Department of Energy

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APR 0 8 2009

DISTRIBUTION LIST

PPPO-03-158-09

Dear Madams/Sirs:

ENGINEERING EVALUATION/COST ANALYSIS FOR THE X-746 BUILDING

Enclosed is the Department of Energy (DOE) *Engineering Evaluation/Cost Analysis (EE/CA) for the X-746 Building at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio.* The X-746 Building EE/CA is being provided to you for review and comment. Your comments should be provided to David Kozlowski, Department of Energy, P. O. Box 700, Piketon, Ohio 45661 no later than May 8, 2009.

DOE is providing the public with a 30-day comment period on the EE/CA. A notice of availability and brief description of the EE/CA will be published in the local newspaper in the near future. After public comment has closed, DOE will consider public comments, including any comments from the Site Specific Advisory Board, provide a written response to significant comments, and issue the EE/CA Approval Memorandum that will select the removal action to be implemented at the X-746 Building.

DOE is currently performing surveillance and maintenance activities (e.g., removal and disposal of liquids, gases, hazardous materials, and utility and equipment disconnects) at the X-746 Building. These activities will continue at the X-746 Building, pending the selection and implementation of the removal.

If you have any questions about the X-746 Building EE/CA, please do not hesitate to call Mr. Kozlowski at (740) 897-2759 or Melda Rafferty at (740) 897-5521.

Sincerely,

William E. Murphie
Manager
Portsmouth/Paducah Project Office

Enclosure:
Engineering Evaluation/Cost Analysis for the X-746 Building

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PPPO Records/LEX
Administrative Record

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DOE/PPPO/03-0067&D1

Engineering Evaluation/Cost Analysis for the X-746 Building at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio

This document is approved for public release per review by:

Henry H. Thomas	03/04/09
PORTS Classification/Information Office	Date

DOE/PPPO/03-0067&D1

Engineering Evaluation/Cost Analysis for the X-746 Building at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio

March 2009

Document Control No. 1205-01.01.03.15.00-02896

Prepared for the
U.S. Department of Energy
Portsmouth/Paducah Project Office

LATA/PARALLAX PORTSMOUTH, LLC
managing the
Environmental Remediation Activities at the
Portsmouth Gaseous Diffusion Plant
under contract DE-AC24-05OH20192
for the
U.S. DEPARTMENT OF ENERGY

CONTENTS

FIGURES

TABLES

ACRONYMS

ACM	asbestos-containing material
ARARs	applicable or relevant and appropriate requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO_2	carbon dioxide
D&D	decontamination and decommissioning
DOE	U.S. Department of Energy
DPM	disintegrations per minute
EE/CA	engineering evaluation/cost analysis
EPA	U.S. Environmental Protection Agency
ES&H	Environmental Safety & Health
FR	*Federal Register*
GCEP	Gaseous Centrifuge Enrichment Plant
GDP	Gaseous Diffusion Plant
HEPA	high energy particulate air
HEU	highly enriched uranium
HPSB	High Performance and Sustainable Buildings
kPa	kilopascal
LDR	land disposal restriction
LLW	low-level waste
mph	miles per hour
NCDC	National Climate Data Center
NEPA	National Environmental Policy Act
Ohio EPA	Ohio Environmental Protection Agency
OSWER	Office of Solid Waste and Emergency Response
PORTS	Portsmouth Gaseous Diffusion Plant
PPPO	Portsmouth/Paducah Project Office
PPE	personal protective equipment
ppm	parts per million
psi	pounds per square inch
RAWP	Removal Action Work Plan
RCRA	Resource Conservation and Recovery Act
S&M	surveillance and maintenance
USEC	United States Enrichment Corporation
VOC	volatile organic compound
WAC	waste acceptance criteria

EXECUTIVE SUMMARY

The U.S. Department of Energy (DOE) is planning to conduct decontamination and decommissioning (D&D) activities in accordance with DOE policy. These D&D activities will be undertaken as a non-time-critical removal action under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). CERCLA 121(e)(1) provides that no Federal, State, or local permit shall be required for the portion of any removal or remedial action conducted entirely onsite. There is a threat of release of hazardous substances into the environment from this building due to its deteriorating condition. This engineering evaluation/cost analysis (EE/CA) report summarizes the evaluation of removal alternatives for the X-746 Building.

In accordance with the 2007 Portsmouth/Paducah Project Office (PPPO) Ten-Year Site Plan, DOE has determined that disposition of the X-746 building in 2009 is appropriate, based on no future use of the building. Additionally the deteriorated condition of the building and an assessment of the cost to upgrade/replace the building as compared to disposition were factored into the decision-making process. In 2008, based on information provided by DOE/PPPO, the DOE Environmental Management Consolidated Business Center determined the facility is excess to the DOE mission and authorized final disposition of the building through the DOE real property management program. The X-746 building was constructed in 1954 and used as a uranium material handling building at the Portsmouth Gaseous Diffusion Plant (PORTS). The X-746 building was used as the plant site shipping and receiving building beginning in 1970. The United States Enrichment Corporation (USEC) leased this building in 1993 and continued its mission as the shipping and receiving facility supporting the gaseous diffusion plant. In early 2002 USEC terminated use of the building and returned the building to DOE in early 2008. Following the return of the building to DOE, an evaluation of the condition of the building was completed. The evaluation determined that there are potential health and environmental hazards due to radiological and hazardous material exposures. Based on the building's current physical condition and the presence of contamination, no beneficial reuse has been identified by DOE.

The following removal action objectives have been developed for this removal action and form the basis for identifying and evaluating appropriate response actions:

- Reduce potential worker exposure during surveillance and maintenance activities.
- Control removal of the X-746 Building to minimize adverse impacts to site-wide leased systems.
- Control removal of the X-746 Building to minimize or eliminate the potential health and environmental hazards of radiation and hazardous material exposure caused by the potential uncontrolled release of contaminated dust, equipment, and building materials from the facility associated with the removal activities at the facility.

The scope of this non-time-critical removal action includes the building contents and the building structures. The scope does not require removal of external utilities. The X-746 Building will be removed and disposed except for the protective tunnel housing the active steam and condensate lines on the east side of the building. The asphalt drive and parking area will also be removed. Only soils incidental to slab, foundation, and asphalt removal will be excavated and disposed. In identifying potential removal alternatives for the X-746 Building, DOE considered the potential reuse of the facility in addition to removal of the facility. As discussed in Section 4.2 of this EE/CA, the reuse alternative was not viable for this facility and was not carried forward for the removal alternatives analysis. The following two removal alternatives were developed and evaluated for effectiveness, implementability, and cost.

- Alternative 1 – No action
- Alternative 2 – Remove contents, demolish structure, dispose of wastes

Alternative 1 is a baseline to which the other alternative may be compared. This alternative is ineffective at achieving the removal action objectives or reducing actual or potential risks to workers and the environment. This alternative is implementable and would have a cost of $50,000-100,000 to maintain fire protection and grounds keeping activities.

Alternative 2 is effective for achieving the removal action objectives and reducing risks to human health and the environment. This alternative is technically and administratively implementable. The estimated schedule to implement Alternative 2 is a ten month duration. The estimated cost for implementing this alternative is approximately $3,200,000. Alternative 2 will meet the requirements of the applicable or relevant and appropriate requirements (ARARs) to the extent practicable. ARARs are federal or state laws or regulations aimed at protecting human health and the environment which have been evaluated and found to be legally applicable or relevant and appropriate for the removal of the building based on the contaminants present.

A detailed discussion of ARARs is contained in Appendix B of this document.

Alternative 2 is the recommended alternative for D&D of the X-746 Building.

1. INTRODUCTION TO THE D&D PROCESS

1.1 PURPOSE

The purpose of this engineering evaluation/cost analysis (EE/CA) is to evaluate alternatives to reduce the potential for future contaminant releases from the X-746 Building (Figure 1) in a manner that protects both human health and the environment. Removal of the X-746 Building will reduce the U.S. Department of Energy's (DOE) out-year surveillance and monitoring costs and reduce potential worker exposure during surveillance and maintenance (S&M) activities.

This action is being documented with an EE/CA in accordance with the *Policy on Decommissioning of Department of Energy Facilities under the Comprehensive Environmental Response, Compensation, and Liability Act* (DOE and EPA 1995). This policy states that unless the circumstances at a facility make it inappropriate, decommissioning activities will be conducted as non-time-critical removal actions. Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (through Presidential delegation of authority) authorizes DOE to develop and perform removal actions to abate, minimize, stabilize, mitigate, or eliminate a release or the threat of a release of hazardous substances, pollutants, or contaminants or hazardous wastes and hazardous constituents at or from the Portsmouth Gaseous Diffusion Plant (PORTS). Based on past usage and current characterization data, the X-746 Building represents a threat of a release of contaminants into the environment. Because no imminent danger is known to exist that would necessitate an early cleanup, the removal action is categorized as non-time-critical.

1.2 REGULATORY SETTING

Many of the DOE facilities across the nation that will undergo decontamination and decommissioning (D&D) are located on or near sites being remediated under CERCLA authority. With this in mind, DOE proposed that D&D efforts would be governed by CERCLA regulations and carried out under the CERCLA regulatory framework for facilities where a known release of hazardous substances had occurred or that pose a threat of release of hazardous substances to the environment. On May 22, 1995, a memorandum entitled Policy on Decommissioning Department of Energy Facilities under CERCLA (DOE and EPA 1995) established an approach agreed upon by DOE and the U.S. Environmental Protection Agency (EPA) for conducting decommissioning activities as non-time-critical removal actions, unless circumstances made such an approach inappropriate. This policy built upon the foundation established in an earlier guidance document issued by EPA/DOE/U.S. Department of Defense, Guidance on Accelerating CERCLA Environmental Restoration at Federal Facilities (August 22, 1994).

CERCLA 121(e)(1) provides that no Federal, State, or local permit shall be required for the portion of any removal or remedial action conducted entirely as an onsite response action. In addition to "permits", EPA has interpreted CERCLA Section 121(e)(1) broadly to cover: "all administrative provisions from other laws, such as recordkeeping, consultation, and reporting requirements. In other words, administrative requirements do not apply to on-site response actions." [Office of Solid Waste and Emergency Response (OSWER) 9205.5-10A].

DOE issued a Secretarial Policy Statement on the National Environmental Policy Act of 1969 (NEPA) (DOE 1994a) stating that DOE will address and incorporate NEPA values into CERCLA documents to the extent practicable, with more attention given to those aspects of the proposed action having the greater anticipated effects. Such values may include analysis of socioeconomic, cultural,

ecological, and cumulative impacts, as well as environmental justice and land use issues, and the impacts of off-site transportation of wastes. NEPA values have been incorporated into this document in accordance with Secretarial Policy.

