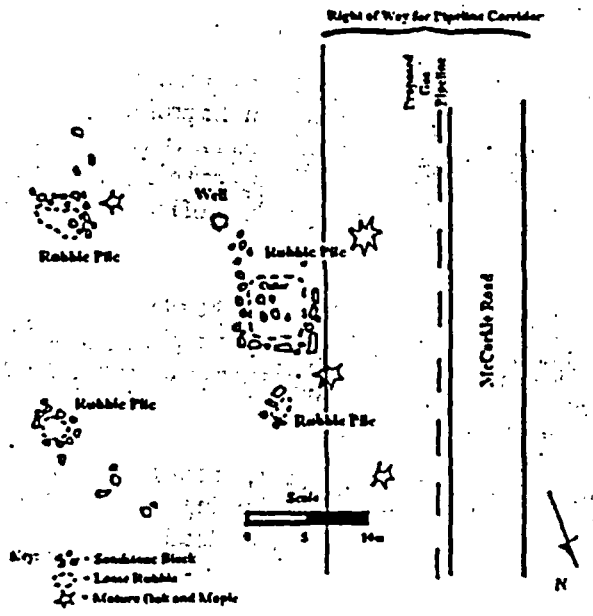

Figure 9: Planview of Site 33Pk245.

Figure 9: Planview of Site 33Pk245.

CONCLUSIONS & RECOMMENDATIONS

A phase I archaeological survey was conducted on a fifty foot wide three mile long corridor in anticipation of the construction of a gas pipeline crossing Sections 5, 8 and 17 in Scioto Township and Sections 27 and 30 in Seal Township, Pike County, Ohio. The archaeological survey was conducted by DuVall & Associates, Inc. on the 15th of May, 2001, for Pro2Serve Technical Services, Oak Ridge, Tennessee under contract from the U.S. Department of Energy.. Field investigations were conducted under terms set forth in the Ohio State Historic Preservation Office "Archaeology Guidelines".

The phase I archaeological survey consisted of extensive background research and field work involving a pedestrian survey of the entire corridor with limited surface collection and shovel testing. Surface collection was limited to undisturbed and dry areas within the corridor with less than fifteen degrees of slope, and 50% or more surface visibility. Shovel testing was conducted on the remaining undisturbed, dry and gently sloping portions of the corridor. All of the 32 shovel test units excavated produced negative results. No cultural resources were encountered within the primary or secondary areas of impact.

The hypothesis that prehistoric occupation sites would be located on undisturbed terraces of the drainages and along ridgetops with a nearby water source was not testable as terraces of the large drainages and knolls along adjacent slopes had been disturbed by road/railway and recent house construction, innundation or intensive cultivation and deflation

of soils across the terraces of the Big Beaver Creek. The hypothesis that evidence for historic occupation would be found along McCorkle Road was confirmed by the identification of the demolished house site 33Pk245 on the ridgetop. The hypothesis that disturbed, innundated or steep portions of the project area would not contain cultural resources was confirmed by negative findings in these areas. Contrary to our initial hypotheses, portions of the corridor along terraces of Big Beaver Creek did not contain cultural resources due to the severe deflation of soils secondary to natural erosion and intensive cultivation of the creek valley.

The pedestrian survey of the corridor resulted in the recording of a previously unidentified demolished early 20th century house site (33Pk245) adjacent to, but outside of the project area. The site was located on a forested ridgetop ten meters east of McCorkle Road. Subsurface investigations were not permitted within the site area as the site was outside of the designated project area. The site was composed of four sandstone rubble piles (demolished foundations) and a damaged well. There is the potential for the presence of intact historic features (cellar, outbuilding foundations, etc.) within the site.

Based on the information gathered from Site 33Pk245, the site was determined to be eligible for nomination to the National Register of Historic Places under Criterion D in compliance with the 1966 National Historic Preservation Act (NHPA) pursuant to 36CFR800. No further investigations are recommended on the site for the pipeline project, as it is outside of the area of potential impact.

All marked and unmarked, historic and prehistoric, burial remains are protected by state burial laws. During development, contractors should exercise caution during any excavations. In the event human remains are encountered, all work should cease immediately and the local coroner and law enforcement agency must be notified.

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APPENDIX A:
The Principal Investigator and Field Supervisor (Glyn D. DuVall):

ABBREVIATED VITAE

Glyn D. DuVall, President

Archaeologist
CRM

DuVall & Associates, Inc.
1242 Old Hillsboro Road
Franklin, TN 37069-9129
615/791-6450
e-mail: duvall2k@bellsouth.net

Education

B.S. 1972: Geology: Middle Tennessee State University
M.A. 1977: Anthropology: University of Tennessee, Knoxville

Experience Summary

Seventeen years experience in the ownership and management of environmental services firm specializing in Phase I-III archaeological investigations, architectural evaluation of historic properties, historical research and cemetery restoration services.

Eight years experience as senior archaeologist with the Tennessee Department of Transportation's Environmental Planning Office. Responsible for statewide coordination and execution of Tennessee Department of Transportation projects involving archaeological survey, testing and mitigation.

Three years supervisory experience with the University of Tennessee/Tennessee Valley Authority, Normandy Archaeological projects. Duties included developing and conducting testing programs, surface reconnaissance, the supervision of seven site excavations, performing lithic analyses, data interpretation and final report preparation.

Principal Investigator on projects within the U.S. Army Corps of Engineers, Nashville District, as part of the open-end contract for environmental studies in the states of Tennessee, Kentucky and Alabama. Subcontractor to Air National Guard Bureau on Continental United States and Caribbean bases.

Principal Investigator: Reconnaissance, testing and mitigation for TVA, U.S. Army Corps of Engineers, private industry, municipalities and developers. Total experience includes over 500 reconnaissance level surveys and reports.

Principal Investigator Projects

Architectural/Historical Survey for the Proposed Feasibility Study to Improve Wolf Creek Power Plant, Russell-Clinton Counties, Kentucky. Client: US Army Corps of Engineers, Nashville District.

An Archaeological, Architectural and Historic Cultural Resources Reconnaissance and Evaluation of the Harlan, Baxter, Loyall and Rio Vista Flood Reduction Measures, Harlan County, Kentucky. Client: US Army Corps of Engineers, Nashville District.

Historic American Building Survey Documentation and Structural Assessment of 12 Structures in the Big South Fork

National River and Recreation Area, Tennessee. Client: US Army Corps of Engineers, Nashville District and the National Park Service.

A Cultural Resource Reconnaissance of Selected Portions of J. Percy Priest Reservoir, Davidson, Rutherford and Wilson Counties, Tennessee. Client: US Army Corps of Engineers, Nashville District.

An Archaeological Reconnaissance of Executive Order 12348 Excess Properties on Cordell Hull Lake, Tennessee. Client: US Army Corps of Engineers, Nashville District.

Historic American Building Survey of the Pine Street Bridge/Freight Depot Bridge, Pineville Bell County, Kentucky. Client: US Army Corps of Engineers, Nashville District.

Barbourville Structural Analysis, Barbourville, Knox County, Kentucky. Client: US Army Corps of Engineers, Nashville District.

Cultural Resource Survey and Testing in the Proctor Public Use Area, Cordell Hull Lake, Tennessee. Client: US Army Corps of Engineers, Nashville District.

Architectural Documentation and Guidelines for the Rehabilitation of the Blevins Barn BS40, Big South Fork National River and Recreation Area, Tennessee. Client: US Army Corps of Engineers, Nashville District.

Burial Removal and Archaeological Salvage Operations at the Parrish Site, 40DV152, Davidson County, Tennessee. Client: Southland Properties, Inc.

Final Report of Archaeological Testing on the Russellville Bypass, Logan County, Kentucky. Client: Kentucky Department of Transportation.

Report of the Removal of Prehistoric Cemetery, 4OWM87, in the Horseshoe Bend Development, Williamson County, Tennessee. Client: Horseshoe Bend Limited.

Phase II Archaeological Testing of Three Sites on the Metropolitan Nashville Airport Property in the Vicinity of the New Runway Location, Davidson County, Tennessee. Client: Metropolitan Nashville Airport Authority.

Report of the Removal of Prehistoric Cemetery 40DV234 - Hooper Site, Nashville, Davidson County, Tennessee. Client: C. Hooper Enterprises.

Report of the Removal of Prehistoric Cemetery 40DV245 on the Harpeth Hall Academy Campus, Nashville, Davidson County, Tennessee. Client: Harpeth Hall School.

Archaeological and Geomorphological Investigations in Selected Bends Along the Lower Cumberland River, Livingston, Crittenden and Lyon Counties, Kentucky. Client: US Army Corps of Engineers, Nashville District.

An Archaeological and Assessment of the Proposed Reregulation Structure Impact Zones Below the Wolf Creek Dam on the Cumberland River, Russell and Clinton Counties, Kentucky. Client: US Army Corps of Engineers, Nashville District.

A Cultural Resource Reconnaissance and Testing of the Barbourville Diversion Channel, Tye Bend of the Cumberland River, Knox County, Kentucky. Client: US Army Corps of Engineers, Nashville District.

Archaeological and Geomorphological Investigations of the Williamsburg Flood Protection Project, Williamsburg, Whitley County, Kentucky. Client: US Army Corps of Engineers, Nashville District.

Archaeological Reconnaissance and Testing for the Proposed Kentucky Lock Addition, Tennessee River, Livingston County, Kentucky. Client: US Army Corps of Engineers, Nashville District.

An Archaeological Reconnaissance of Executive Order 12348 Excess Properties on Cordell Hull Lake, Tennessee. Client: Us Army Corps of Engineers, Nashville District.

Deep Testing of the Proposed Springhouse Golf Course on Crab Island, Cumberland River, Nashville, Davidson County, Tennessee. Client: Opryland, Inc.

A Phase I Archaeological Reconnaissance of the Proposed Impact Areas of Alternates ttall, "B" and "C" on State Route 6 From State Route 20 to the Mount Pleasant Bypass, Maury County, Tennessee. Client: Tennessee Department of Transportation.

A Phase I Archaeological Reconnaissance of the State Route 33 (US 411) Alternates From SR64 South of Benton to Etowah, McMinn and Polk Counties, Tennessee. Client: Tennessee Department of Transportation.

Phase II Archaeological Testing of Four Sites in the Daniel Boone National Forest, Morehead Ranger District, Rowan County, Kentucky. Client: US Forest Service.

Archaeological reconnaissance Report: Preferred Alternative and Access Roads Right-ofWay, State Route 40 Through the Cherokee National Forest, Polk County, Tennessee. Client: Tennessee Department of Transportation.

Archaeological Evaluation of the Y-12 Plant Facility Within the Fenced Areas of the Bear Creek Valley. Client: US Department of Energy and Martin Marietta Energy Systems.

An Archaeological Reconnaissance of the Waste Area Grouping 2 (WAG-2) Project at the Oak Ridge National Laboratory, Oak Ridge Reservation, Roane County, Tennessee. Client: US Department of Energy and Martin Marietta Energy Systems.

An Archaeological Reconnaissance of the Liquid Low-Level Waste Solidification (LWSP) Retrievable Cask Interim Storage Facility 11 at the Oak Ridge National Laboratory, Oak Ridge Reservation, Roane County, Tennessee. Client: US Department of Energy and Martin Marietta Energy Systems.

An Archaeological Reconnaissance of the Advance Neutron Source (ANS) Project on the Oak Ridge Reservation, Anderson and Roane Counties, Tennessee. Client: US Department of Energy and Martin Marietta Energy Systems.

An Archaeological Reconnaissance of the Solid Waste Storage Area (SWSA-7) at the Oak Ridge National Laboratory, Oak Ridge Reservation, Tennessee. Client: US Department of Energy and Martin Marietta Energy Systems.