1.3 PHASES OF THE D&D PROCESS

The D&D process encompasses activities that take place after a facility has been deactivated and placed in an ongoing S&M program by DOE. Decommissioning activities can include decontamination and dismantlement activities. Decontamination includes the removal and/or reduction of radioactive or hazardous contaminated facilities. Dismantlement involves disassembly or demolition and the interim or long-term disposal of waste materials in compliance with applicable requirements.

The D&D operation will be conducted as a non-time-critical removal action for the X-746 Building.

1.4 COMMUNITY PARTICIPATION

Community involvement is a necessary aspect of the CERCLA process. DOE is conducting community relations activities for this project in compliance with 40 Code of Federal Regulations *(CFR)* 300.415(n)(1), (n)(3), and (n)(4). State and community acceptance of this action will be addressed by providing the EE/CA to the public, regulators, and the Site Specific Advisory Board for information and comment. Specifically, a brief description of this EE/CA and a notice of availability of the entire document will be published in the local newspaper(s). Public stakeholders will have at least 30 days for review of the EE/CA and submission of written and oral comments. A written response will be prepared addressing significant comments and will be included in the administrative record file.

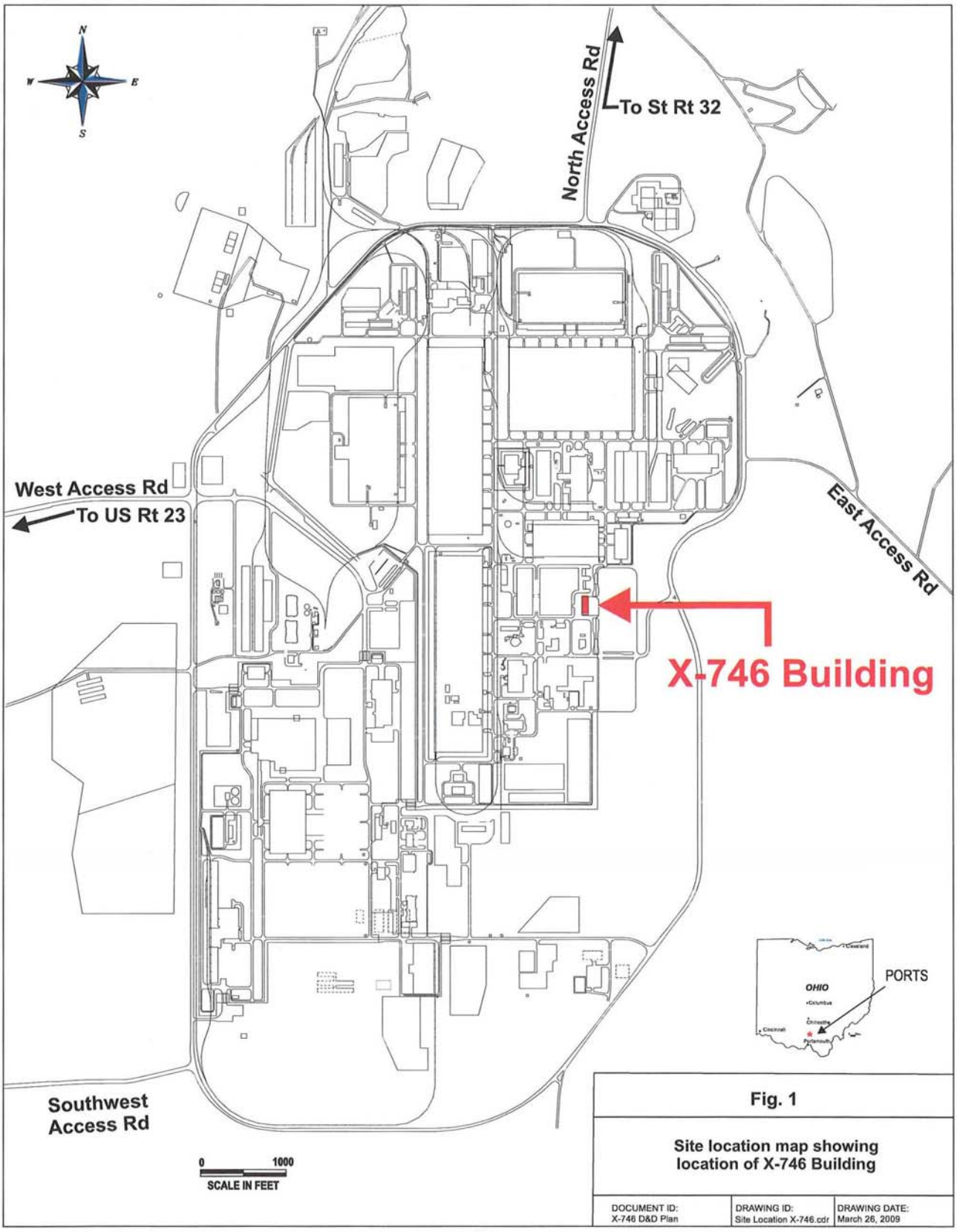
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Fig. 1
Site location map showing
location of X-746 Building
DOCUMENT ID:
X-746 D&D Plan
DRAWING ID:
Site Location X-746.cdr
DRAWING DATE:
March 26, 2009

2. SITE CHARACTERIZATION

2.1 PORTS DESCRIPTION AND BACKGROUND

PORTS is located in a rural area of Pike County, Ohio, east of the Scioto River on a 5.8-square mile site. The site is two miles east of the Scioto River in a small valley running parallel to and approximately 130 ft above the Scioto River floodplain. Pike County has approximately 28,200 residents. The nearest population center to the facility is Piketon, Ohio, which is approximately five miles north of the plant site on U.S. Route 23 (Figure 2).

PORTS occupies an upland area of southern Ohio with an average land surface elevation of 670 ft above mean sea level. The plant site sits in a mile-wide abandoned river valley situated above the Scioto River floodplain to the west. In much of the industrialized area of PORTS, the original topography has been modified and graded for construction of buildings and other facility components. Much of the industrialized area of PORTS is located on fill that was removed from the higher elevations of the plant site and placed in existing drainage valleys and depressions.

PORTS is drained by several small tributaries of the Scioto 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. Big Run Creek is the smaller tributary of the Scioto River that drains the southern portion of the PORTS property.

Because both Little Beaver Creek and Big Run Creek cut through unconsolidated material and intersect bedrock, and the ancestral Portsmouth River Valley essentially forms a large "bowl" around the facility, all groundwater leaving the site through unconsolidated deposits eventually is drained to the Scioto River by these two streams.

Two ditches drain the western and southwestern portions of the PORTS property. Flow in these ditches is low to intermittent. The West Drainage Ditch receives water from surface water runoff, storm sewers, and plant effluent. The unnamed south drainage ditch receives water mainly from storm sewers and groundwater discharge. These two drainage ditches continue west and ultimately discharge into the Scioto River.

The subsurface in the PORTS area consists of approximately 30-40 ft of unconsolidated Quaternary clastic sediments unconformably overlying Paleozoic bedrock that dips gently toward the east. In stratigraphic order, bedrock is overlain by fluvial Gallia Sand and Gravel (Gallia) and by the lacustrine Minford Clay and Silt (Minford) of the Teays Formation.

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.

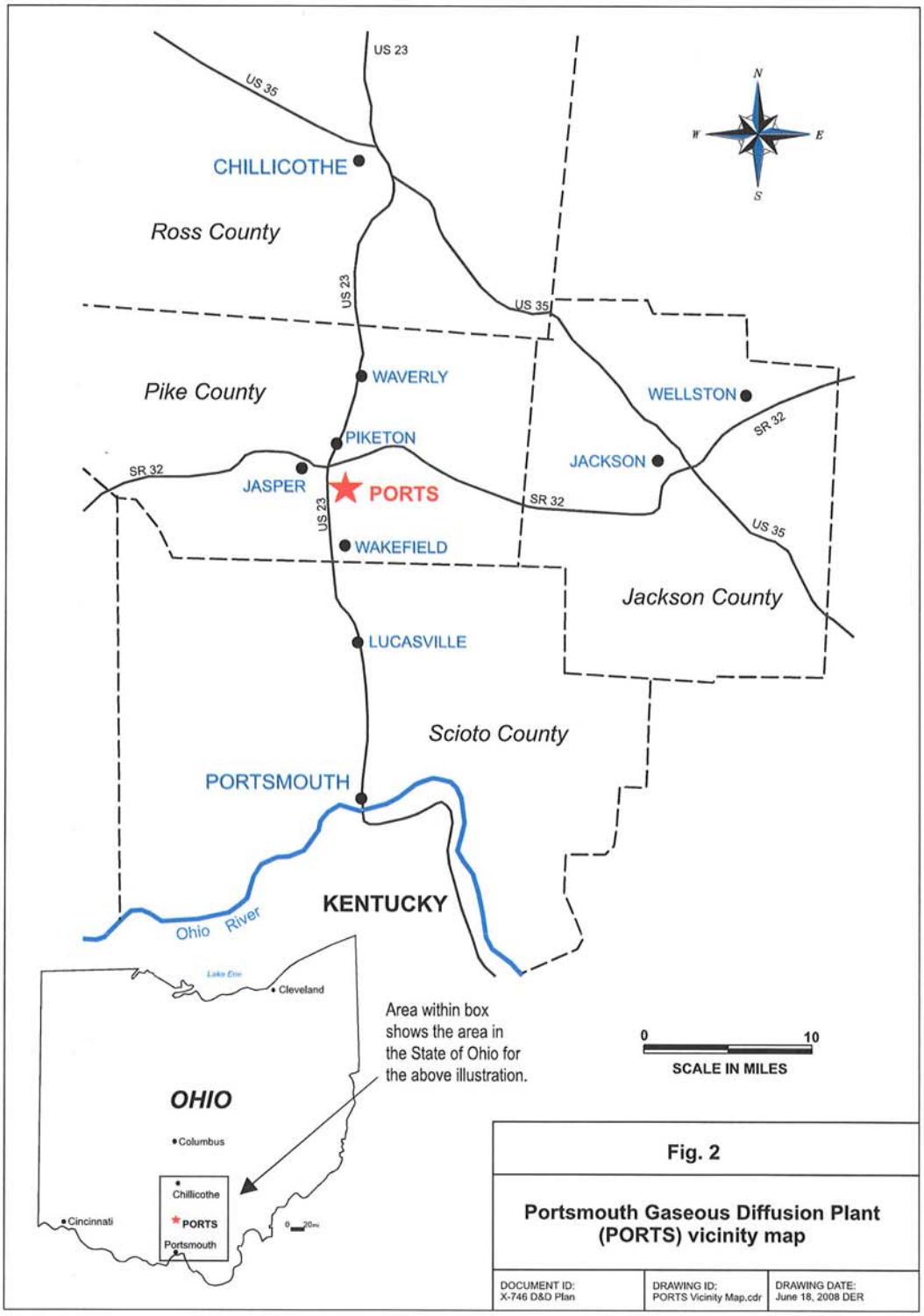

Fig. 2

Portsmouth Gaseous Diffusion Plant (PORTS) vicinity map

DOCUMENT ID:	DRAWING ID:	DRAWING DATE:
X-746 D&D Plan	PORTS Vicinity Map.cdr	June 18, 2008 DER

According to the Soil Survey of Pike County, Ohio, 22 soil types occur within the PORTS property boundary. The predominant soil type at the site is 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 0-6% 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 making identification of the soil series difficult. The soil in these areas are so obscured or disturbed that assignment of specific soil series is not feasible. Well developed soil horizons may not be present in all areas inside the perimeter road because of cut and fill operations related to construction.