An Archaeological Reconnaissance of the Remote Handled Transuranic Waste Storage (RH TRU) Area Within the ORNL Complex, Oak Ridge Reservation, Tennessee. Client: US Department of Energy and Martin Marietta Energy Systems.

An Archaeological Reconnaissance of Two Borrow Areas at the HPPR-DOSAR and Tower Shielding Sites on the Oak Ridge Reservation, Anderson and Roane Counties, Tennessee. Client: US Department of Energy and Martin Marietta Energy Systems.

An Archaeological Reconnaissance of the MK Ferguson Lay-Down Area/West End Treatment Facility and Tank Farm on the Y-12 Plant, Oak Ridge Reservation, Tennessee. Client: US Department of Energy and Martin

Marietta Energy Systems.

An Archaeological Reconnaissance of the Melton Valley Low Level Waste Collection and Transfer System Upgrade of the Oak Ridge Reservation, Roane County, Tennessee. Client: US Department of Energy and Martin Marietta Energy Systems.

An Archaeological Reconnaissance of the Pond Waste Management Project (K-1065-1066) and The Production Waste Storage Facilities on the K-25 Complex, Oak Ridge Reservation, Tennessee. Client: US Department of Energy and Martin Marietta Energy Systems.

An Archaeological Reconnaissance of the Melton Valley Recontour Site on the Oak Ridge Reservation, Roane County, Tennessee. Client: US Department of Energy and Martin Marietta Energy Systems.

Phase III Mitigation of the 30 Acre Haften Site Complex on the Big Sandy River, Wayne County, West Virginia. Client: Cyrus Dock Company.

Phase II Archaeological Testing of the Biedleman Site (40SL69), Sullivan County, Tennessee. Client: Tennessee Valley Authority.

Phase I Reconnaissance of 27 Mile of 161 kV Transmission at Reelfoot Lake, Lake and Obion Counties, Tennessee. Client: Tennessee Valley Authority.

Archaeological Reconnaissance With Testing of the Proposed Reregulation Structure Below the Blue Ridge Dam, Fannin County, Georgia. Client: Tennessee Valley Authority.

Archaeological Reconnaissance of Sixteen Miles of 46 kV Transmission Line From Sparta to Cookeville, Putnam and White Counties, Tennessee. Client: Tennessee Valley Authority.

Phase I and II Archaeological Investigation of a 100 Acre Industrial Tract at Wurtland, Greenup County, Kentucy. Client: P&C Chemical Company, Cincinnati, Ohio.

Cultural Resource Management Plan (CRMP): McEntire Air National Guard Base, Eastover, South Carolina. Client: Air National Guard Bureau.

Cultural Resource Management Plan (CRMP): Oak Ridge Reservation, Tennessee. Client: U.S. Department of Energy.

Archaeological and Architectural Survey of the Punta Salinas Air National Guard Station, Toa Baja, Puerto Rico. Client: Air National Guard Bureau.

Archaeological and Architectural Survey of the 1300 Acre Camp Santiago Bombing Range, Salinas, Puerto Rico. Client: Air National Guard Bureau.

Archaeological and Architectural Survey of Punta Borinquen Air National Guard Station, Aguadilia, Puerto Rico. Client: Air National Guard Bureau.

Archaeological and Architectural Survey of the St. Croix Air National Guard Station, St. Croix, U.S. Virgin Islands.

Archaeological and Architectural Survey of Smoky Hills Air Gunnery Range, Salina, Kansas. Client: Air National Guard Bureau.

Archaeological and Architectural Survey of the Coos Head Air National Guard Station, Coos Head, Oregon. Client: Air National Guard Bureau.

Archaeological and Architectural Survey of the Portland Air National Guard Base, Portland International Airport, Portland, Oregon. Client: Air National Guard Bureau.

Archaeological and Architectural Survey of the Savannah Air National Guard Base, Savannah International Airport, Savannah, Georgia. Client: Air National Guard Bureau.

Archaeological Survey of the 1996-2000 Timber Harvest Area, Arnold Engineering Development Center, Tennessee. Client: U.S. Air Force.

Professional Associations

Society for American Archaeology
Southeastern Archaeological Conference
Tennessee Anthropological Association
Society for Historical Archaeology
Williamson County Chamber of Commerce
The Heritage Foundation
Williamson County Historical Society

Experience

1987-Present: President, DuVall & Associates, Inc.
Provide archaeological, biological, water quality, property liability/environmental audit assessments and related environmental studies for governmental agencies, engineering firms, real estate developers and industrial clients.

1984-1987: Principal, Barcon, Inc. Responsible for archaeological and environmental assessments for municipalities, federal agencies, engineering firms, real estate developers, and industrial clients.

1976-1984: Staff Archaeologist, Tennessee Department of Transportation, Environmental Planning Division. Archaeological reconnaissance, site evaluation, site evaluation, testing and mitigation.

1973-1976: Field Supervisor in charge of Phase I survey, Phase II testing and Phase III excavations of archaeological sites within the TVA boundary of The Normandy Reservoir, Tennessee.

1973-1976: Graduate school and research assistant in archaeology, University of Tennessee, Knoxville.

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APPENDIX B: ARCHAEOLOGY INVENTORY SITE FORM COVER PAGE.

Ohio Historic Preservation Office

567 East Hudson Street
Columbus, Ohio 43211-1030
614/298-2000
Fax: 298-2037

OHIO HISTORICAL SOCIETY
SINCE 1885

*Site No. 33- Pk - 245

OHIO ARCHAEOLOGICAL INVENTORY

*Response required for acceptance of form

for official use only

Coder ___
Date ___

A. Identification

*1. Type of Form (select as many as appropriate):
X New Form ___ Revised Form ___ Transcribed Data

2. County Pike *3. Trinomial State Site Number 33- PK - 245 — pk245

4. Site Name(s) McCorkle Road Site

5. Project Site Number H-1

6. Other State Site Number ___

7. Source (of Item A.5. and/or A.6.) ___

B. Location

*1. UTM Zone ___ 16 or ___ 17 X

Easting 3 2 9 1 6 0 — 0

Northing 4 3 2 1 3 2 0 — 0

2. Latitude ___ ___ ___
Longitude (12) ___ ___

*3. Township Scioto Range ___ Not Applicable ___
Section NE ¼ Section: ___ SW ___ SE ___ NW X NE
Township Name Scioto

*4. Quadrangle Name Waverly South, Ohio — 1 9

*5. Quadrangle Date 1992

*6. Confident of Site Location X Yes ___ No

C. Ownership

*1. Name(s) USDOE Richmond-Portsmouth Office
Address P.O. Box 700
City/Town, State, Zip ~~Piketon, Ohio~~ 45661-0700
Phone (___) ___

2. Tenant (if any) ___
Address ___
City/Town, State, Zip ___
Phone (___) ___

*3. Ownership Status (select only one, as appropriate):
___ Private (single) ___ Private (multiple) ___ Local Govt.
___ State Govt. X Federal Govt. ___ Multiple Govt.
___ Mixed-Govt./Private ___ Unknown

D. Temporal Affiliations

*1. Affiliations Present (select only one, as appropriate):
___ Prehistoric X Historic ___ Prehistoric and Historic

*Site No. 33- PK - 245
Plotted ☐

APPENDIX C

VERTEBRATE SPECIES OBSERVED AT PORTS

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Table C.1. Vertebrate species observed on the reservation of the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio

Scientific name	Common name	Scientific name	Common name
Mammals			
Blarina brevicauda	short-tailed shrew	*Odocoileus virginianus*	white-tailed deer
Bos taurus	Cattle	*Ondatra zibethicus*	muskrat
Canis familiaris	Dog	*Peromyscus leucopus*	white-footed mouse
Didelphis virginiana	Opossum	*Peromyscus maniculatus*	deer mouse
Eptesicus fuscus	big brown bat	*Pipistrellus subflavus*	eastern pipistrelle
Felis domestica	house cat	*Procyon lotor*	raccoon
Glaucomys volans	southern flying squirrel	*Reithrodontomys humulis*	eastern harvest mouse
Lasiurus borealis	red bat	*S. carolinensis*	gray squirrel
Marmota monax	Woodchuck	*Sciurus carolinensis*	fox squirrel
Microtus pennsylvanicus	meadow vole	*Sorex cinereus*	masked shrew
Mus musculus	house mouse	*Sylvilagus floridanis*	eastern cottontail rabbit
Mustela frenata	long-tailed weasel	*Tamius striatus*	eastern chipmunk
Myotis lucifugus	little brown bat	*Urocyon cinereoargenteus*	gray fox
Myotis septentrionalis	northern long ear bat	*Vulpes vulpes*	red fox
Reptiles and Amphibians			
Bufo americanus	American toad	*Hyla c. crucifer*	northern spring peeper
Bufo woodhousei fowleri	Fowler's toad	*Natrix s. sipedon*	northern water snake
Chelydra serpentina	snapping turtle	*Opheodrys aestivus*	rough green snake
Chrysemys picta	midland painted turtle	*Rana catesbeiana*	bullfrog
Columber c. constrictor	northern black racer	*Rana p. pipiens*	northern leopard frog
Desmognathus f. fuscus	northern dusky salamander	*Terrapene c. carolina*	eastern box turtle
Elaphe o. obsoleta	black rat snake	*Thamnophis s. sirtalis*	eastern garter snake
Graptemys geographica	map turtle	*Trionyx s. spinifer*	eastern spiny softshell turtle
Heterodon playtrhinos	eastern hognose snake		
Birds			
Accipiter cooperii	Cooper's hawk	*Guiraca caerulea*	blue grosbeak
Accipiter striatus	sharp-shinned hawk	*Hirundo rustica*	barn swallow
Actitis macularia	spotted sandpiper	*Hylocichla guttata faxoni*	hermit thrush
Agelaius phoeniceus	red-winged blackbird	*Hylocichla mustelina*	wood thrush
Aix sponsa	wood duck	*Icteria virens virens*	yellow-breasted chat
Ammodramus henslowii	Henslow's sparrow	*Icterus galbula*	northern oriole
Ammodramus savannarum	grasshopper sparrow	*Junco hyemalis*	dark-eyed junco
Anas crecca	green-winged teal	*Lophodytes cucullatus*	hooded meganser
Anas discors	blue-winged teal	*Megaceryle alcyon*	belted kingfisher
Anas platyrhynchos	Mallard	*Melanerpes erythrocephalus*	red-headed woodpecker
Anas rubripes	black duck	*Meleagris gallopauo*	wild turkey
Anas strepera	Gadwall	*Melospiza georgiana*	swamp sparrow
Archilochus colubris	ruby-throated hummingbird	*Melospiza melodia*	song sparrow
Ardea herodias	great blue heron	*Mimus polyglottos*	mockingbird

Table C.1. (continued)

Scientific name	Common name	Scientific name	Common name
Birds			
Aythya affinis	lesser scaup	*Molothus ater ater*	brown-headed cowbird
Aythya collaris	ring-necked duck	*Myiarchus crinitus*	great crested flycatcher
Bombycilla cedrorum	cedar waxwing	*Oporornis formosus*	Kentucky warbler
Bonasa umbellus	ruffed grouse	*Otus asio*	screech owl
Botarus lentiginosus	American bittern	*Parus atricapillus*	black-capped chickadee
Bucephala albeola	bufflehead	*Parus bicolor*	tufted titmouse
Buteo jamaicensis	red-tailed hawk	*Parus carolinensis*	Carolina chickadee
Butorides virescens	green heron	*Passerculus sandwichensis*	savannah sparrow
Calidres alpina	dunlin	*Passerina cyanea*	indigo bunting
Calidres melanotos	pectoral sandpiper	*Philohela minor*	American woodcock
Calidres minutilla	least sandpiper	*Pipilo erythropthalmus*	rufous-sided towhee
Calidris pusillus	semipalmated sandpiper	*Piranga olivacea*	scarlet tanager
Capodacus purpureus	purple finch	*Piranga rubra*	summer tanager
Caprimulgus vociferus	whippoorwill	*Podilymbus podiceps*	pied-billed grebe
Cardinalis cardinalis	cardinal	*Polioptila caerulea caerulea*	blue-gray gnatcatcher
Cathartes aura	turkey vulture	*Progne subis*	purple martin
Centurus carolinus	red-bellied woodpecker	*Regulus calendula calendula*	ruby-crowned kinglet
Certhia familiaris	brown creeper	*Regulus satrapa satrapa*	golden-crowned kinglet
Chaetura pelagica	chimney swift	*Sayornis phoebe*	eastern phoebe
Charadrius vociferus	killdeer	*Seiurus aurocapillus*	ovenbird
Circus cyaneus	marsh hawk	*Siala sialis*	eastern bluebird
Coccyzus americanus	yellow-billed cuckoo	*Sitta canadensis*	red-breasted nuthatch
Coccyzus erythropthalamus	black -billed cuckoo	*Sitta carolinensis*	white-breasted nuthatch
Colaptes aurantus	common flicker	*Sphyrapicus varius*	yellow-bellied sapsucker
Colinus virginianus	bobwhite	*Spinus pinus*	pine siskin
Columba livia	rock dove	*Spinus tristis*	American goldfinch
Contopus virens	eastern wood pewee	*Spizella arborea*	tree sparrow
Corvus brachyrhynchos	common crow	*Spizella passerina*	chipping sparrow
Cyanocitta cristata	blue jay	*Spizella pusilla*	field sparrow
Dendrocopos pubescens	downy woodpecker	*Sturnella magna magna*	eastern meadowlark
Dendrocopos villosus	hairy woodpecker	*Sturnus vulgaris vulgaris*	starling
Dendroica coronata coronata	yellow-rumped warbler	*Thryothorus ludovicianus*	Carolina wren
Dendroica discolor	prairie warbler	*Toxostoma rufum rufum*	brown thrasher
Dendroica petechia	yellow warbler	*Tringa flavipes*	lesser yellowlegs
Dendroica virens	black-throated green warbler	*Tringa melanoleucus*	greater yellowlegs
Drycopus pileatus	pileated woodpecker	*Turdus migratorius*	American robin
Dumetella carolinensis	gray catbird	*Tyrannus tyrannus*	eastern kingbird
Empidonax traillii	willow flycatcher	*Vermivora pinus*	blue-winged warbler
Empidonax virescens	acadian flycatcher	*Vireo griseus*	white-eyed vireo
Falco sparverius	American kestrel	*Vireo olivaceus*	red-eyed vireo
Fulica americanus	American coot	*Zenaida macroura*	mourning dove
Gavia immer	common loon	*Zonotrichia albicollis*	white-throated sparrow
Geothlypis trichas	common yellowthroat	*Zonotrichia leucophrys*	white-crowned sparrow

Table C.1. (continued)

Scientific name	Common name	Scientific name	Common name
Fish (Note: Fish species were observed in the streams in and immediately surrounding the Plant.)			
Ambloplitis rupestris	rock bass	*Lythrurus umbratilius*	redfin shiner
Ameiurus natalis	yellow bullhead	*Moxostoma duquesnei*	black redhorse
Aplodinatus grunniens	freshwater drum	*Micropterus dolmieui*	smallmouth bass
Campostoma anomalum	central stoneroller	*Micropterus punctulatus*	spotted bass
Catostomus commersoni	white sucker	*Micropterus salmoides*	largemouth bass
Cyprinella spiloptera	spotfin shiner	*Minytrema melanops*	spotted sucker
Cyprinella whippplei	steelcolor shiner	*Moxostoma erythrurum*	golden redhorse
Cyprinus carpio	common carp	*Moxostoma macrolepidotum*	shorthead redhorse
Dorosoma cepedianum	gizzard shad	*Notropis atherinoides*	emerald shiner
Esox americanus vermiculatus	grass pickerel	*Notropis buccatus*	silverjaw minnow
Etheostoma blennoides	greenside darter	*Notropis rubellus*	rosyface shiner
Etheostoma caeruleum	rainbow darter	*Notropis stramineus*	sand shiner
Etheostoma flabellare	fantail darter	*Noturus flavus*	stonecat madtom
Etheostoma nigrum	Johnny darter	*Noturus miuris*	brindled madtom
Etheostoma spectabile	orangethroat darter	*Percina caprodes*	logperch
Etheostoma zonale	banded darter	*Percina maculata*	blackside darter
Fundulus notatus	blackstripe topminnow	*Percina sciera*	dusky darter
Hypentelium nigricans	northern hogsucker	*Percopsis omiscomaycus*	trout-perch
Ictaluris punctatus	channel catfish	*Phenacobius mirabilis*	suckermouth minnow
Labidesthes sicculus	brook silverside	*Phoxinus erythrogaster*	southern redbelly dace
Lepisosteus osseus	longnose gar	*Pimephales notatus*	bluntnose minnow
Lepomis cyanellus	green sunfish	*Pimephales vigilax*	bullhead minnow
Lepomis macrochirus	Bluegill	*Pomoxis annularis*	white crappie
Lepomis megalotis	longear sunfish	*Rhinichthys atratulus*	blacknose dace
Luxilus chrysocephalus	striped shiner	*Semotilus atromaculatus*	creek chub
Lythrurus ardens	rosefin shiner	*Stizostedion canadense*	sauger
Lythrurus umbratilis	redfin shiner	*Stizostedion vitreum*	walleye

Sources:

U.S. Department of Energy. 1994. *Baseline Ecological Risk Assessment, Portsmouth Gaseous Diffusion Plant, Piketon, Ohio.* Volume 3: Appendices C–E. DOE/OR/11-1316/V3&D1. 0-04-04/32.010.

U.S. Department of Energy. 1994. *Baseline Ecological Risk Assessment, Portsmouth Gaseous Diffusion Plant, Piketon, Ohio.* Volume 5: Appendices K–Q. DOE/OR/11-1316/V5&D1. 0-04-04/32.012.

Energy Research & Development Administration. *Final Environmental Impact Statement: Portsmouth Gaseous Diffusion Plant Site, Piketon, Ohio.* Volume 2: Appendices. ERDA-1555.

Lockheed Martin Energy Systems, Inc. 1998. *Final Threatened and Endangered Species Report: Portsmouth Gaseous Diffusion Plant, Piketon, Ohio.* DOE/OR/11/1668&D0

Ohio Environmental Protection Agency. 1998. *Biological and Water Quality Study of Little Beaver Creek and Big Beaver Creek – 1997. Portsmouth Gaseous Diffusion Plant, Pike County, Ohio.* Ohio EPA Technical Report MAS/1998-5-1.

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APPENDIX D

ARCHAEOLOGICAL AND HISTORICAL ARCHITECTURAL RESOURCES

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Table D.1. PORTS archaeological resources that do not meet the NRCE

OAI/OHI No.	Quadrant	Temporal affiliations	Site name
33 Pk 186	I	Unassigned Prehistoric	Lithic Scatter
33 Pk 187	I	Historic (ca. 1915–1951)	Farmstead Remnant
33 Pk 188	I	Historic (post 1952)	Worker Barracks
33 Pk 189	IV	Unassigned Prehistoric/Historic (post 1952)	Isolated Find & Tower Platform
33 Pk 190	I	Historic (post 1952)	Radio Tower Base
33 Pk 191	I	Historic (ca. 1830s–present)	Open Dump
33 Pk 192	I	Historic (ca. 1900–present)	Open Dump
33 Pk 196	I	Historic (ca. 1952–present)	Culvert/Drain Pipes
33 Pk 198	IV	Unassigned Prehistoric	Isolated Find
33 Pk 199	IV	Historic (ca. 1820–present)	Isolated Find
33 Pk 200	IV	Historic (ca. 1820–present)	Historic Scatter
33 Pk 201	IV	Historic (ca. 1890–present)	Isolated Find
33 Pk 202	IV	Historic (ca. 1934–present)	Historic Scatter
33 Pk 204	IV	Unassigned Prehistoric	Isolated Find
33 Pk 205	IV	Unassigned Prehistoric	Isolated Find
33 Pk 206	II	Unassigned Prehistoric	Lithic Scatter
33 Pk 207	II	Unassigned Prehistoric	Isolated Find
33 Pk 208	II	Unassigned Prehistoric	Isolated Find
33 Pk 209	I	Historic (ca. 1933–1964)	Historic Scatter
33 Pk 215	IV	Historic (ca. 1820–present)	Open Dump
33 Pk 216	IV	Historic (ca. 1879–present)	Open Dump
33 Pk 219	IV	Historic (post 1952)	Old Firing Range

Source: Schweikart et al. 1997.

Table D.2. PORTS archaeological resources recommended for Phase II assessments to determine if they meet the NRCE

OAH/OHI No.	Quadrant	Temporal affiliations	Site name
33 Pk 184	I	Historic (ca. 1820–present)	Davis Farmstead
33 Pk 185	I	Historic (ca. 1900–present)	South Shyville Farmstead
33 Pk 193	I	Historic (ca. 1820–present)	Iron Wheel Farmstead
33 Pk 194	II	Historic (ca. 1820–present)	North Shyville Farmstead
33 Pk 195	I	Historic (ca. 1820–present)	Beaver Road Farmstead
33 Pk 197	II	Historic (ca. 1951)	Dutch Run Road Farmstead
33 Pk 203	IV	Historic Farmstead (ca. 1820–present)	Ruby Hollow Farmstead
33 Pk 206	II	Historic (ca. 1820–present)	Terrace Farmstead
33 Pk 210	I	Unassigned Prehistoric	Southview Site (lithic scatter)
33 Pk 211	IV	Historic (1890–1964)	Bamboo Farmstead
33 Pk 212	IV	Historic (ca. 1931–present)	Railside Farmstead
33 Pk 213	IV	Historic (ca. 1820–present)	Log Pen Farmstead
33 Pk 217	IV	Historic (ca. 1820–present)	Stockdale Road Dairy
33 Pk 218 (PIK-205-12)	IV	Historic (ca. 1820–present)	Cannett Farmstead

Source: Schweikart et al. 1997

Table D.3. PORTS archaeological and architectural historic resources to which the NRCE have not been applied

OAI/OHI No.	Quadrant	Temporal affiliations	Site name
33 Pk 189 (PIK-206-9)	II	Historic (ca. 1790–present)	Mount Gilead Cemetery and Chapel Remnant
33 Pk 214 (PIK-207-12)	IV	Historic (ca. 1877–mid-20th century)	Holt Cemetery

Source: Schweikart et al. 1997.