The climate of the PORTS area can be described as humid-continental. It is characterized by warm, humid summers and by cold, humid winters. Daily temperature averages are 22.2°C or 72°F in the summer and 0°C (32°F) in the winter. The average annual temperature is 12.7°C (55°F). Record high and low temperatures are 39.4°C (103°F) and -32°C (-25°F), respectively (National Climatic Data Center [NCDC] 2002).

Precipitation is distributed relatively evenly throughout the year and averages approximately 40 inches per year. The month with the highest average amount of precipitation is May. Groundwater recharge and flood potential are greatest during this time. Fall is the driest season. Snowfall averages 20.4 inches per year. Although snow amounts vary greatly from year to year, an average of eight days per year have snowfall in excess of one inch. (NCDC 2002)

Prevailing winds are from the south-southwest at approximately five miles per hour (mph). The highest average monthly wind speed of eleven mph typically occurs during the spring.

The terrain surrounding the plant, with the exception of the Scioto River floodplain, consists mainly of marginal farmland and densely forested hillsides. The Scioto River floodplain is extensively farmed. PORTS is situated on a 3,777-acre parcel of DOE-owned land. Twelve hundred acres of this area are located within the facility's Perimeter Road, and comprise the centrally developed area. Five hundred acres of this area are fenced for controlled access. Approximately 190 buildings are located within PORTS and there are numerous utility structures on the site. The DOE owned land outside Perimeter Road is used for a variety of purposes, including a water treatment plant, holding ponds, sanitary and inert landfills, and open and forested buffer areas. The majority of the site improvements associated with the gaseous diffusion plant (GDP) are located within the fenced area. Within this area are three large process buildings and auxiliary facilities that are currently leased to the United States Enrichment Corporation (USEC). A second, large developed area covering about 300 acres contains the facilities built for the Gaseous Centrifuge Enrichment Plant (GCEP). These areas are largely devoid of trees, with grass and paved areas dominating the open space. The remaining area within the perimeter road has been cleared and is essentially level.

The uranium enrichment production and operations facilities at PORTS are leased by USEC. The lease between DOE and USEC is active through July 1, 2016, although some facilities may be returned to DOE on an earlier date. In addition to the leased facilities, USEC also leases common areas including ditches, creeks, ponds, and other areas such as roads and rail spurs that are necessary for ingress, egress, and proper maintenance of facilities.

The economic region of influence for PORTS includes four counties in southern Ohio: Ross, Scioto, Jackson, and Pike. The largest city within 50 miles of the plant is Chillicothe, Ohio with a population of 22,216 persons, based on year 2006 census results. The City of Chillicothe is located approximately 27 miles north of PORTS in Ross County, Ohio.

The population of Pike County, in which PORTS is located, was 28,269 persons in 2006. The other counties within the region of influence reported the following populations: Jackson County, Ohio, 33,543; Ross County, Ohio, 75,556; and Scioto County, Ohio, 76,441 (U.S. Census Bureau, 2008). The nearest population center to PORTS is Piketon, Ohio with a population of 1,907 reported in the 2000 census.

2.2 X-746 BUILDING

The following sections contain summary descriptions of the X-746 Building, nature and extent of contamination, analytical data, and streamlined risk evaluation. When developing the EE/CA, various information was gathered and evaluated. The information included data pursuant to the requirements of the Consent Decree. The DOE Office of Oversight Investigation and the 2004 Groundwater Monitoring Report are summarized in Appendix C. In addition, building characterization data was gathered and evaluated to support development of the EE/CA and is described in Section 2.2.2. Following completion of the selected removal action for the X-746 Building, any necessary evaluations and actions to address environmental media will be conducted under the Consent Decree. Confirmation sampling will be performed for the environmental media under the concrete slab at the completion of the removal activity to confirm that no further action is warranted. Previous data pertaining to environmental media has been collected pursuant to the Consent Decree and are summarized in Appendix C of this EE/CA.

2.2.1 General Facility Description

The X-746 Building was constructed in 1954 and was originally designed to be the uranium material handlers building at the GDP. The steel-framed building is approximately 19,975 ft^2 in size with a concrete floor and is located at approximate plant coordinates N 8500, E 9200. When the building was first constructed, uranium was stored in the facility, including highly enriched uranium (HEU). This use ended in 1970 when the facility became the Shipping and Receiving Building and was used for this purpose until early 2002. The X-746 Building served primarily as a materials receiving and inspection facility within the core GDP operations area. Facility modifications over the life of the structure included the conversion of a portion of the facility interior to office space and enclosure of the western loading dock to expand the interior footprint. The building was leased by DOE to USEC in 1993. USEC returned the facility to DOE in February 2008. The building is vacant and has not been used since 2002.

2.2.2 Nature and Extent of Contamination

Based on the previous investigations listed in Table 1, there is fixed radiological contamination at the facility. The fixed radiological contamination present on the concrete floor in one of the personnel locker rooms and in a small corner of the receiving area resulted from a uranium release in the 1960's. Radioactive warning labels clearly mark both areas. The fixed radiological contamination ranges from non-detect to 35,603 disintegrations per minute (DPM)/100 cm^2 for alpha and non-detect to 47,949 DPM/100 cm^2 for beta-gamma. The X-746 Building also contains removable radiological contamination, primarily in the attic, that ranges from 9 to 539 DPM/100 cm^2 for alpha and non-detect to 134 DPM/100 cm^2 for beta-gamma.

Asbestos-containing material, which is dry and easily crumbled, is present in the building. The forms of asbestos-containing material in the X-746 Building includes indoor and outdoor pipe and tank insulation, asbestos-containing material wallboard and floor tile, roof shingle flashing on exhaust roof vents, and transite wall coverings. The off-site disposal of asbestos wastes will be in accordance with the disposal facility's license.

The extent of beryllium contamination has been extensively evaluated by sampling throughout representative areas in the building. These areas were identified in a manner consistent with the industry practice to accurately reflect building contamination. EPA 530-0-02-002, *RCRA Waste Sampling Draft Technical Guidance*, was used as the standard guidance for collection of 17 samples using a random generation process to determine sampling locations. All results were found to be below the release criteria level of 0.2 micrograms per 100 square centimeters in accordance with 10 *CFR* 850 Chronic Beryllium Disease Prevention Program. 10 CFR 850 establishes a chronic beryllium disease prevention program to reduce the number of workers exposed to beryllium in the course of their work at DOE facilities managed by DOE or its subcontractors.

Due to the age of the building, paint is present that contains concentrations of lead from 190 to 17,000 parts per million (ppm) with a percent by weight range of 0.17 to 6.7 percent. The lead paint in the building would pose a hazard to human health if it becomes dust.

Table 1. X-746 Building previous investigations

Previous Investigations
1. USEC Letter Request for Additional Action Associated with the USEC Request of August 23, 2006, to Return Building X-746 Under the Gaseous Diffusion Plant Lease DOE-07-0027 (December 10, 2007)
2. Radiological Survey Characterization of X-746 Building (April and May 2008)
3. Asbestos and other fibrous constituents, lead, and beryllium survey characterization of the X-746 Building (May-August 2008)

2.2.3 Previous Removal Actions

No previous removal actions have been conducted at this facility.

2.2.4 Preliminary Assessment of Releases

Table 1 provides a listing of the previous investigations associated with the X-746 Building. Detailed descriptions of the investigations are available in the Administrative Record File for this removal action at the DOE Environmental Information Center in Piketon, Ohio.

2.2.5 Streamlined Risk Evaluation

DOE performed a qualitative risk assessment for the X-746 Building. Based on the characterization data, asbestos, lead-based paint, and uranium are contaminants of potential concern. Based on the sampling data, beryllium was not a contaminant of potential concern. Contaminants of potential concern are substances detected that have the potential to adversely affect human health and the environment due to their concentrations, distributions, and toxicity. Additionally, the X-746 Building is posted as a radiologically contaminated area. See Section 4.1.4.1 of this document for a detailed description of potential waste streams anticipated with removal of the X-746 Building.

Weather elements such as wind and rain could result in an infrastructure failure (e.g., asbestos transite blowing off the building) which may result in an increased threat of exposure to workers and ecological receptors. Risks to workers from exposure to these contaminants of potential concern are minimal under current access restrictions; however, unrestricted industrial exposure could cause increased risks to workers. Additionally, releases of the contaminants of potential concern from this facility could impact ecological receptors in Big Run Creek by surface water migration through Outfall 002; however, amounts

of contaminants of potential concern indicate that any impacts to these ecological receptors would likely be minimal.

2.2.6 Applicable or Relevant and Appropriate Requirements

Applicable or relevant and appropriate requirements (ARARs) specific to the identified contaminants of potential concern are contained in Appendix B of this document.

3. REMOVAL ACTION SCOPE, OBJECTIVES, AND SCHEDULE

This chapter summarizes DOE's response authority under CERCLA for D&D actions, removal action scope, removal action objectives, justification for D&D, and planning schedule for D&D of the X-746 Building.

3.1 RESPONSE AUTHORITY AND STATUTORY LIMITS

Section 104 of CERCLA addresses the response to releases or threats of release of hazardous substances through removal actions. Executive Order 12580, "Superfund Implementation," delegates to DOE the response authorities for DOE facilities. As lead agency, DOE is authorized to conduct response measures (e.g., removal actions) under CERCLA. A response under CERCLA is appropriate when (1) hazardous substances are released or there is a substantial threat of such release into the environment or (2) there is a release or substantial threat of release into the environment of any pollutant or contaminant, which may present an imminent and substantial danger to the public health or welfare. DOE and EPA have issued a joint policy statement (DOE and EPA 1995) stating that building D&D activities should be conducted as non-time-critical removal actions unless circumstances at the facility make it inappropriate.