Table D.4. Architectural resources evaluated in the DRAFT PORTS Cultural Resources Survey

OHI No.	PORTS Name	Quadrant	Date	Period	Type
PIK-45-12	Cooling Tower	II	1976	3	Heat Exchanging Structure
PIK-46-12	Cooling Tower and Uncovered Extension Basin	II	1954–1955	2	Heat Exchanging Structure
PIK-47-12	Recirculating Water Pump House	II	1953–1954	2	Mechanical Building
PIK-48-12	Cooling Tower and Uncovered Extension Basin	II	1954–1955	2	Heat Exchanging Structure
PIK-49-12	Cooling Tower	II	1978	3	Heat Exchanging Structure
PIK-50-12	Feed Vaporization and Sampling Facility	II	1981	3	Process Building
PIK-51-12	East Groundwater Treatment Facility	II	1994–1995	3	Mechanical Building
PIK-52-12	Bulk Storage Building–Non-UEA	II	1956	2	Warehouse
PIK-53-12	Neutralizing Building	II	1973	3	Mechanical Building
PIK-54-12	Bulk Storage Building	II	1953	2	Warehouse
PIK-55-12	Bulk Storage Building	II	1953	2	Warehouse
PIK-56-12	Undocumented Guard Post	II	ca. 1952–1960	2	Booth
PIK-57-12	Personnel Monitoring Building	II	1955	2	Booth
PIK-58-12	Maintenance Building	II	1957	2	Warehouse
PIK-59-12	Maintenance and Stores Warehouse	II	ca. 1983	3	Warehouse
PIK-60-12	Lime House	II	1955	2	Mechanical Building
PIK-61-12	Neutralizing Pit	II	1953	2	Basin
PIK-62-12	Converter Shop and Cleaning Facility	II	1955	2	Work Building
PIK-63-12	Water Deionization Facility	II	1955	2	Mechanical Building
PIK-64-12	Air Conditioning Equipment Building	II	1975	3	Mechanical Building
PIK-65-12	Decontamination Building	II	1955	2	Work Building
PIK-66-12	Heating Booster Pump Building	II	1983	3	Mechanical Building

Table D.4 (continued)

PIK-67-12	Special Nuclear Material Storage Building	II	1980	3	Bunker Warehouse
PIK-68-12	Radio Base Station Building	II	1978	3	Mechanical Building
PIK-69-12	Elevated Water Tank	II	1960	3	Elevated Cylinder Tank
PIK-70-12	Paint and Oil Storage Building	II	1980	3	Warehouse
PIK-71-12	Maintenance and Stores Building	II	1954	2	Work Building
PIK-72-12	Maintenance and Stores Gas Manifold Shed	II	1954	2	Covered Platform
PIK-73-12	North Portal and Shelter	I	1955	2	Booth
PIK-74-12	South Portal and Shelter	I	1955	2	Booth
PIK-75-12	Oil Drum Storage Facility	I	1954	2	Covered Platform
PIK-76-12	Gas Cylinder Storage Facility	I	1954	2	Covered Platform
PIK-77-12	Materials Receiving and Inspection	I	1954	2	Warehouse
PIK-78-12	Indoor Firing Range	I	ca. 1980–1985	3	Enclosed Firing Range Building
PIK-79-12	Guard Headquarters	I	1954, 1991	2	Office Building
PIK-80-12	Tactical Response Station	I	1955	2	Garage
PIK-81-12	Mobile Equipment Maintenance Shop	I	1953	2	Garage
PIK-82-12	Garage Storage Building	I	ca. 1953	2	Storage Shed
PIK-83-12	Auxiliary Office Building	I	1954	2	Warehouse
PIK-84-12	Plant Control Facility and Emergency Communications Antenna	I	ca. 1952–1955	2	Bunker Office Building
PIK-85-12	Process Monitoring Building	I	ca. 1954	2	Mechanical Building
PIK-86-12	Lumber Storage Facility	I	ca. 1953–1956	2	Covered Platform
PIK-87-12	Technical Service Building	I	1953, 1975	2	Laboratory Building
PIK-88-12	Explosion Test Facility	I	1956	2	Mechanical Building
PIK-89-12	Technical Service Gas Manifold Shed	I	ca. 1955	2	Covered Platform

Table D.4 (continued)

PIK-90-12	Cafeteria	I	1954	2	Cafeteria
PIK-91-12	Health Service Center	I	1954	2	Medical Building
PIK-92-12	Exchange Telephone Building	I	1954	2	Office Building
PIK-93-12	Air Conditioning Equipment Building	I	1958	3	Mechanical Building
PIK-94-12	Administration Building	I	1954	2	Office Building
PIK-95-12	Personnel Monitoring Trailer	I	1975	3	Mobile Home
PIK-96-12	Chemical Engineering Building	I	1954	2	Laboratory Building
PIK-97-12	Mechanical Test Building	I	1954	2	Mechanical Building
PIK-98-12	Steam Plant	I	1954, 1996	2	Heating Plant Structure
PIK-99-12	Steam Plant Shop Building	I	1981	3	Garage
PIK-100-12	Coal Pile Runoff Treatment Facility	I	1984	3	Mechanical Building
PIK-101-12	Recirculating Water Pump House	I	1954	2	Mechanical Building
PIK-102-12	Cooling Tower	I	1954	2	Heat Exchanging Structure
PIK-103-12	Interplant Portal	I	1985	4	Booth
PIK-104-12	Maintenance, Stores, and Training Facility	I	1985	4	Office Building, Multi-level
PIK-105-12	Plant Emergency Operations Center	I	ca. 1980–1985	4	Office Building
PIK-106-12	Fire Station	I	1981	4	Emergency Vehicle Garage
PIK-107-12	Data Processing Building	I	1984	4	Office Building
PIK-108-12	Administrative Portal - Pedestrian	I	1985	4	Booth
PIK-109-12	Administration Building	I	1981	4	Office Building
PIK-110-12	Electronic Maintenance Facility	I	ca. 1980–1985	4	Office Building
PIK-111-12	Cooling Tower Pump House	I	1984	4	Mechanical Building
PIK-112-12	Cooling Tower and Valve House	I	1984	4	Heat Exchanging Structure

Table D.4 (continued)

PIK-113-12	Undocumented Guard Booth	I	ca. 1960–1980	3	Booth
PIK-114-12	GCEP Process Building #2	I	1979–1985	4	Process Building
PIK-115-12	GCEP Process Support Building	I	1983	4	Office Building
PIK-116-12	GCEP Process Building #1	I	1979–1985	4	Process Building
PIK-117-12	GCEP Transfer Corridor	I and III	1983	4	Mechanical Corridor
PIK-118-12	Fire Water Pump House	I	ca. 1980–1985	4	Mechanical Building
PIK-119-12	Sanitary Water Storage Tank	I	ca. 1980–1985	4	Large Cylinder Tank
PIK-120-12	Fire Water Storage Tank 1	I	ca. 1980–1985	4	Large Cylinder Tank
PIK-121-12	Fire Water Storage Tank 2	I	ca. 1980–1985	4	Large Cylinder Tank
PIK-122-12	GCEP Switch House, Switchyard, Valve House and Oil Pumping Station	I	1982	4	Utility Yard
PIK-123-12	Waste Handling and Storage Facility (GCEP Feed and Withdrawal Facility)	I	ca. 1980–1985	4	Process Building
PIK-124-12	South Portal - Pedestrian	I	1985	4	Booth
PIK-125-12	South Portal - Vehicular	I	1985	4	Booth
PIK-126-12	Sewage Lift Stations	I and III	ca. 1970–1978	3	Mechanical Building
PIK-127-12	Mobile Equipment Garage	I	1979	4	Linear Garage
PIK-128-12	Warehouse K - Non-UEA	I	1953–1954, 1978	3	Warehouse
PIK-129-12	South Groundwater Treatment Facility	I	ca. 1994	3	Mechanical Building
PIK-130-12	Administration Portal - Vehicular	I	1983	4	Booth
PIK-131-12	GCEP Construction Warehouse	I	ca. 1980–1985	4	Warehouse
PIK-132-12	South pH Adjustment Facility	I	1979	3	Mechanical Building
PIK-133-12	South Environmental Sampling Building	I	1968	3	Mechanical Building
PIK-134-12	South Office Building	I	1977–1978	4	Office Building

Table D.4 (continued)

PIK-135-12	South Weather Station	I	ca. 1979, ca. 1993–1996	3	Communications Antenna
PIK-136-12	East Environmental Monitoring Station (Liquid Effluent System)	II	1981	3	Mechanical Building
PIK-137-12	Recirculating Water Pump House	II	ca. 1993–1996	3	Weatherport
PIK-138-12	Little Beaver Groundwater Treatment Facility	II	ca. 1993–1996	3	Mechanical Building
PIK-139-12	Groundwater Treatment Facility	I	ca. 1995	3	Mechanical Building
PIK-140-12	Hazardous Waste Storage Building (GCEP Recycle/ Assembly Building and GCEP Training and Test Facility)	III	1983	4	Process Building
PIK-141-12	GCEP Waste Accountability Facility	III	1984	4	Warehouse
PIK-142-12	Undocumented temporary warehouse in X-7745 R Yard	III	ca. 1996–1997	3	Weatherport
PIK-143-12	Process Building, SNM Monitoring Portals	III	1956, 1981	2	Process Building
PIK-144-12	Instrumentation Tunnels (beside X-326, X-330 and X-333)	I and III	1954	2	Utility Tunnel
PIK-145-12	Process Building	III	1955	2	Process Building
PIK-146-9	Undocumented bridge over tributary to Little Beaver Creek	IV	ca. 1930–1950, ca. 1954	1	Bridge
PIK-147-12	Switchyard, Test and Repair Building, Oil House, Valve Houses, GCEP Oil Pumping Station, undocumented building, undocumented mobile office	III	1954, 1980	2	Mechanical Building
PIK-148-12	Switch House (includes Control House, North Switch House, South Switch House)	III	1954	2	Utility Yard
PIK-149-12	Waste Oil Storage Building	III	1982	3	Weatherport
PIK-150-12	Personnel Monitoring Building	III	1955	2	Office Building
PIK-151-12	Recirculating Water Pump House	IV	ca. 1954–1955	2	Mechanical Building
PIK-152-12	Cooling Tower	IV	ca. 1954–1955	2	Heat Exchanging Structure
PIK-153-12	Cooling Tower	IV	ca. 1954–1955	2	Heat Exchanging Structure
PIK-154-12	Two undocumented booths in X-745 E Yard	IV	ca. 1970–1980	3	Booth

Table D.4 (continued)

PIK-155-12	Undocumented shed in X-745 C Yard	III	ca. 1996–1997	3	Storage Shed
PIK-156-12	Toll Enrichment Facility	IV	1958, 1971–1975	2	Process Building
PIK-157-12	Feed Vaporization and Fluorine Generation Facility	IV	1954, 1982–1983	2	Process Building
PIK-158-12	Fluorine Storage Building	IV	1954	2	Mechanical Building
PIK-159-12	Maintenance Storage Building	IV	1958	2	Warehouse
PIK-160-12	Undocumented mobile office behind X-344 A	IV	ca. 1990–1997	3	Mobile Home
PIK-161-12	Hydrofluoric Acid Storage Building, Gas Ventilation Stack, Safety Building	IV	1958	2	Weatherport
PIK-162-12	Transformer Storage and Cleaning Building	IV	1985	3	Storage Garage
PIK-163-12	Pike Avenue Portal	IV	1976	3	Booth
PIK-164-12	Switchyard, Test and Repair Facility, Oil House, Valve Houses, Gas Reclaiming Cart Garage, Electric Power Tunnels and undocumented mobile office	IV	1954, 1955, 1985, ca. 1997	2	Utility Yard
PIK-165-12	Switch House (includes Control House, East Switch House, West Switch House)	IV	1955	2	Mechanical Building
PIK-166-12	Recirculating Water Pump House	II	1960	3	Mechanical Building
PIK-167-12	Process Building	IV	1955	2	Process Building
PIK-168-12	Construction Entrance Building, Truck Scale Facility	III	1975	3	Booth
PIK-169-12	Northeast Portal – Vehicular and Northeast Portal – Pedestrian	III	1985	4	Booth
PIK-170-12	Fire Training Building	III	ca. 1993	3	Emergency Training Building
PIK-171-12	Liquid Effluent Control Facility	III	1976	3	Mechanical Building
PIK-172-12	Sanitary Sewage Treatment Facility	III	ca. 1954–1955	2	Mechanical Building
PIK-173-12	Warehouses	III	1957, 1978	2	Warehouse
PIK-174-12	Sewage Treatment Facility	III	1980	4	Mechanical Building
PIK-175-12	Warehouses	III	1988	3	Warehouse

Table D.4 (continued)