3.2 REMOVAL ACTION SCOPE AND OBJECTIVES

As outlined below, this non-time-critical removal action will address the building contents and the building structures. The utilities serving this building will be isolated and an air gap (a break in the utility line that is visually observed) constructed. Steam and condensate lines will be valved off and capped at their point of connection to the X-746 system. Electric power supplies will be isolated at the nearest pole and water and sewer lines will be cut and capped underground at a convenient location outside of the building footprint. The floor drains will be plugged prior to any decontamination efforts or structural removal. In consultation with USEC, exact locations of utility terminations will be selected. The X-746 Building and contents, foundation, and concrete slab will be removed and disposed except for the protective tunnel housing the active steam and condensate lines on the east side of the building. The protective tunnel housing will be evaluated and decontaminated as necessary. The asphalt drive and parking area will also be removed and disposed. The only soils that will be removed and disposed pursuant to this non-time-critical removal action are those soils incidental to the slab, foundation, and asphalt removal.

The fixed radiological contamination present in the building is a hazard to workers only if removed from the concrete surface and dispersed into the air in a breathable form. The removable radiological contamination is not a worker or public hazard since it is present in quantities less than the limit for unrestricted release. Radiological work controls will be employed during removal activities in the affected area of the building to minimize or preclude worker exposure. Asbestos-containing material abatement will be accomplished using a licensed Asbestos-Containing Material Abatement Contractor. Dust control measures will be employed during removal activities to minimize or preclude worker exposure.

The following removal action objectives have been developed for this removal action and form the basis for identifying and evaluating appropriate response actions:

- Reduce potential worker exposure during S&M activities.

- Control removal of the X-746 Building to minimize adverse impacts to site-wide leased systems.

- Control removal of the X-746 Building to minimize or eliminate the potential health and environmental hazards of radiation and hazardous material exposure caused by the potential uncontrolled release of contaminated dust, equipment, and building materials from the facility associated with the removal activities at the facility.

3.3 REMOVAL ACTION JUSTIFICATION

The X-746 Building and its contents have the potential to present risks to workers if exposure is not restricted through access controls. This facility also might impact ecological receptors in Big Run Creek via surface water migration if contaminants were released through infrastructure failure. Based upon these potential risks, the D&D of this building is appropriate and will prevent, minimize, or eliminate potential and actual risks posed by the potential release or threat of release of hazardous substances, pollutants or contaminants (40 *CFR* 300.415(b)(2)(i), (v), (viii)).

In addition, D&D of this building will meet the DOE objectives to control legacy hazards.

3.4 REMOVAL ACTION PLANNING SCHEDULE

Figure 3 presents the removal action planning schedule for Alternative 2 which is provided for informational purposes only. There will be a 30 day public comment period for the completed EE/CA as a part of the approval process. The Removal Action Work Plan (RAWP) will contain the sequence of activities to implement the removal action and may include supporting information (e.g., health and safety plan, waste management plan, data management plan, quality assurance project plan, transportation plan, etc). The remainder of the planning schedule identifies the field tasks and proposed durations for project completion.

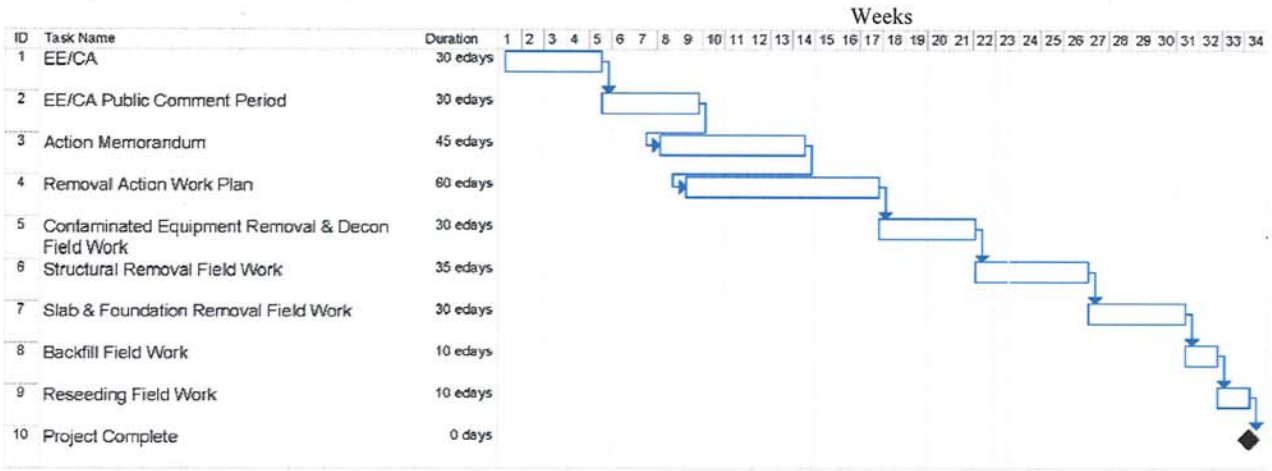

Figure 3. X-746 removal action planning schedule for alternative 2
For Informational Purposes Only

4. DEVELOPMENT OF REMOVAL ACTION ALTERNATIVES

This chapter summarizes the identification and screening of technologies and the development of the two removal action alternatives for D&D of the X-746 Building.

4.1 TECHNOLOGY IDENTIFICATION AND SCREENING

This section identifies the technologies and disposal options based on site-specific conditions, contaminants, affected media, and anticipated activities. Technologies for building dismantlement and size reduction were identified based on their ability to meet removal action objectives, provide safety to workers, the feasibility of the technology under site-specific conditions, and the ability to provide radiological control of the D&D activity. Disposal options for waste streams that would be generated from D&D activities are also presented.

4.1.1 Building Dismantlement and Size-Reduction Technologies, (Including Pipe/Utility Separation/Disconnection/Sealing and Lead-based Paint/Asbestos Removal)

Multiple dismantlement and size-reduction technologies exist and could be used for this project. Table 2 identifies the dismantlement and size-reduction technologies that are the most appropriate for this removal action and addresses their applicability and limitations. Dismantlement technologies include conventional disassembly using hand tools, circular cutters, hydraulic shears, and oxyacetylene torches. Size-reduction techniques also have been identified for use in the D&D efforts. The technologies considered most appropriate for removal of lead-based paint dust and asbestos are dusting, scrubbing, vacuuming, and wiping. The techniques selected will be based on the properties of the material being removed. The technologies considered for sealing floor drains and open piping include check valves, expandable plugs, and pipe end caps. Compaction has been used as the representative process option, since this technique can be easily applied to a variety of materials and results in substantial volume reduction.

4.1.2 Concrete Slab and Foundation Decontamination, Stabilization, and Removal Technologies

Multiple decontamination, stabilization, and removal technologies exist for the concrete slabs and foundations and could be used for this project. Table 3 identifies the technologies considered for the concrete slabs and foundations that will remain after removal of the buildings and addresses their applicability and limitations; these technologies are the most appropriate for this removal action.

The application of fixative/stabilizer coatings (such as latex paints, gums, or resins) is considered a viable technology to fix any contamination found on the concrete slabs. An encapsulant such as concrete or polymer could be applied to the concrete having radioactive or other hazardous contamination.

The following technologies are considered viable for decontamination of the concrete; scabbling, sponge blasting, and abrasive blasting.

4.1.3 Waste Containerization Options

It will be necessary to containerize the waste generated during D&D activities for transportation and/or disposal. A large variety of containers are available that would be appropriate for the different waste streams generated depending upon which technologies identified in Sections 4.1.1 and 4.1.2 are

applied. The containers that are the most appropriate for this removal action include gondolas, Sea-land containers, intermodal containers, roll-off boxes, ST-boxes (B-25), steel drums, and polyethylene drums. Due to the potential variety of waste that will be generated from the D&D activities, it is possible that multiple container options will be used during implementation of the removal action.

Table 2. Description and evaluation of building dismantlement, size-reduction technologies, pipe/utility separation/disconnection, and lead-based paint/asbestos removal

Technology	Description	Applicability	Limitations	Comments
Conventional disassembly	Hand-held tools and saws; used for hand removal of nuts and bolts, disconnection of piping (including floor drains), and modifications of utility conduits to form an air gap.	May be applied to any area including utility piping and floor drains.	Labor intensive and slow; recommended for limited application.	No additional worker training required; rotary saws, grinders and other high-speed mechanical tools would produce airborne particulates and fines that may need to be collected. If applicable, verify utilities have been tagged per lock out/tag out procedure before being disconnected.
Mobile hydraulic shear	Two-bladed cutter attached to excavator; typically uses hydraulic power from excavator.	Can cut 0.6-cm-(1/4-inch)-thick steel (large-diameter pipe, structural steel, tanks); up to 2.5-cm-(1-inch)-thick pipe can be cut with reduced blade life.	Pipe ends are pinched, requiring further processing before decontamination, treatment, or disposal; eliminates airborne contamination associated with thermal cutting processes.	Good for conduit and small pipe. If applicable, verify utilities have been tagged per lock out/tag out procedure before being disconnected.

Technology	Description	Applicability	Limitations	Comments
Circular cutters	Self-propelled; cut as they move around a track on outside circumference.	Metal pipes from 3.175 cm (1.25 inch) to 6 m (20-ft) diameter; wall thickness up to 15 cm (6 inches), depending on type of circular cutter used.	10-cm (4-inch) to 5.3-cm (21-inch) clearance required, depending on type of circular cutter used; requires multiple passes for thickness greater than 1.9 cm (0.75 inches).	Safety concerns: • Lacerations from blades and jagged metal. • Flying particles from metal shavings. • Ergonomics/body postures from use of cutters. • Noise exposures. • Metal fumes from dusts of metal cuts. • If applicable, verify utilities have been tagged per lock out/tag out procedure before being disconnected.
Oxyacetylene torch	Oxygen and a fuel gas mixed and ignited at the tip of a torch; metal heated to 816°C (1,500°F) is burned away.	Very effective in cutting carbon steel; depth of cut up to 10 to 15 cm (4 to 6 inches); cutting speed up to 76 cm/min (30 inches/min); common technique for structural carbon steel member disassembly.	Alloys uranium with the metal; however, generally does not affect cutting operation.	Not recommended for aluminum or stainless steel due to formation of refractory oxides.
Compaction (crushing) and super compaction	Compresses wastes using hydraulic mechanical technology to achieve volume reduction.	Scrap metal, concrete, glass, rubble, plastic material, rubber, paper, and cloth.	Limited to compressible wastes; super compactors operating at 29,000 to 150,000 kilopascal (kPa) (4,000 to 22,000 pounds per square inch (psi)) required to compact most items.	Greatly reduces the volume of reactors, tanks, etc. Volume reduction factors of 4 to 5 can be achieved for scrap metal resulting in densities as high as 150 lb/ft^3.
Dusting/scrubbing/vacuuming/wiping	Physical removal of dust, dirt, and loose surface contamination by common cleaning techniques.	Removal of various types of contamination from a variety of surfaces including lead-based paint chips and asbestos.	Labor intensive, which causes high potential for worker exposure; wiping should not be used on porous or absorbent surfaces.	Appropriate for most items where loose contamination could spread; vacuuming performed using high energy particulate air (HEPA) filters.