PIK-176-12	West Environmental Sampling Building	III	1968	3	Mechanical Building
PIK-177-12	West Environmental Monitoring Station	III	1981	3	Mechanical Building
PIK-178-12	Ohio Valley Electric Corporation office building	III	ca. 1954, ca. 1980–1990	2	Office Building
PIK-179-12	Ohio Valley Electric Corporation storage shed	III	ca. 1960–1980	3	Tractor Shed
PIK-180-12	Ohio Valley Electric Corporation Microwave Tower and Dish	III	ca. 1980–1990	3	Communications Antenna
PIK-181-12	Don Marquis Substation (upper tier yard)	III	ca. 1954–1970	2	Utility Yard
PIK-182-12	Don Marquis Substation (lower tier yard)	III	ca. 1954–1970	2	Utility Yard
PIK-183-12	Warehouse	IV	1978	3	Warehouse
PIK-184-12	Salt Storage Building	IV	1979	3	Bin
PIK-185-12	Surplus and Salvage Warehouse	IV	1957, 1983	2	Warehouse
PIK-186-12	North Holding Pond Storage Building	IV	1981	3	Mechanical Building
PIK-187-12	North Environmental Storage Building	IV	ca. 1986	3	Booth
PIK-188-12	Booster Pump House and Appurtenances, Chlorinator Building, Diesel Generator Building	IV	1954	2	Mechanical Building
PIK-189-9	Landfill Utility Building	IV	1980	3	Storage Garage
PIK-190-12	Elevated Water Tank	III	ca. 1960	3	Elevated Cylinder Tank
PIK-191-12	Water Treatment Plant Chemical Building and Mixing and Settling Basins	IV	1954	2	Mechanical Building
PIK-192-12	Water Treatment Plant Filter Building, Chlorine Building and Recarbonation Building	IV	1954, 1979, ca. 1993–1997	2	Mechanical Building
PIK-193-12	Northeast Environmental Monitoring Station	IV	1981	3	Mechanical Building
PIK-194-12	Former Firing Range	IV	ca. 1960–1970	3	Weatherport
PIK-195-12	Undocumented pipeline from Water Treatment Plant to X-611 B Sludge Lagoon	IV	1979–1980	3	Pipeline

Table D.4 (continued)

PIK-196-12	Undocumented sludge lagoon environmental monitoring station	IV	ca. 1980	3	Mechanical Building
PIK-197-9	Firing Range (New)	IV	ca. 1990	3	Open Firing Range
PIK-198-9	Undocumented water pipeline building near Little Beaver Creek	IV	ca. 1954	2	Mechanical Building
PIK-199-9	Undocumented railroad overpass over North Access Road	IV	1923, ca. 1952	1	Railroad Overpass
PIK-200-9	Undocumented barricade	IV	ca. 1980–1990	3	Earthen Barricade
PIK-201-9	Undocumented bridge over tributary to Little Beaver Creek	IV	ca. 1880–1920, ca. 1954	1	Bridge
PIK-202-12	Undocumented bridge over Little Beaver Creek	IV	ca. 1880–1920, ca. 1954	1	Bridge
PIK-203-12	Northwest Portal – Vehicular and Northwest Portal – Pedestrian	III	1985	4	Booth
PIK-204-12	Undocumented temporary warehouse beside X-3346	I	ca. 1996–1997	3	Weatherport

Source: Dobson-Brown et al. 1996 and Coleman et al. 1997.
GCEP = Gas Centrifuge Enrichment Plant.
SNM = Special Nuclear Material.
UEA = Uranium Enrichment Administration.

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APPENDIX E

PUBLIC COMMENTS RECEIVED ON DRAFT ENVIRONMENTAL ASSESSMENT

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PACE Local 5-689

PAPER, ALLIED-INDUSTRIAL, CHEMICAL AND ENERGY INTERNATIONAL UNION, AFL-CIO

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To: DOE Oak Ridge Operations Office
Attention: Gary Hartman DOE

From: Daniel J. Minter, President
PACE Local 5-689

Subject: Environmental Assessment of the DOE's Portsmouth GDP Winterization Project

Date: May 21, 2001

Outlined below are the comments of PACE Local 5-689 on the Environmental Assessment for the winterization project at the Energy Department's Portsmouth Gaseous Diffusion Plant in Piketon, OH. The comments support the statements provided at the public hearing in Piketon on May 15, 2001. These comments are being submitted pursuant to the National Environmental Policy Act and the implementing regulations.

In analyzing alternatives to the proposed installation of gas boilers in the X3002, and the installation of the accompanying supply pipeline of natural gas, at lease two additional options must be included and analyzed in the Environmental Assessment (EA). The two options that should be included in the EA involve the use of existing facilities rather than utilizing new construction with the potential for significant savings to the taxpayers on both initial expenditures and continuing operational expenditures for an action that eventually will not be needed. Option 1 would utilize seasonal low-power operation of selected equipment in the process buildings to provide the heat necessary to heat both the process buildings and the remainder of the facilities on site which currently utilize the re-circulating hot water (RHW) for their heat. Option 2 involves the use of the excess steam from the existing steam plant in conjunction with much smaller supplemental heat capacity. A discussion of the two options follows:

1) For Option 1, the question which must be answered is whether or not it would be more cost effective to use DOE funds intended for winterization (capital expenditures and operating costs) to operate a seasonal or a small scale SWU production operation at Portsmouth GDP. (Note: DOE has performed previous studies, which indicate that seasonal operation of a GDP is possible.) This alternative would supply latent process heat to keep the process buildings warm and heat that could be transferred to the RHW system to provide the necessary heat for those facilities currently dependent upon process heat. The seasonal operation could be optimized to produce SWU (.8-1.0 million SWU) which could be recovered as product. The EA should include a calculation of an optimized SWU production for the power levels needed for plant heating

(which also must be calculated). The SWU could be sold to USEC (or if legislation permitted on the spot market) to offset the purchase price of the electricity needed for the seasonal operation. DOE currently plans to keep the PORTS GDP in cold standby which requires some operation of existing auxiliary equipment, plant operational and support staff, and a surveillance and maintenance program which could potentially last until a replacement enrichment technology is in place. Labor costs for the seasonal operation would thus be allocated to cold standby operations in any scenario so that no additional expense to DOE would be necessary for labor costs. At current market prices, the cost of firm power (which should be procured via contract) should be offset by the SWU production. Thus, the additional marginal cost to DOE for seasonal operation in excess of cold standby may be nil.

Seasonal operation of the cascade would provide additional benefits to DOE beyond virtually eliminating the cost of winterization and the further need for plant modification. The seasonal operation would provide better assurance that the plant could restart in the time frames specified by DOE in the Cold Standby plan. Seasonal operation would maintain a core cadre of personnel experienced in the operation of the PORTS GDP enrichment process. Seasonal operation would create savings to several million dollars in power costs (approximately ½ of the total power costs) currently planned to support deposit removal. Seasonal operation would also provide additional assurance that key components of the enrichment process were protected thus better ensuring cascade restart potential when compared to restarting from cold standby with a significant shutdown period. DOE's Cold Standby operational plan requires that feed (X342) and withdrawal facilities (tails and product) be maintained operational. Hence, DOE would be able to seasonally demonstrate their continued operability.

As part of the analysis, the EA should consider whether a SWU-for-power swap would be economic and could be arranged with other utilities. By trading low cost firm electric power supplied by a utility for SWU, you may crate a situation where the costs of winterization are eliminated and the cost of cold standby may be reduced because of the funds recouped from the electricity conversion into SWU and the use of the waste heat to keep the buildings warm. Also, the electricity utilized for space heaters would be wasted with no SWU return.

2) For Option 2: During its long history of operation, the PORTS plant utilized a coal fired steam plant to provide steam heat to facilities, process equipment, and shipping and transfer activities. With the shutdown of the PORTS enriching facilities, excess steam is now available to support winterization at the plant. The steam plant has in recent years undergone modernization and major refurbishment. Heat produced by coal is considerably cheaper than natural gas (the cost of which cannot be reliably assumed since its cost has risen substantially and continues to rise) and fuel oil. Utilizing this excess steam in conjunction with a much smaller supplemental heat capacity should represent definite cost savings to the government. The use of a smaller supplemental heat addition would lessen DOE's D&D costs. The EA study should examine this option and contrast it to all other options studied. The EA should examine any proposals that DOE has received on alternate heat supplies in the EA.

3) The EA should analyze whether such seasonal operations in lieu of winterization and installation of heaters would be feasible on any one, several or all process buildings at Portsmouth.

4) A third alternative that should be analyzed under the EA, is whether the cascade could be used to provide added value to the DOE by cleaning up the Tc-99 contaminated natural uranium that DOE provided to USEC and which USEC claims it wants clean material in exchange. The DOE's plan for addressing the Tc-99 contaminated uranium (normal feed) is under discussion with the Energy Department. The process for cleaning up the TC may involve processing the normal feed with the TC constituent as well as using the magnesium fluoride traps. PORTS is the only GDP with a sufficient number of stages and purging system to produce product within specification utilizing normal feed with TC constituents greater than ASTM specifications and even PORTS cannot produce in-spec. product for normal feed with excessive TC constituent.

Since Option #1 can be implemented with virtually no lead-time, the urgency to complete plant modifications for heating is unnecessary. Implementation of Option 1 would ensure that DOE would be in regulatory compliance for facility heating. The EA should indicate the potential for regulatory non-compliance for each heating option considered.

5) What will any option have on D&D? These costs should also be included in the EA analysis for all options.

If you have any questions, please contact Daniel Minter at 740-289-2405.

cc: NRC Local Staff
Pat Musser, USEC Plant Manager
Graham Mitchell, Ohio EPA
Ted Brown, Ohio Governor's Office

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Responses to Comments Received from Daniel J. Minter, President PACE Local 5-689, Environmental Assessment of the DOE's Portsmouth GDP Winterization Project, Dated 5/21/01

The following comments were received by DOE from Daniel J. Minter. These comments warranted further consideration by DOE. A section addressing alternatives considered but not further evaluated was included in Section 2.5 of the EA. DOE's responses are shown in italics immediately following each comment.

"Outlined below are the comments of PACE Local 5-689 on the Environmental Assessment for the winterization project at the Energy Department's Portsmouth Gaseous Diffusion Plant in Piketon, OH. The comments support the statements provided at the public hearing in Piketon on May 15, 2001. These comments are being submitted pursuant to the National Environmental Policy Act and the implementing regulations."

"In analyzing alternatives to the proposed installation of gas boilers in the X3002, and the installation of the accompanying supply pipeline of natural gas, at lease two additional options must be included and analyzed in the Environmental Assessment (EA). The two options that should be included in the EA involve the use of existing facilities rather than utilizing new construction with the potential for significant savings to the taxpayers on both initial expenditures and continuing operational expenditures for an action that eventually will not be needed. Option 1 would utilize seasonal low-power operation of selected equipment in the process buildings to provide the heat necessary to heat both the process buildings and the remainder of the facilities on site which currently utilize the re-circulating hot water (RHW) for their heat. Option 2 involves the use of the excess steam from the existing steam plant in conjunction with much smaller supplemental heat capacity. A discussion of the two options follows:

1. **"For Option 1, the question which must be answered is whether or not it would be more cost effective to use DOE funds intended for winterization (capital expenditures and operating costs) to operate a seasonal or a small scale SWU production operation at Portsmouth GDP. (Note: DOE has performed previous studies, which indicate that seasonal operation of a GDP is possible.) This alternative would supply latent process heat to keep the process buildings warm and heat that could be transferred to the RHW system to provide the necessary heat for those facilities currently dependent upon process heat. The seasonal operation could be optimized to produce SWU (.8-1.0 million SWU) which could be recovered as product. The EA should include a calculation of an optimized SWU production for the power levels needed for plant heating (which also must be calculated). The SWU could be sold to USEC (or if legislation permitted on the spot market) to offset the purchase price of the electricity needed for the seasonal operation. DOE currently plans to keep the PORTS GDP in cold standby which requires some operation of existing auxiliary equipment, plant operational and support staff, and a surveillance and maintenance program which could potentially last until a replacement enrichment technology is in place. Labor costs for the seasonal operation would thus be allocated to cold standby operations in any scenario so that no additional expense to DOE would be necessary for labor costs. At current market prices, the cost of firm power (which should be procured via contract) should be offset by the SWU production. Thus, the additional marginal cost to DOE for seasonal operation in excess of cold standby may be nil. "Seasonal operation of the cascade would provide additional benefits to DOE beyond virtually eliminating the cost of winterization and the further need for plant modification. The seasonal operation would provide better assurance that the plant could restart in the time frames specified by DOE in the Cold Standby plan. Seasonal operation would maintain a core cadre of personnel experienced in the operation of the PORTS GDP enrichment process. Seasonal operation**

would create savings to several million dollars in power costs (approximately ½ of the total power costs) currently planned to support deposit removal. Seasonal operation would also provide additional assurance that key components of the enrichment process were protected thus better ensuring cascade restart potential when compared to restarting from cold standby with a significant shutdown period. DOE's Cold Standby operational plan requires that feed (X342) and withdrawal facilities (tails and product) be maintained operational. Hence, DOE would be able to seasonally demonstrate their continued operability.

"As part of the analysis, the EA should consider whether a SWU-for-power swap would be economic and could be arranged with other utilities. By trading low cost firm electric power supplied by a utility for SWU, you may crate a situation where the costs of winterization are eliminated and the cost of cold standby may be reduced because of the funds recouped from the electricity conversion into SWU and the use of the waste heat to keep the buildings warm. Also, the electricity utilized for space heaters would be wasted with no SWU return."

- *In June 2000, the United States Enrichment Corporation (USEC) made the decision to cease uranium enrichment operations at the Portsmouth Gaseous Diffusion Plant (PORTS). Consequently, various scenarios, including cold standby and warm standby were evaluated by the Department of Energy (DOE) to best determine how to maintain the plant capable of being restarted to produce 3 million separative work units of enrichments service. On March 1, 2001, the Department of Energy Secretary Abraham announced that $125 million would be provided over two years to place PORTS in cold standby, winterize facilities, and provide assistance to workers affected by the shutdown. Because some facilities at PORTS, including the three process buildings, are currently heated by the waste heat of compression from the gaseous diffusion plant, the decision to place PORTS in cold standby necessarily created the need to find an alternative heat supply for these buildings. Consequently, the need for winterization activities and thus, the purpose of the Environmental Assessment, is to evaluate the various heating options available to ensure that an adequate heating capability will exist at PORTS. Evaluation of a warm standby scenario is therefore outside the scope of the Environmental Assessment.*

- *Further, it should be noted that the power levels necessary for enrichment services are no longer available to DOE under the existing Power Agreement between DOE and Ohio Valley Electric Corporation (OVEC) and that the sale of enrichment services and product by DOE is limited by provisions of the USEC Privatization Act. Even if such authority existed, the returns from the sale of separative work units (SWUs) produced from a seasonal operation of PORTS would not offset the cost of power and operations.*

2. **"For Option 2: During its long history of operation, the PORTS plant utilized a coal fired steam plant to provide steam heat to facilities, process equipment, and shipping and transfer activities. With the shutdown of the PORTS enriching facilities, excess steam is now available to support winterization at the plant. The steam plant has in recent years undergone modernization and major refurbishment. Heat produced by coal is considerably cheaper than natural gas (the cost of which cannot be reliably assumed since its cost has risen substantially and continues to rise) and fuel oil. Utilizing this excess steam in conjunction with a much smaller supplemental heat capacity should represent definite cost savings to the government. The use of a smaller supplemental heat addition would lessen DOE's D&D costs. The EA study should examine this option and contrast it to all other options studied. The EA should examine any proposals that DOE has received on alternate heat supplies in the EA."**

- *This alternative was evaluated in the EA as the X-600 Coal Fired Steam Plant alternative to heat the non-process buildings. Use of the steam plant is not a viable alternative to heat the process buildings. The coal fired steam plant steam distribution system does not provide steam to the*

potential use of the steam plant for providing heat following placing the plant in a cold standby mode. At that time, USEC officials indicated that only 30,000 lbs. of steam would be available for DOE's use. The DOE requirement for 200,000 lbs. of steam (196,000,00 BTUs) is more than six times greater than the amount of steam available from USEC.

3. **"The EA should analyze whether such seasonal operations in lieu of winterization and installation of heaters would be feasible on any one, several or all process buildings at Portsmouth."**

   - *See response to comment 1. The cost of seasonal operation and the complications associated with seasonal operation render this proposal infeasible.*

4. **"A third alternative that should be analyzed under the EA, is whether the cascade could be used to provide added value to the DOE by cleaning up the Tc-99 contaminated natural uranium that DOE provided to USEC and which USEC claims it wants clean material in exchange. The DOE's plan for addressing the Tc-99 contaminated uranium (normal feed) is under discussion with the Energy Department. The process for cleaning up the TC may involve processing the normal feed with the TC constituent as well as using the magnesium fluoride traps. PORTS is the only GDP with a sufficient number of stages and purging system to produce product within specification utilizing normal feed with TC constituents greater than ASTM specifications and even PORTS cannot produce in-spec. product for normal feed with excessive TC constituent.**

   "Since Option #1 can be implemented with virtually no lead-time, the urgency to complete plant modifications for heating is unnecessary. Implementation of Option 1 would ensure that DOE would be in regulatory compliance for facility heating. The EA should indicate the potential for regulatory non-compliance for each heating option considered."

   - *Continued operation of the plant to cleanup Tc-99 contaminated natural uranium is not consistent with DOE's decision to place the plant in cold standby; therefore, this proposal would not meet the purpose and need for agency action and is not evaluated in this EA as a viable alternative.*

   - *The modification of the system to transform the GDP into a process used for polishing product is an action that is not connected to the action currently being evaluated and would require generation of separate NEPA documentation.*

   "What will any option have on D&D? These costs should also be included in the EA analysis for all options."

   - *USEC's decision to cease enrichment activities at PORTS and place the GDP in cold standby prompted this action. Continued efforts to facilitate environmental cleanup programs and provide facilities for workers to accomplish environmental restoration of the site prompted the investigations to determine the most appropriate means to heat the facilities. Separate NEPA documentation to evaluate D&D of the enrichment facilities will be required once a decision to D&D the site has been reached. Consequently, costs associated with the ultimate D&D of PORTS, including D&D of any alternative associated with winterization activities, is premature. The plant was placed in a cold standby mode effective May 11, 2001. Current plans will keep the plant in cold standby until energy policy considerations dictate closure or restart of the GDP.*

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PACE Local 5-689

May 25, 2001

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To: DOE Oak Ridge Operations Office
Attention: Gary Hartman DOE

From: Daniel J. Minter, President
PACE Local 5-689

Subject: Environmental Assessment of the DOE's Portsmouth GDP Winterization Project

Below are some other things that needs to be considered regarding the Environmental Assessment:

1. The EA must examine the proposed impacts on USEC operations and state whether or not NRC approval has been obtained for the natural gas line. DOE is obligated by a shared site agreement to coordinate safety issues that impact USEC with the NRC. In order for the gasoline to be installed, USEC must submit a dispersion analysis to the NRC, which considers pipeline breaks which release potentially detonative gas clouds that could be transported via the atmosphere to the USEC, operated transfer and shipping facilities. How could DOE continue forward without NRC approval of USEC's analysis? The EA should address this issue.

2. If a gas break or leak is likely onsite, then a dispersion analysis must be performed to determine if an explosive gas is created which could be transported to an area where an unacceptable safety hazard can result. DOE must evaluate in the EA the resulting over-pressure wave and the potential damages created by the reflection of the overpressure wave from any potential explosion (including structural damage, damage to mitigative safety systems, threat to personnel, etc.) and state that there are no unacceptable consequences.

3. For enclosed areas which contain the natural gas, if a leak can occur which would produce a detonable mixture of air and gas in the enclosed area, then DOE must evaluate in the EA the impact of an explosion inside the building and the consequences of the explosion (structural damage, missiles created (internal to building and external)) and the impact of those projectiles. The EA should include a discussion of the evaluation and a discussion of any safety systems relied on to prevent or mitigate an accident of this type and whether or not these systems are redundant.

4. The preferred action is to construct a gas pipeline for several miles. Has the EA evaluated the impact on the private owners along the route of the pipeline and the hazards created by the installation of the pipeline along with the potential accident consequences from a postulated pipe failure. The EA should include this evaluation.

Re-industrialization impacts what potential negative impact would a gas line have on future re-industrialization efforts of the site.

cc: NRC Local Staff
Pat Musser, USEC Plant Manager
Graham Mitchell, Ohio EPA
Ted Brown, Ohio Governor's Office

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Responses to Comments Received from Daniel J. Minter; President PACE Local 5-689, Environmental Assessment of the DOE's Portsmouth GDP Winterization Project, Dated 5/25/01

The following comments were received by DOE from Daniel J. Minter. These comments were excellent comments that warranted further consideration by DOE, and additional information has been included in Section 4.11.3 of the EA. DOE's responses are shown in italics immediately following each comment.

"Below are some other things that needs to be considered regarding the Environmental Assessment:

1. **"The EA must examine the proposed impacts on USEC operations and state whether or not NRC approval has been obtained for the natural gas line. DOE is obligated by a shared site agreement to coordinate safety issues that impact USEC with the NRC. In order for the gasoline to be installed, USEC must submit a dispersion analysis to the NRC, which considers pipeline breaks which release potentially detonative gas clouds that could be transported via the atmosphere to the USEC, operated transfer and shipping facilities. How could DOE continue forward without NRC approval of USEC's analysis? The EA should address this issue."**

   - *Human health and safety and potential accident scenarios are addressed in Section 4.10 for human health and safety and Section 4.11 for accidents in the Draft EA.*

   - *Bechtel Jacobs and DOE have evaluated this safety issue, in accordance with the shared site agreement, in collaboration with USEC safety analysis professionals. The results of these evaluations will be incorporated into the DOE and USEC safety basis as required by DOE and the NRC. DOE would not have the natural gas pipeline installed at PORTS until the appropriate DOE and NRC approvals are given.*

   - *The process for review of safety questions was initiated at the conceptual inception of this project. An early overview of DOE plans was presented to USEC representatives in the December 6, 2000, USEC Plant Operations Review Committee.*

   - *Steps followed in the safety evaluation process are:*

     1. *development of a scoping calculation document,*

     2. *performance of a consequence analysis, and*

     3. *development of a auditable safety analysis.*

   DOE has modified the EA by incorporating additional discussion of accident scenarios into Section 4.11.3.

2. **"If a gas break or leak is likely onsite, then a dispersion analysis must be performed to determine if an explosive gas is created which could be transported to an area where an unacceptable safety hazard can result. DOE must evaluate in the EA the resulting over-pressure wave and the potential damages created by the reflection of the overpressure wave from any potential explosion (including structural damage, damage to mitigative safety systems, threat to personnel, etc.) and state that there are no unacceptable consequences."**

- *Human health and safety and potential accident scenarios are addressed in Section 4.10 for human health and safety and Section 4.11 for accidents in the Draft EA..*

- *A separate safety analysis, including consequence analysis, has been completed. Bechtel Jacobs and DOE have evaluated safety issues in collaboration with USEC safety analysis professionals. In this analysis, overpressure waves and potential explosion scenarios were addressed.*

DOE has modified the EA by incorporating additional discussion of accident scenarios into Section 4.11.3.

3. **"For enclosed areas which contain the natural gas, if a leak can occur which would produce a detonable mixture of air and gas in the enclosed area, then DOE must evaluate in the EA the impact of an explosion inside the building and the consequences of the explosion (structural damage, missiles created (internal to building and external)) and the impact of those projectiles. The EA should include a discussion of the evaluation and a discussion of any safety systems relied on to prevent or mitigate an accident of this type and whether or not these systems are redundant."**

   - *Human health and safety and potential accident scenarios are addressed in Section 4.10 for human health and safety and Section 4.11 for accidents in the Draft EA. A separate safety analysis including consequence analysis is underway.*

   DOE has modified the EA by incorporating additional information in Section 4.11.3.