Technology	Description	Applicability	Limitations	Comments
Sealing of piping and/or floor drains using check valves, expandable plugs, and pipe end caps.	After disconnection of pipe by mechanical means, pipe end will be sealed.	May be applied to any disconnection (i.e., floor drain, pipe conduit (air gaps)).	Labor intensive and slow. If pipe ends are pinched, will require additional processing to establish a seal.	Verify utilities have been tagged per lock out/tag out procedure before being disconnected.

Table 3. Description and evaluation of concrete slab and foundation decontamination, stabilization and removal technologies

Technology	Description	Applicability	Limitations	Comments
Shredding	Shreds waste to provide waste volume reduction.	Waste materials with large void spaces and thin metals.	Waste size restrictions for most shredders [>3.175 cm (>1.25-inch) rebar, 3.75 cm (1.25-inch) steel cable, and 10 cm (4.0-inch) Schedule 40 pipe]; primarily for metal wastes.	Not recommended due to limitations on size of material that can be shredded.
Encapsulation	Fixes wastes by encasement in low solubility solid matrix.	Used for wastes that are unstable.	Increases volume and mass of waste.	Reduces potential for leaching to groundwater.
Applying fixative stabilizer coatings	Application of paints, films, and resins used as coatings to fix and stabilize contaminants in place.	Stabilizes radioactive contamination.	No removal of contaminant is achieved; experiments to ensure effectiveness of stabilizer generally are required due to site-specific requirements.	Also useful for containment of contaminants on transite siding or other building materials.
Scabbling	Uses physical means (steel shot, steel rods, carbide cutters, etc.) to loosen and remove surface contamination.	Effective on flat, shatterproof surfaces (concrete).	Effective for near surface contamination; creates additional waste.	Highly effective for removal of surface layer of concrete. Technology is readily available. Dust can be suppressed.
Sponge blasting	Uses a sponge grit suspended in an air spray to loosen and remove surface contamination.	Effective on flat, shatterproof surfaces (concrete, aluminum, steel, and painted or coated surfaces) and on hard to reach areas such as ceilings.	Effective for near surface contamination; creates additional waste.	Sponge grit can be recycled.
Abrasive blasting	Uses an abrasive media (sand, glass beads, grit, or CO_2 pellets) suspended in an air spray to loosen and remove surface contamination.	Effective on flat, shatterproof surfaces (concrete, aluminum, steel, and painted or coated surfaces) and on hard to reach areas such as ceilings.	Effective for surface contaminants up to 0.64 centimeters (0.25 inches) deep, depending on abrasive technique; creates additional waste; slow, labor-intensive technique, which causes high potential for worker exposure.	Can produce substantial amount of contaminated dust; appropriate for items that can be effectively decontaminated for reuse or "clean" disposal; CO_2 minimizes additional waste streams.
Destruction and Removal	Jackhammers that are hand-held or mounted to a backhoe may be used to break up concrete. Standard construction equipment may be used for removal.	Applicable for reducing the size of large pieces of concrete.	No removal of contaminant is achieved; slow, labor-intensive technique, which increases potential for worker exposure. (Metal cutting methods may be required if rebar is present.)	Technology and equipment are readily available. Highly effective for removal. Can produce substantial amount of contaminated dust, but dust can be suppressed.

CO_2 = carbon dioxide.

4.1.4 Waste Disposal Options

Table 4 summarizes the waste volumes that are anticipated from removal of the X-746 building. The total waste volume is anticipated to be approximately 98,325 ft^3.

Table 4. Summary of anticipated waste volumes

Facility	Structure	Volume of Waste	Cumulative Totals
X-746 Building	Equipment and building structure above foundation and slab (including asbestos – 3194 ft^3)	38,550 ft^3	38,550 ft^3
	Concrete slab and foundations	19,275 ft^3	57,825 ft^3
	Asphalt	40,500 ft^3	98,325 ft^3

4.1.4.1 Waste Streams

DOE plans to ship all wastes, with the exception of liquid decontamination waste water, generated from the X-746 Building removal project to appropriate off-site facilities for disposal. The liquid decontamination waste water will be treated through one of the permitted on-site treatment processes. Sufficient off-site waste disposal capacity is available for all solid waste streams generated by the project. The project will document that if current characterization data is not sufficient to meet an off-site disposal facility's waste acceptance criteria (WAC), additional sampling and analysis will be performed to verify compliance with the disposal facility's WAC. It is anticipated that the waste material will require disposal as low-level radioactive waste; radioactive ACM; non-radioactive ACM mixed waste; hazardous waste; or non-radioactive, non-hazardous solid waste. A listing of anticipated potential waste streams is presented in Table 5. Hazardous waste determinations used available process knowledge and sampling analyses in accordance with EPA guidance contained in 57 Federal Register (FR) 990. This guidance allows consideration of Resource Conservation and Recovery Act (RCRA) hazardous constituents in the same proportions as they are found with the associated construction/demolition debris and does not require sorting and segregation for management as a separate waste stream.

EPA guidance recognizes that it may not be practical to segregate all potential RCRA items from a heterogeneous waste stream. In 57 FR 990, EPA gives an example of the demolition of a building from which various types of debris constitute the waste stream. Included as one of the types of debris is a relatively small quantity of potentially RCRA hazardous material. EPA states (assuming no listed wastes are present) a representative sample of such debris would include all components of the waste in the same proportions as found in the demolition debris, and unless such a representative sample exhibits a hazardous characteristic, the debris would not be hazardous. Accordingly, sorting and segregation, as discussed above, will be instituted as a best management practice and constitutes a reasonable effort to determine the presence of RCRA hazardous waste as required by EPA guidance.

Disposal options that can be considered for the disposal of certain wastes generated during D&D activities may be limited if radionuclide contamination is present at levels that exceed the industrial/sanitary landfill limits of the receiving disposal facility.

Although a variety of waste streams will be generated, the primary X-746 Building removal waste streams are expected to be construction/removal debris and radiologically contaminated materials identified as low-level waste (LLW). Wastes such as non-radioactive RCRA and/or mixed waste sludges or liquids (decontamination wastes, etc.), and secondary waste streams generated during performance of the non-time-critical removal action also may be generated. It is anticipated that no on-site treatment will be necessary for this non-time-critical removal action; however, if on-site treatment becomes necessary,

DOE will consult with the Ohio Environmental Protection Agency (Ohio EPA). Mixed waste and RCRA waste will be treated, if necessary, to meet RCRA land disposal restrictions (LDRs) prior to disposal. Any liquid decontamination wastes generated will be treated and disposed through the on-site waste water treatment process. Results of the characterization efforts will be used to separate the debris using reasonable efforts into waste streams that conform to the proposed disposal facility waste acceptance criteria. A discussion of the primary waste disposal facilities being considered for waste from the D&D activities and a summary of their respective waste acceptance criteria are presented in the following sections. In addition, if wastes are generated that cannot meet the waste acceptance criteria for the facilities discussed here (currently unidentified mixed waste and RCRA waste), other commercial disposal facilities will be utilized for these wastes.

4.1.4.2 Off-Site Disposal

Off-site facilities used for disposal will depend on the nature of the waste generated. Sampling data collected at the X-746 Building has identified the majority of the waste to be classified as LLW requiring off-site disposal. Off-site disposal facilities (e.g., DOE's Nevada Test Site and Energy Solutions) will be evaluated in order to determine the appropriate off-site disposal path.

Table 5. Description of anticipated potential waste streams

Waste Streams	Description
LLW	LLW is defined as radioactively contaminated, nonconsolidated, solid material and is managed separately from non-debris LLW because of differing characterization requirements. The waste streams within this category can include slag, scrap metal, lead based painted materials, personal protective equipment (PPE), concrete, decontamination materials, including decon waste waters, transite (also ACM), miscellaneous waste types from process areas or systems and secondary waste streams generated during performance of the non-time-critical removal action.
Radioactive ACM	This waste category includes ACM derived from process areas or systems such as process pipe insulation, concrete dusts from scabbling or blasting ACM material, transite, and secondary waste streams generated during performance of the non-time-critical removal action.
Non-radioactive ACM	This waste category consists of ACM that can be demonstrated to meet the appropriate radiological release criteria, and secondary waste streams generated during performance of the non-time-critical removal action.
Mixed Wastes	This waste category includes waste streams that have both a RCRA hazardous component and a radioactive component based on their origin within a radioactive materials management area, surface contamination exceeding release limits, or available characterization data. Among the wastes included in this category are inherently hazardous non-recyclable metal items, trap materials, concrete dusts from decontamination of process floors where lube oil leakage occurred, radioactively contaminated lamps, co-mingled ACM residual hydraulic fluids, dust control water, ventilation duct gaskets, deposits within the ventilation ducts, and secondary waste streams generated during performance of the non-time-critical removal action..
Hazardous Wastes	This waste category encompasses RCRA-hazardous waste streams (that are not mixed wastes and do not exceed radiological release criteria), and secondary waste streams generated during performance of the non-time-critical removal action.
Non-radioactive, Non-hazardous, Solid Waste	This waste category includes wastes which are non-radioactive and RCRA non-hazardous. Among the items included in this category is miscellaneous trash (paper, cloth, wood, plastic, etc.) generated outside the work boundary area, and secondary waste streams generated during performance of the non-time-critical removal action..