4. **"The preferred action is to construct a gas pipeline for several miles. Has the EA evaluated the impact on the private owners along the route of the pipeline and the hazards created by the installation of the pipeline along with the potential accident consequences from a postulated pipe failure. The EA should include this evaluation."**

   - *The EA evaluates potential impacts to property owners and the human population occupying structures along the proposed natural gas pipeline route. This evaluation is presented in Sections 4.10.3 of the Draft EA. Potential accidents are also addressed in Section 4.11.3 of the Draft EA..*

   - *In the consequences analysis, a thorough investigation of potential accident scenarios is being conducted. Specific results of that analysis for the natural gas pipeline are presented in the EA. In addition, other accident scenarios were considered.*

   DOE has modified the EA by incorporating additional information in Section 4.11.3.

5. **"Re-industrialization impacts what potential negative impact would a gas line have on future re-industrialization efforts of the site."**

   - *Reindustrialization efforts would be enhanced by the opportunity to utilize an array of fuels. The diversity of fuel on site would support reindustrialization efforts.*

May 16, 2001

Mr. Gary Hartman

I just came back from the public meeting on writing the Piketon Plant.

Why don't you look into the use of solar Energy to heat this plant.

1. It would save Energy
2. no greenhouse gases
3. clean with no polution
4. may be cost & feasible.

George Hendricks
Box 166
Beaver, OH 45613
Phone 740-226-5067

'01 MAY 18 PM1:47

Natural wind pressure in covered pre-drying chambers lowers MC of oak lumber to 12% MC in three months—for FREE! Then, the Super Solar Cycle collects 300,000 btu/hr free energy from the sun to dry the lumber to 6% MC in four weeks! Nightly stress relief conditioning produces superior quality lumber. For construction & operation information and all 4 blueprints, send $29.95.

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ALSO: FULL VIGOR FORESTRY – *Sustainable Forest Management from the Forest Owner's Point of View* by Jim Birkemeier. This common sense book explains 5 basic concepts of timber management to produce a forest that is fully stocked with vigorous high value trees. Low impact logging methods, value-added processing, direct marketing of wood products to consumers, and the origional vision for the Sustainable Forestry Cooperative movement are all described. Mail $16.00 to:

Timbergreen Forestry
S11478 Soeldner Rd. Spring Green, WI 53588
www.timbergreenforestry.com Over 170 pages of free information!

George Hendricks
Box 166
Beaver, Oh 45613

CHILI
15 MAY
2001

Mr. Gary Hartman
U.S. Dept. of Energy
P.O. Box 2001 EM912
Oak Ridge, Tenn. 37831

37831/2001

Responses to Comments Received from George Hendricks on the Environmental Assessment of the DOE's Portsmouth GDP Winterization Project, Dated 5/16/01

The following comments were received by DOE from George Hendricks. These comments were excellent comments that warranted further consideration by DOE, and additional information has been included in Section 2.3 of the EA. DOE's responses are shown in italics immediately following each comment.

"I just came back from the public meeting on winterizing the Piketon Plant.

Why don't you look into the use of solar energy to heat this plant.

1. **It would save energy.**
2. **No greenhouse gases.**
3. **Clean with no pollution.**
4. **May be cost effective."**

- *DOE considered the use of solar energy for providing heat to the PORTS facilities, as suggested; however, solar energy was eliminated as a reasonable alternative because of the significant cost associated with installation of solar panels and concern regarding the reliability of a stable energy supply (this has been incorporated in Sec. 2.3 of the Environmental Assessment).*

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OhioEPA

State of Ohio Environmental Protection Agency

Southwest District Office

401 East Fifth Street
Dayton, Ohio 45402-2911

TELE: (937) 285-6357 FAX: (937) 285-6249

Bob Taft, Governor
Maureen O'Connor, Lt. Governor
Christopher Jones, Director

May 18, 2001

Mr. Gary Hartman, Manager
NEPA Documents
US DOE Oak Ridge Operations Office
P.O. Box 2001
Oak Ridge, Tennessee 37831-2001

Dear Mr. Hartman:

Considering DOE's decision to place the Portsmouth GDP in cold standby, Ohio EPA agrees with the proposed action in the draft Environmental Assessment (EA) to winterize the production facilities and other buildings that will need heat this fall. If DOE does not immediately proceed with this project, significant damage could occur to site infrastructure resulting in potential releases of contamination to the environment.

Separate from activities outlined in this winterization EA, Ohio EPA would like to see DOE consider the following:

- The draft EA describes plans to install a five mile long natural gas pipeline from the area of Zahns Corner to the X- 3002 building to supply fuel to the boiler system. This pipeline may enhance redevelopment opportunities at the Portsmouth complex. Ohio encourages evaluation of possible future land uses for DOE-owned property along the route of the proposed gas pipeline to ensure compatibility with future DOE missions. DOE may find value to expand such an evaluation to consider land use needs for identified future missions throughout the complex. The availability of natural gas may enhance future missions or even facilitate development of new missions. We encourage development of a comprehensive future land use plan for the Portsmouth complex.

- Ohio would like to work with DOE and Bechtel Jacobs to use the cold standby and winterization projects to start planning for the eventual D&D of production facilities. It may be possible to do pilot projects of various activities related to D&D, such as deposit removal, starting with parts of the GDP not currently slated for cold standby.

Listed below are specific comments on the EA:

- Based on recent information provided by DOE, Ohio understands that there is a potential for the proposed location of the fuel oil storage tanks to be contaminated by past practices. Ohio suggests that DOE thoroughly evaluate this area and conduct all needed remediation prior to tank and dike installation.

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HARTMAN.GEM.WPD

- Page 5-5, Section 10.4, Lines 14-21 and page 5-16, Section 5.1.3: The text discusses installation of a 6-inch steel natural gas pipeline. This action will require soils excavation over the five mile route of the proposed gas line. The text in section 5.1.3 implies that the regulatory agencies have agreed that any soils generated from excavations less than ten feet in depth are considered uncontaminated. This is misleading. Ohio EPA reviews each action on a case by case basis. US DOE or its subcontractors are required to stop work and evaluate all soils should any discoloration, odor, or other evidence of contamination be observed during construction. It is the responsibility of DOE to ensure soils excavated during pipeline installation (and any other construction activities) are properly evaluated to ensure proper management. Soils found to be contaminated with hazardous constituents must be properly stored and disposed in accordance with regulatory requirements.

Please contact me at 937-285-6018 if you have any questions.

Sincerely,

Graham E. Mitchell
Chief, Office of Federal Facilities Oversight

cc: Ken Dewey, SEDO
Fran Kovac, Legal
Sharon Robinson, DOE PORTS
T. J. Justice, Ohio DOD

GEM/br

Responses to Comments Received from Graham E. Mitchell, Chief, Office of Federal Facilities Oversight, Ohio Environmental Protection Agency, on the Environmental Assessment of the DOE's Portsmouth GDP Winterization Project, Dated 5/18/01

The following comments were received by DOE from Graham E. Mitchell. These comments were excellent comments that warranted further consideration by DOE, and additional information has been included in Section 4.12 of the EA. DOE's responses are shown in italics immediately following each comment.

Listed below are specific comments on the EA:

1. **"Based on recent information provided by DOE, Ohio understands that there is a potential for the proposed location of the fuel oil storage tanks to be contaminated by past practices. Ohio suggests that DOE thoroughly evaluate this area and conduct all needed remediation prior to tank and dike installation."**

   - *The proposed location for the fuel oil storage tanks will be surveyed for contamination prior to installation.*

2. **"Page 5-5, Section 10.4, Lines 14-21 and page 5-16, Section 5.1.3: The text discusses installation of a 6-inch steel natural gas pipeline. This action will require soils excavation over the five mile route of the proposed gas line. The text in section 5.1.3 implies that the regulatory agencies have agreed that any soils generated from excavations less than ten feet in depth are considered uncontaminated. This is misleading. Ohio EPA reviews each action on a case by case basis. US DOE or its subcontractors are required to stop work and evaluate all soils should any discoloration, odor, or other evidence of contamination be observed during construction. It is the responsibility of DOE to ensure soils excavated during pipeline installation (and any other construction activities) are properly evaluated to ensure proper management. Soils found to be contaminated with hazardous constituents must be properly stored and disposed in accordance with regulatory requirements."**

   - *The text has been modified in Section 4.12 of the Environmental Assessment to clarify the comment regarding soils excavation.*

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SOUTHERN
OHIO
DIVERSIFICATION
INITIATIVE

1864 Styville Road
Piketon, Ohio 45661
P: 740 - 289 - 3654
F: 740 - 289 - 4591

reindustrializing south central ohio

May 25, 2001

Gary Hartman
DOE ORO
PO Box 2001
EM-912
Oak Ridge, TN 37831

Dear Mr. Hartman,

The Southern Ohio Diversification Initiative (SODI) wishes to place on the record comments regarding the *Winterization Activities for Cold Standby at the Portsmouth Gaseous Diffusion Plant, DOE/EA-1392.*

SODI has planned for the reuse of existing facilities at the Portsmouth Gaseous Diffusion Plant (PGDP) after DOE determines the facilities are available to SODI for reuse. The location of the three boilers inside of the X-3002 building is unacceptable for two reasons.

1. Placement of the boilers in the X-3002 would prohibit the location of any future uranium enrichment technology, such as centrifuge, in that facility.
2. Placement of the boilers in the X-3002 would prohibit the location of future tenants brought forward by SODI's marketing efforts.

SODI believes other locations should be utilized for locating the boilers. The location, as currently proposed, is unacceptable. Furthermore, SODI hopes this is not an indication of the Department's intent for future use of the facilities, one that precludes productive and adaptive reuse/economic development opportunities.

Sincerely,

Gregory L. Simonton
Executive Director

Cc: Congressman Ted Strickland
TJ Justice, Governor Taft's Regional Representative
Sharon Robinson
Russ Vranicar

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Responses to Comments Received from Gregory L. Simonton, Executive Director, Southern Ohio Diversification Initiative, on the Environmental Assessment of the DOE's Portsmouth GDP Winterization Project, Dated 5/25/01

The following comments were received by DOE from Gregory L. Simonton. DOE's responses are shown in italics immediately following each comment.

"SODI has planned for the reuse of existing facilities at the Portsmouth Gaseous Diffusion Plant (PGDP) after DOE determines the facilities are available to SODI for reuse. The location of the three boilers inside of the X-3002 building is unacceptable for two reasons."

1. **"Placement of the boilers in the X-3002 would prohibit the location of any future uranium enrichment technology, such as centrifuge, in that facility."**

The boilers that would be installed in Building X-3002 are self-contained, packaged boilers, which could be moved to another location if the space would be required by the gas centrifuge project. Current estimates for building needs for the gas centrifuge plant do not include use of all of the space in both Building X-3001 and Building X-3002. The boiler location within Building X-3002 would require less than 10,000 ft^2; this is less than 5% of the available floor space. No impacts to the centrifuge project would be anticipated in association with the installation of boilers in this facility.

2. **"Placement of the boilers in the X-3002 would prohibit the location of future tenants brought forward by SODI's marketing efforts."**

"SODI believes other locations should be utilized for locating the boilers. The location, as currently proposed, is unacceptable. Furthermore, SODI hopes this is not an indication of the Department's intent for future use of the facilities, one that precludes productive and adaptive reuse/economic development opportunities."