ACM = asbestos-containing material
LLW = low-level waste
PPE = personal protective equipment
RCRA = Resource Conservation and Recovery Act

4.1.4.3 Summary of Disposal Options

As identified in Table 5, a variety of waste streams will be generated. The primary waste steam, LLW, will be disposed at the DOE Nevada Test Site, Energy Solutions facility, or another licensed permitted, commercial facility. Mixed waste and RCRA waste will be treated, if necessary, to meet RCRA land disposal restrictions prior to disposal at the Energy Solutions facility or another permitted, commercial facility. Radioactive and non-radioactive asbestos containing material will be disposed at the DOE Nevada Test Site, Energy Solutions facility, or another permitted, commercial facility. Any non-radioactive, non-hazardous solid wastes generated will be disposed at a permitted, commercial Subtitle D facility. Any liquid decontamination waste generated will be treated and disposed through one of the on-site waste water treatment processes. Any non-decontamination liquid waste generated will be disposed at a permitted, commercial facility since only decontamination liquid waste is permitted to be treated through one of the on-site waste water treatment processes. A summary of the waste disposal options for the various waste streams is presented in Table 6.

Table 6. Summary of disposal options for D&D wastes

Facility	Low-level radiological waste	Mixed waste	Hazardous (RCRA) waste	Non-radioactive, non-hazardous, solid waste	Radioactive and non-radioactive ACM	Liquid waste	Liquid decon waste
Energy Solutions	X	X (treated)	X (mixed)		X (w/rad)		
DOE Nevada Test Site	X				X (w/rad)		
Other permitted, commercial facilities	X	X	X	X	X	X	
PORTS on-site waste water treatment							X

Notes: All waste accepted at Nevada Test Site and Energy Solutions must be radiological waste.
ACM = asbestos containing material
RCRA = Resource Conservation and Recovery Act

4.2 IDENTIFICATION AND SCREENING OF ALTERNATIVES

In accordance with the National Oil and Hazardous Substances Pollution Contingency Plan and EPA guidance, DOE screened several alternatives for the X-746 Building; however, not all of the alternatives (including a reuse alternative) were carried forward.

The primary reasons a reuse alternative was not carried forward included: the nature of the facility, current state of contamination, historic uses that rendered the facility impractical for reuse, current state of consideration, lack of infrastructure, lack of current or future DOE mission for the facility, lack of any other reasonably foreseeable use, and renovation cost.

DOE took into consideration that a reuse alternative which included removing the contents of the building, decontaminating the building structures to remove the threat of release of contaminants of potential concern, disposal of any wastes generated, and renovation of the building for potential reuse. Any renovations to the building for reuse must meet or exceed statutory goals addressed in *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings* (HPSB) (Executive Order 13423 section 2(f)) to the greatest extent practical. Examples of HPSB improvements include installation of new electrical wiring and energy efficient lighting and Energy Star heating, ventilation, and air conditioning equipment. Costs to renovate the X-746 Building to meet Executive Order 13423

standards for an office building range from $275 per square foot to $530 per square foot ($5,500,000 to $10,600,000) (Davis, Langdon, Adamson, 2004). In addition to the renovation cost (which includes decontamination cost), at some future date, the building would eventually have to be demolished/removed at a cost of $3,200,000 (unescalated cost estimate in 2008 dollars).

A reuse alternative considered the age of the building and the extent of deterioration of both the inside and outside conditions of the building. Since the building has not been used since 2002, routine maintenance and safety upgrade activities have not been performed on the building. Therefore, the building in its current state is unusable. Additionally, DOE has not received any request or interest from other governmental organizations or commercial businesses to use the building. Therefore, this alternative has not been carried forward.

DOE has identified two alternatives to address the Removal Action Objectives that were specified in Chapter 3. The removal alternatives are summarized in Sections 4.3.1 and 4.3.2.

4.3 DEVELOPMENT OF ALTERNATIVES

Removal alternatives 1 and 2 are summarized in the following sections.

4.3.1 Alternative 1—No Action

Inclusion of a no action alternative is provided as a baseline for comparison to the other alternatives. In the no action alternative, S&M would be discontinued, the building would be allowed to deteriorate, and D&D would not be performed on the building. The following are key components of this alternative:

- Limited deactivation activities likely would be performed as part of other programs to isolate the building from major utility feeds (e.g., water and electric).

- Final disposition of contaminants generated by building degradation or failure would be deferred until a future decision document.

4.3.2 Alternative 2 – Remove Contents, Remove Structure, and Dispose Wastes

In this alternative, the building structures and all contents would be removed and disposed in appropriate off-site disposal facilities. A Waste Certification Official would be appointed prior to generation of any waste streams for this removal action. The Waste Certification Official will be responsible for determining and overseeing the segregation of waste. The removal of the contents and internal utilities would be sequenced to facilitate dismantling of the building structures, and the specific order in which systems are removed from service and dismantled would be determined during the design phase.

The following are key components of this alternative.

Contents: Prior to building removal, equipment and materials such as fluorescent light bulbs, mercury switches, etc. will be removed, sized, and placed in appropriate containers for disposal. DOE intends to ship all wastes off-site, with the exception of decontamination water, which will be treated through one of the on-site waste water treatment units. Waste characterization will be completed using process knowledge or sampling and analysis. The waste equipment and materials will be placed in appropriate containers for disposal at an appropriate off-site facility. If unexpected or unknown waste items are uncovered during the D&D process, they will be characterized and placed into a proper storage

facility until such time as an appropriate disposition path can be identified. Extensive decontamination, processing, and treatment of wastes are not planned at this time (unless treatment is necessary to meet land disposal restrictions).

Hazardous waste determinations will be made based on a representative sample in accordance with EPA procedures contained in SW846; this allows characterization of construction/demolition debris based on the average properties of the materials, assuming all materials are present in the same proportions as they are found in the resulting demolition debris. Results of the characterization efforts using the above approach will be used to separate the debris using reasonable efforts into waste streams that conform to the proposed disposal facility waste acceptance criteria.

Utilities: All utilities (electrical, water, etc.) will be disconnected, severed and/or removed from the building as outlined in Section 3.2 of this document.

Structures: The building structure will be disassembled and removed from the building slab. Appropriate measures will be taken to prevent the release of fugitive dust or other contaminants during this operation. The wastes generated by disassembly/removal of the structures will be segregated. These wastes will be characterized to determine the appropriate waste type and disposal in an appropriate off-site facility. No decontamination or treatment is planned at this time (unless treatment is necessary to meet land disposal restrictions).

Concrete slabs and foundations: As discussed earlier, the building foundation will be removed and disposed except for the active steam and condensate lines, the east foundation wall, the building east annex slab, and the protective tunnel. The protective tunnel housing will be evaluated and decontaminated as necessary. If contamination is found on the remaining concrete slab and foundation, they will be decontaminated and/or stabilized, as necessary, to prevent the migration of any contaminants and to reduce or eliminate restrictions for workers to access this area.

Soil within the elevated areas of the foundation walls will be used to backfill the foundation and parking lot excavations. Clean soil will be imported to prepare the area for final grading and seeding. Straw bales and mulch will be used to control erosion until vegetation is re-established.

5. ANALYSIS OF REMOVAL ACTION ALTERNATIVES

In accordance with the National Contingency Plan and EPA guidance (EPA 1993), the alternatives developed in Section 4.3 have been evaluated against the short and long-term aspects of three broad criteria: effectiveness, implementability, and cost. Subcriteria are summarized in Table 7. These evaluations were used to draw sufficient distinctions among the alternatives to allow selection of a recommended alternative.

Table 7. Criteria to be used for evaluation of removal action alternatives

EFFECTIVENESS

- Protectiveness
  - Protective of public health and community (short and long-term)
  - Protective of workers during implementation (short-term)
  - Protective of the environment (short and long-term)
  - Complies with ARARs
- Ability to Achieve Removal Action Objectives
  - Level of treatment/containment expected
  - No residual effect concerns
  - Will maintain control until long-term solution implemented

IMPLEMENTABILITY

- Technical Feasibility
  - Construction and operational considerations
  - Demonstrated performance/useful life
  - Adaptable to environmental conditions
  - Contributes to remedial performance
- Availability
  - Equipment
  - Personnel and services
  - Outside laboratory testing capacity
  - Off-site treatment and disposal capacity
  - Post-removal site control
- Administrative Feasibility
  - Permits required
  - Easements or right-of-ways required
  - Impact on adjoining property
  - Ability to impose institutional controls
  - Likelihood [of] obtaining exemption from statutory limits (if needed)

COST

- Capital cost
- Post-removal site control cost
- Present worth cost

NEPA values (discussed in Section 1.2, Regulatory Setting, of this document) associated with short and long-term effectiveness may include potential impacts upon the following resources: land use, socioeconomics, air quality and noise, vegetation, wildlife, threatened and endangered species, cultural resources, groundwater, surface water, floodplains, wetlands, soils and prime farmland, transportation, and cumulative impacts.

5.1 ALTERNATIVE 1 – NO ACTION

In this alternative, the facility would be left in its current condition. Existing institutional controls that limit public and worker access to the on-site facility would be maintained. No new controls would be implemented. Support systems (i.e., fire protection) would be maintained in an operable condition. No repairs or modifications to the facility would be undertaken. Removal of the building would not take place until a future date.

5.1.1 Effectiveness

Alternative 1 does not meet the removal action objectives and the ARARs.

Protectiveness and ability to achieve removal action objectives – Since this alternative consists of no action, the short-term risks to the public, the workers, and the environment would remain unchanged. Existing hazards to workers and the public would continue to be controlled with institutional controls that restrict access to the facility.

In the long term, a gradual reduction in protection of human health and environment would result from the deterioration of the facility, with the potential risk to on-site worker health and safety resulting from the eventual failure of building structure. Releases of contaminants to the atmosphere and surface water pathway could potentially occur. Asbestos-containing material could also be released as the structure deteriorates. The release of hazardous constituents to the surface water pathway could result in unacceptable concentrations of such constituents at site compliance monitoring points. Animal intruders, such as mice and birds, could track contamination outside the facility. The inevitable deterioration of this facility eventually could result in the release of contamination to the environment. This could present a hazard to on-site workers due to physical dangers associated with roof and building structure failure and the release of contaminants and to the off-site public from the potential migration of releases.

With regard to NEPA values, this alternative could inhibit future land use, since the existing structure would remain in place. The building contaminants would present limited impacts to air, soil, and other affected environments, unless a catastrophic release occurred. Wetlands and floodplains would not be affected. No federal or state-listed Threatened and Endangered plant or animal species have been identified at this facility. The federally endangered Indiana bat (*Myotis sodalis*) potentially exists in the vicinity, but the X-746 Building does not provide suitable habitat. This alternative would not have any direct or indirect adverse impacts on local socioeconomic resources.

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. No census tracts near PORTS include a higher proportion of minorities than the national average. Some nearby tracts meet the definition of low-income populations, but there would be no disproportionate or adverse environmental impacts to any minority or low-income populations.