Other locations for the boilers were investigated in the planning stages for this project. These alternate locations would require approximately the same amount of floor space in facilities with similar potential uses. The impacts from alternate locations would be essentially the same as the location chosen. The boilers that would be installed in Building X-3002 are self-contained, packaged boilers, which could be moved to another location if the space would be required by a lessee. The boiler location within Building X-3002 would require less than 10,000 ft^2; this is less than 5% of the available floor space within the building. In addition, the installation of boilers in the building would have no impact on the use of the remainder of the building by other tenants.

DOE expects that the addition of an alternate fuel source at PORTS and the ability to offer heated structures to tenants would enhance economic development activities at the site.

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DOE F 1325.8
(4/93)

United States Government

Department of Energy
Oak Ridge Operations Office

memorandum

DATE: June 13, 2001

REPLY TO ATTN OF: EM-912:Hartman

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WINTERIZATION ACTIVITIES IN PREPARATION FOR COLD STANDBY AT THE PORTSMOUTH GASEOUS DIFFUSION PLANT

TO: Rodney R. Nelson, Assistant Manager for Environmental Management, EM-90

The subject Environmental Assessment (EA) dated June 2001 has been reviewed in accordance with our responsibilities under Department of Energy (DOE) Order 451.1B, paragraph 5a(9). Based upon this review, recommendations made by your staff, and after consultation with the Office of Chief Counsel and the National Environmental Policy Act (NEPA) Compliance Officer, I have determined that within the meaning of NEPA, the proposed action is not a major Federal action significantly affecting the quality of the human environment. Therefore, the preparation of an Environmental Impact Statement is not required. The basis for this determination is explained in the attached Finding of No Significant Impact (FONSI) and the supporting final EA.

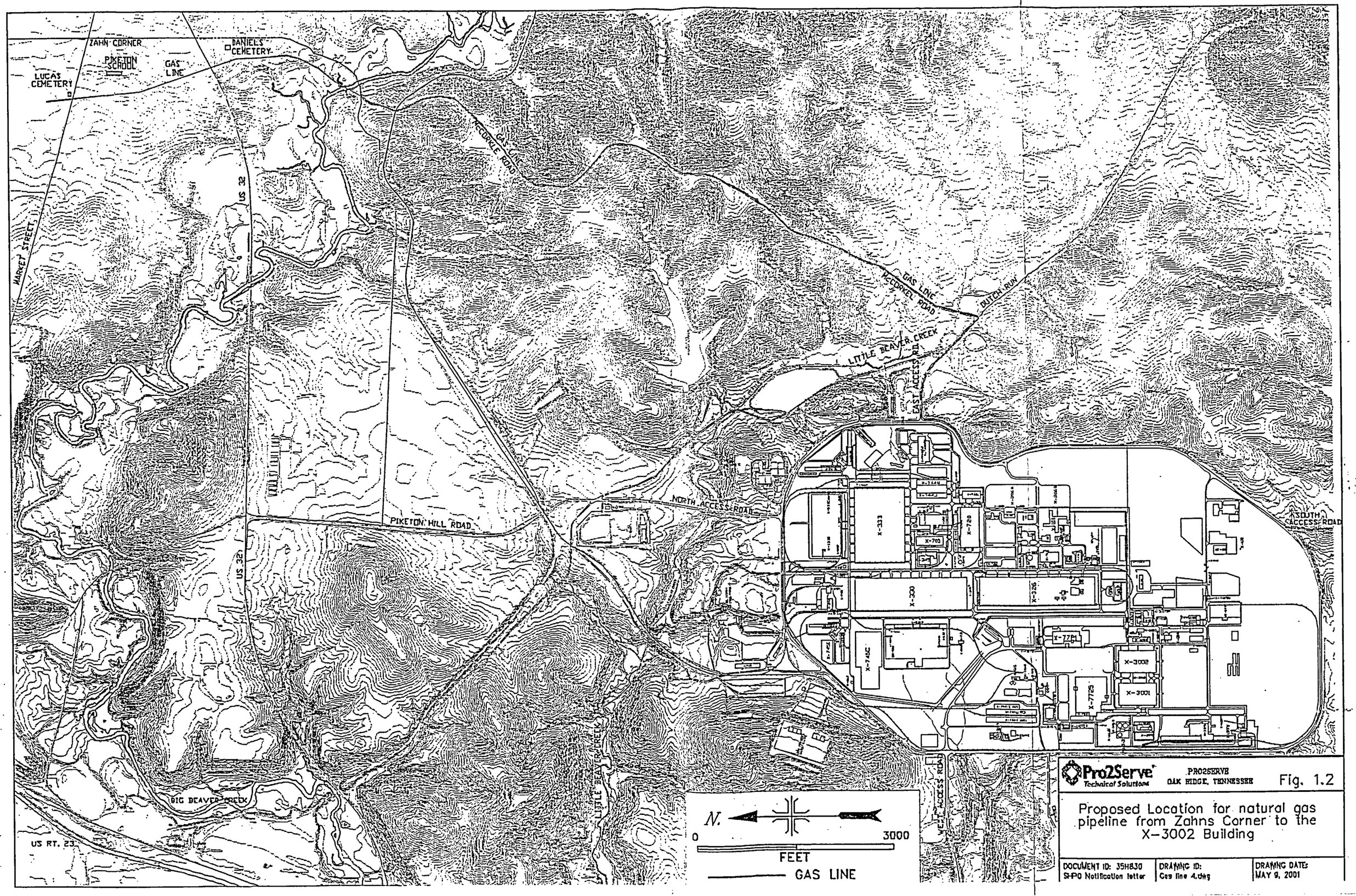
Please note that your office is responsible for providing public notice of the availability of the EA and FONSI in accordance with 40 CFR 1506.6(b), 10 CFR 1021.322, and DOE Order 451.1B, paragraph 5e(5).

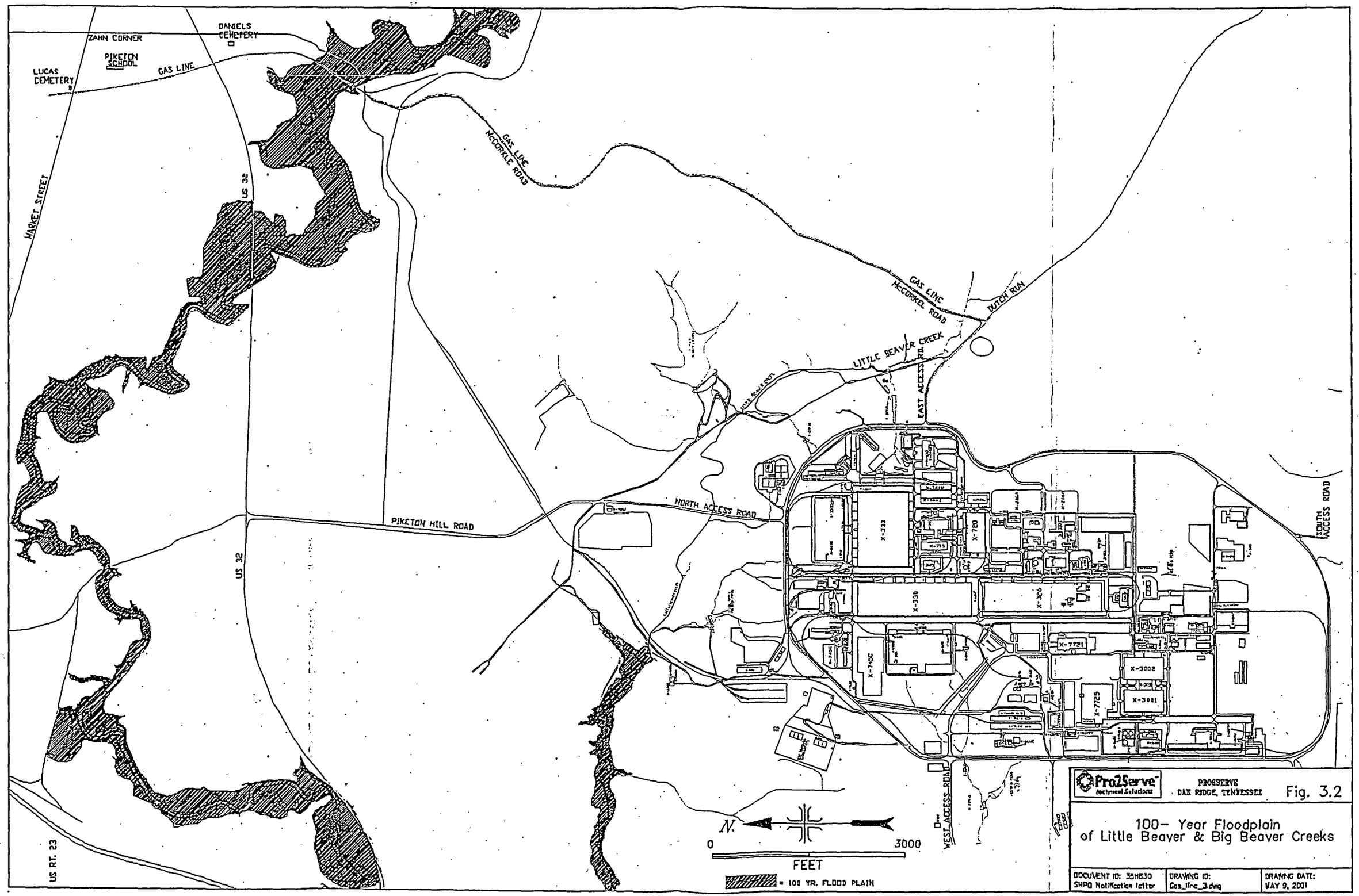
If you need further assistance or have any questions or comments, please contact David R. Allen, Oak Ridge Operations NEPA Compliance Officer, at (865) 576-0411.

G. Leah Dever
Manager

Attachments (2)

cc w/attachments:
Carol Borgstrom, EH-42, HQ/FORS (5 copies, electronic copy)
David Allen, SE-32 (2 copies)
Dennis Boggs, EM-96, ORO
Nancy Carnes, CC-10, ORO
Jim Elmore, SE-32, ORO
Ray Miskelley, CC-10, ORO
Ray Moore, SE-32, ORO
Sharon Robinson, EM-97, PORTS
Bill Seay, EM-91, ORO
Terri Slack, CC-10, ORO
Bob Sleeman, EM-92, ORO
ORO Public Reading Room
PORTS Public Reading Room
Steve Houser, K-1001, MS 7294


ZAHN CORNER
PIKETON SCHOOL
DANIELS CEMETERY
LUCAS CEMETERY
GAS LINE
MARKET STREET
US 32
MCCURKLE ROAD
GAS LINE
MCCURKLE ROAD
GAS LINE
DUTCH RUN
LITTLE BEAVER CREEK
EAST ACCESS RD.
NORTH ACCESS ROAD
PIKETON HILL ROAD
SOUTH ACCESS ROAD
X-333
X-720
X-703
X-300
X-326
X-745C
X-7725
X-3002
X-3001
BIG BEAVER CREEK
LITTLE BEAVER CREEK
US RT. 23
WEST ACCESS ROAD
N.
0
3000
FEET
GAS LINE
Pro2Serve Technical Solutions
PRO2SERVE
OAK RIDGE, TENNESSEE
Fig. 1.2
Proposed Location for natural gas pipeline from Zahns Corner to the X-3002 Building
DOCUMENT ID: 35H830
SHPO Notification letter
DRAWING ID:
Gas line 4.dwg
DRAWING DATE:
MAY 9, 2001


ZAHN CORNER
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LUCAS CEMETERY
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GAS LINE
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FEET
= 100 YR. FLOOD PLAIN
Pro2Serve Technical Solutions
PROSERVE
OAK RIDGE, TENNESSEE
Fig. 3.2
100- Year Floodplain
of Little Beaver & Big Beaver Creeks
DOCUMENT ID: 35HB30
SHPO Notification letter
DRAWING ID:
Gas_line_3.dwg
DRAWING DATE:
MAY 9, 2001