5.1.2 Implementability

Technical and administrative feasibility – The no action alternative is readily implementable. No specialized services or equipment are required. No off-site or on-site waste disposal is required.

Availability of services and materials – Existing site services can maintain current institutional controls.

5.1.3 Cost

The cost for Alternative 1 as described, with no further surveillance and maintenance activities, is $50,000-100,000, as no activities would be performed. However, maintenance costs likely would be required to address regulatory requirements and limit impacts on other facilities. Ultimate costs for cleanup of contaminants from these facilities at a later time could greatly increase if a release occurred or hazards to workers increased as a result of building degradation.

5.2 ALTERNATIVE 2 – REMOVE CONTENTS, REMOVE STRUCTURE, AND DISPOSE OF WASTES

In this alternative, the building contents would be removed and the building structure and foundation demolished. Note: The active steam and condensate lines, their protective tunnel housing, the east foundation wall of the building and the east annex slab would be left in place. If necessary, limited decontamination and/or stabilization of the foundation wall, tunnel housing, and annex slab will be implemented to prevent the migration of any contaminants.

5.2.1 Effectiveness

Alternative 2 would meet the removal action objectives and the ARARs to the extent practicable.

Protectiveness and ability to achieve removal action objectives – Based on the streamlined risk evaluation, the decontamination and decommissioning of the X-746 Building would prevent, minimize, or eliminate potential and actual risks to workers and ecological receptors posed by the release or threat of release of the contaminants of potential concern. Removal of the structure, equipment, and materials would prevent or minimize any migration of RCRA or radioactive materials or constituents to the environment. The decontamination and/or stabilization of the remaining building foundation wall and annex slab would isolate any remaining constituents from the environment.

The ARARs for this alternative are presented in Appendix B. Appendix B identifies a specific action and requirement under the identified ARAR. All on-site CERCLA actions under this non-time-critical removal action would comply with ARARs to the extent practicable. The transportation of waste to any off-site disposal facility (and any treatment that may be required to satisfy land disposal restrictions) would be performed in accordance with ARARs, and shipments may be performed by truck or rail. All off-site disposal activities would be conducted in accordance with disposal site permit requirements. Implementation of this alternative would have no adverse impact on any known cultural or archeological resources.

This alternative would permanently remove contaminants in the above-grade building structure from an uncontrolled environment. Wastes would be disposed at an appropriate site that would provide long-term containment for any hazardous and/or radioactive constituents. The decontamination and/or stabilization of the remaining foundation wall and annex slab structures, the off-site disposal of solid

waste, along with the maintenance of existing institutional controls, would prevent any residual effects on the environment, worker health and safety, and public health and safety. Institutional controls would maintain the integrity of the remaining structures until a long-term solution is implemented.

With regard to NEPA values, leaving the concrete foundation wall and annex slab in place could inhibit future land use. Any remaining fixed contaminants would present little or no impacts to air, soil, and other affected environments. Wetlands and floodplains would not be affected. No federal or state-listed threatened and endangered plant or animal species have been identified at these facilities. The federally endangered Indiana bat (*Myotis sodalis*) potentially occurs in the vicinity, but this facility does not provide suitable habitat. This alternative would not have any direct or indirect adverse impacts on local socioeconomic resources.

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. No census tracts near PORTS include a higher proportion of minorities than the national average. Some nearby tracts meet the definition of low-income populations, but there would not be disproportionate or adverse environmental impacts to any minority or low-income populations.

Decontamination and/or stabilization of the concrete foundation wall, the protective tunnel housing, and annex slab will significantly reduce the mobility of hazardous and radioactive materials.

Building deterioration that would result in any significant increase in contaminant release would not be expected during implementation of Alternative 2. Risks to on-site workers and the public would increase slightly during implementation; however, these risks are manageable by adherence to health and safety requirements and PORTS procedures. Chemical, radiological, and physical risks to workers would be controlled by engineering controls and/or personal protective equipment.

If wastes are shipped to off-site disposal facilities, there would be increased cargo and vehicle-related transportation risks[1] to transportation workers (i.e., crew) and members of the public. A radioactive material release resulting from a transportation accident would be of minor consequence, however, because it would be quickly contained and recovered. Additionally, shipping the waste by rail rather than by truck would reduce these risks.

5.2.2 Implementability

Technical and administrative feasibility – This alternative is technically feasible. Conventional construction/removal techniques would be used to remove the equipment and building infrastructure. Decontamination and/or stabilization of the remaining concrete foundation wall and annex slab would utilize techniques that have been effectively used at PORTS in other areas with similar concerns. Off-site disposal of waste materials would occur at existing facilities that have sufficient existing capacities.

Availability of services and materials – Sufficient on-site equipment and personnel are available for this alternative. On-site waste storage is available, if necessary for unexpected or unknown wastes generated during the D&D process and waste being prepared for and waiting off-site disposal. Off-site disposal services are available.

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[1] Vehicle-related transportation risks are independent of the types of material sent, but are related to the method of transportation (e.g., road, rail), the number of shipments, and the distance traveled. Cargo-related transportation risks are concerned with the risks to expected receptors (e.g., drivers, members of the public) from hypothetical exposure to waste transported.

5.2.3 Cost

The escalated estimated cost of Alternative 2 is approximately $3,200,000. (Cost is dependent on the actual waste type and volume, so the estimated costs may vary once the wastes are fully characterized and the actual volumes are known.)

6. COMPARATIVE ANALYSIS OF REMOVAL ACTION ALTERNATIVES

This section compares the alternatives on the basis of effectiveness, implementability, and cost. Table 8 presents the comparative analysis.

6.1 EFFECTIVENESS COMPARISON

The no action alternative does not provide a long-term solution. The building structures would remain in place and would be subject to deterioration. Hazardous substances potentially would be released to the environment at an increasing rate.

Alternative 2 would result in greater short-term risks than Alternative 1, but with the appropriate planning and controls, these risks could be controlled at an acceptable level. Prior to building removal, engineering controls would be implemented during removal of extraneous debris and asbestos material. Air monitoring would be on-going during removal to identify any impacts. The removal action work plan will detail the procedures for on-going risk identification, assessment, mitigation, and tracking throughout implementation of the X-746 removal.

The removal alternative would be the most effective alternative to isolate the structure's hazardous substances from the environment. This alternative would provide a long-term solution by removing the structure and any associated hazardous substances for disposal at an appropriate disposal facility.

6.2 IMPLEMENTABILITY COMPARISON

Alternative 1 would be easiest to implement technically because no additional activities would be required; however, both alternatives are implementable using existing technologies and services. Alternative 1 would be ineffective at achieving the removal action objectives or reducing actual or potential risks to workers and the environment. Additionally, some landlord type activities including fire protection and grounds keeping activities are necessary.

6.3 COST COMPARISON

Cost estimates are presented in Table 8. The cost for the No-Action alternative is less than the cost for Alternative 2. While there are no direct removal costs associated with the no action alternative, other costs associated with continued support systems (i.e., fire protection) maintenance will continue to be incurred. In addition, the undiscounted cost would continue to increase, and the future inevitable D&D of the facility would increase as construction costs escalate in the future.

Table 8. Comparative analysis of removal action alternatives

Alternative	Effectiveness	Implementability	Cost [A]
1. No Action	• Will not achieve removal action objectives. • Will not remove hazardous and radioactive constituents. • Least protective of human health and the environment. • Highest potential for environmental release. • Does not provide a long-term solution or permanent solution. • Results in no progress toward site cleanup goals.	• Readily implementable technically. • Generates no wastes. • Fire protection and grounds keeping activities.	$ 50,000-100,000
2. Removal of facility infrastructure, equipment, and stored materials.	• Will achieve removal action objectives. • Most protective of human health and the environment. • Could be implemented in compliance with ARARs. • Could be implemented in such a manner that is protective of workers and the public. • Potential off-site shipments of waste would create transportation risks. • Provides a long-term solution. • Results in progress toward site cleanup goals. • Most effective at isolating contaminants from the environment.	• Readily implementable. • Generates wastes.	$ 3,205,932

[A] = Escalated estimated cost

7. RECOMMENDED REMOVAL ACTION ALTERNATIVE

The recommended removal action alternative for D&D of the X-746 Building is Alternative 2. This alternative consists of the following components:

- Remove, transport, and dispose of all equipment and materials stored in the building at an appropriate disposal facility (including any treatment that may be necessary to meet land disposal restrictions);

- Disconnect and remove utilities from inside the building.

- Demolish and remove the building structure, the foundation and building slab except for the active steam and condensate lines and their protective tunnel housing, the east foundation wall of the building and the east annex concrete slab. An air gap will be constructed to isolate the utilities serving this building.

- Containerize, transport, and dispose of all waste from the structures and/or slabs/foundations at an appropriate off-site disposal facility (including any treatment that may be necessary to meet land disposal restrictions). Note: liquid decontamination waste will be treated and disposed through one of the permitted PORTS on-site waste water treatment processes; and

- Stabilize and/or decontaminate the foundation wall, the protective tunnel housing, and annex concrete slab, as necessary, to prevent the migration of any newly-exposed contaminants.

This alternative has been determined to be the most cost-effective approach that satisfies the removal action objectives for D&D of this building, and will meet ARARs to the extent practical.

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APPENDIX A

PHOTOGRAPH

APPENDIX B

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs) AND TO-BE-CONSIDERED (TBC) GUIDANCE

CONTENTS

TABLES

ACRONYMS FOR APPENDIX B

ALARA	as low as reasonably achievable
AOC	area of contamination
ARAR	applicable or relevant and appropriate requirement
CAA	Clean Air Act of 1970, as amended
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended
CFR	*Code of Federal Regulation*
D&D	decontamination and decommissioning
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
FR	*Federal Register*
GCEP	Gaseous Centrifuge Enrichment Plant
LLW	low-level (radioactive) waste
mrem	millirem
NHPA	National Historic Preservation Act
NRCE	National Register Criteria for Evaluation
NRHP	National Register of Historic Places
OHP	Ohio Historic Inventory
PORTS	Portsmouth Gaseous Diffusion Plant
RCRA	Resource Conservation and Recovery Act of 1976, as amended
TBC	to be considered
T&E	threatened and endangered

B-1. INTRODUCTION

In accordance with Section 40 *Code of Federal Regulations (CFR)* Section 300.415(j) of the National Oil and Hazardous Substances Pollution Contingency Plan and U.S. Department of Energy (DOE) Headquarters guidance, DOE on-site removal actions conducted under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, are required to attain applicable or relevant and appropriate requirements (ARARs) to the extent practicable, considering the exigencies of the situation. ARARs include only federal and state environmental or facility siting laws/regulations; they do not include occupational safety or worker radiation protection requirements. Additionally, per 40 CFR 300.405(g)(3), other advisories, criteria, or guidance may be considered in determining remedies [to-be considered (TBC) category]. The decontamination and decommissioning (D&D) removal action alternatives include removal of stored materials, equipment, infrastructure, and any waste materials generated during the removal action; demolition of the building structures; and characterization and disposal of the generated wastes. The removal action alternatives (i.e., other than no action) would comply with all identified ARARs/TBCs and would not require an ARAR waiver.

CERCLA 121(e)(1) provides that no Federal, State, or local permit shall be required for the portion of any removal or remedial action conducted entirely as an onsite response action. In addition to "permits", EPA has interpreted CERCLA Section 121(e)(1) broadly to cover: "all administrative provisions from other laws, such as recordkeeping, consultation, and reporting requirements. In other words, administrative requirements do not apply to on-site response actions." [Office of Solid Waste and Emergency Response (OSWER) 9205.5-10A]. Those portions of the removal action that are taken off-site are subject to both the substantive and administrative requirements of applicable laws.

ARARs are typically divided into three groups: (1) chemical-specific, (2) location-specific, and (3) action-specific. Tables B.1, B.2, and B.3 list the chemical-, location-, and action-specific ARARs/TBCs, respectively, for the D&D removal action. In some cases, the conditions associated with the prerequisite requirements have not been confirmed to be present; if the subject condition is encountered during implementation of the action, then the specified ARAR would apply. A brief description of key ARAR/TBC topics follows.

B-2. CHEMICAL-SPECIFIC ARARs/TBCs

Chemical-specific ARARs provide health or risk-based concentration limits or discharge limitations in various environmental media (i.e., surface water, groundwater, soil, and air) for specific hazardous substances, pollutants, or contaminants; they are listed on Table B.1 and discussed below.

The radiation dose to members of the public must not exceed 100-millirem (mrem)/year total effective dose equivalent from all sources excluding dose contributions from background radiation, medical exposures, or voluntary participation in medical/research programs and must be reduced below this limit as low as reasonably achievable (ALARA) per DOE Order 5400.5. This dose limit addresses exposure to radiation from all sources and activities (including both operations and removal/remedial actions) at a facility. In addition, DOE is required to use procedures to maintain the dose ALARA. Thus, the actual dose that the public might receive from any individual activity such as this removal action is expected to be a very small fraction of the 100-mrem/year dose limit.

B-3. LOCATION-SPECIFIC ARARs/TBCs

Location-specific requirements establish restrictions on permissible concentrations of hazardous substances or establish requirements for how activities will be conducted because they are in special locations (e.g., wetlands, floodplains, critical habitats, historic districts, and streams). Table B.2 lists federal and state location-specific ARARs for protection of cultural or sensitive resources.

B.3.1 FLOODPLAINS AND WETLANDS

None of the activities associated with the removal action alternatives would be conducted within any floodplain. In addition, no wetlands are present at or near the vicinity of the buildings. Thus, no impacts to either floodplains or wetlands would result from any of the alternatives considered for this proposed removal action.

B.3.2 THREATENED AND ENDANGERED SPECIES

None of the removal action alternatives would adversely impact any federally or state-listed threatened or endangered (T&E) species located or seen at the Portsmouth Gaseous Diffusion Plant (PORTS). Consequently, none of the requirements for protection of T&E species or critical habitat are included as ARARs.

B.3.3 CULTURAL RESOURCES

Cultural resources are defined as a 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 on the National Register of Historic Places (NRHP).

Phase I history/architecture survey of the Portsmouth Gaseous Diffusion Plant in Scioto and Seal townships, Pike County, Ohio has been completed. The purpose of this investigation was to provide information for compliance with Sections 106 and 110 of the National Historic Preservation Act of 1966, as amended.

This investigation consisted of the entire federal reservation on which the facility is located, an area of 3,777 acres. A 1996-1997 survey completed Ohio Historic Inventory (OHI) forms for the buildings and structures at the facility. A total of 160 architectural locations, some consisting of multiple buildings and/or structures, were identified and were documented on OHI forms. Listed by facility number, a total of 196 resources were documented at the facility.

The X-746 facility is recognized as a contributing element to the Portsmouth Gaseous Diffusion Plant Historic District, a property considered to be eligible for inclusion in the National Register of Historic Places. The demolition of this inactive facility at the Portsmouth Gaseous Diffusion Plant would have an adverse effect on the historical character of the property. To meet the substantive requirements of the National Historic Preservation Act (NHPA), the following stipulations shall be implemented prior to

demolition in order to take into account and mitigate the effects of the undertaking on the historic property:

a. Original Ohio Historic Inventory form No. PIK-77-12, including a map showing the location of the X-746 facility to be demolished at the Portsmouth Gaseous Diffusion Plant, will be provided to the OHPO. DOE PPPO will retain a copy of the form in its files.

b. Full sets of color or black and white photographs in a minimum 5"x 7" format, appropriately labeled, documenting the design and current conditions and surrounding landscape around the X-746 facility will be provided to the OHPO and copies shall be retained in the DOE PPPO files.

c. Historic structural and architectural drawings documenting the details and layout of the facility will be provided to the OHPO. Copies of any such drawings will be retained in the DOE PPPO files. If drawings are not available, DOE PPPO will prepare basic plan view drawings, to scale, of the facility emphasizing the spatial organization of interior components and the functional relationship of the facility to the overall processes.

d. DOE PPPO will prepare a brief written narrative explaining the functional relationship of the facility to the overall processes at PORTS and submit the written narrative to OHPO with the photographic documentation and retain a copy for its files.

B-4. ACTION-SPECIFIC ARARs/TBCs

Action-specific ARARs include operation, performance, and design requirements or limitations based on the waste types, media, and removal/remedial activities. ARARs for the D&D alternatives include requirements related to waste characterization, scrap metal removal, decontamination, waste storage, treatment and disposal and transportation of hazardous materials.

B.4.1 BUILDING REMEDIATION

The D&D alternatives include removal of scrap metal, equipment, infrastructure, any waste materials and debris, and where necessary, stabilization of foundation concrete surfaces, etc. Requirements under the Clean Air Act (CAA) of 1970, as amended for control of asbestos and/or radionuclide emissions included in Table B.3 would have to be met.

B.4.2 WASTE MANAGEMENT

Building remediation activities may result in generation of, Resource Conservation and Recovery Act of 1976, as amended (RCRA) solid or hazardous waste, low level radioactive waste (LLW), mixed waste, asbestos-containing waste materials. Although some characterization has been performed, additional waste streams may be identified during implementation of the removal action.

All primary wastes (e.g., D&D debris) and secondary wastes (e.g., contaminated personal protective equipment, decontamination wastes) generated during building remediation activities must be appropriately characterized and managed in accordance with appropriate RCRA or DOE Order

requirements as specified in the ARARs Tables. On-site RCRA, TSCA, and radiological waste storage areas are available, however, long term storage of waste would not be anticipated. Hazardous waste determinations will be made based on a representative sample in accordance with U.S. Environmental Protection Agency (EPA) guidance contained in 57 Federal Register *(FR)* 990; this allows consideration of RCRA hazardous constituents in the same proportions as they are found with the associated construction/demolition debris and does not require sorting and segregation of individual waste items (e.g., fuses) for separate management. Table B.3 lists the requirements associated with the characterization, storage, treatment, and disposal of the aforementioned waste types. For this project the Area of Contamination (AOC) includes (but is not necessarily limited to) the footprint of the X-746 Building. Consistent with EPA policy, the movement, consolidation, and storage of hazardous waste within the AOC do not trigger RCRA storage or disposal requirements. Hazardous and other waste may be accumulated and stored in appropriate storage areas at PORTS.

B.4.3 POST-REMOVAL CONTROLS

In accordance with DOE Order 5400.5(IV)(6)(c), interim controls, including physical barriers (i.e., fences, signs) to prevent access, and appropriate radiological safety measures will be used, if necessary to prevent disturbance of any residual radioactive material that may remain on/in the concrete foundations.

B.4.4 TRANSPORTATION

Any wastes transferred off-site or transported in commerce along public right-of-ways must meet the requirements summarized on Table B.3, depending on the type of waste (e.g., RCRA, LLW, or mixed). These include packaging, labeling, marking, manifesting, and placarding requirements for hazardous materials at 49 *CFR* 170-180 *et seq.* Transport of D&D wastes along roads within the PORTS site must meet the requirements of the *Transportation Safety Document for the On-Site Transfer of Hazardous Material at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio* (LPP-0021/R2).

In addition, CERCLA Section 121(d)(3) provides that the off-site transfer of any hazardous substance, pollutant, or contaminant generated during CERCLA response actions be sent to a treatment, storage, or disposal facility that complies with applicable federal and state laws and has been approved by the U.S. Environmental Protection Agency (EPA) for acceptance of CERCLA waste (see also the "Off-Site Rule" at 40 CFR 300.440 *et seq.*). Accordingly, DOE will verify with the appropriate EPA regional contact that any needed off-site facility is acceptable for receipt of CERCLA wastes before transfer.

Table B.1. Chemical-specific ARARs and TBC guidance for D&D of the X-746 Building

Action/medium	Requirements	Citations
Release of radionuclides into the environment	Exposure to individual members of the public from radiation shall not exceed a total EDE of 0.1 rem/year (100 mrem/year), exclusive of the dose contributions from background radiation, any medical administration the individual has received, or voluntary participation in medical/research programs — **TBC.**	DOE Order 5400.5
	Shall use, to the extent practicable, procedures and engineering controls based on sound radiation protection principles to achieve doses to members of the public that are ALARA — **TBC.**	DOE Order 5400.5

ALARA = as low as reasonable achievable
ARAR = applicable or relevant and appropriate requirement
CFR = Code of Federal Regulations
D&D = decontamination and decommissioning
EDE = effective dose equivalent
mrem = millirem
OAC = Ohio Administrative Code
ORC = Ohio Revised Code
TBC = to be considered

Table B.2. Location-specific ARARs and TBC guidance for D&D of the X-746 Building

Location characteristics	Requirements	Prerequisite	Citations
	Cultural resources		
Presence of historic properties (including artifacts, records, or remains located within such properties)	Must comply with the substantive requirements of Section 106 of the NHPA.	Undertaking [as defined in 36 *CFR* 800.16(y)] that has the potential to affect historic property on or eligible for inclusion on the NRHP — **relevant and appropriate.**	36 *CFR* 800.1(a) 36 *CFR* 800.3
	Determine adverse effects and if found, evaluate alternatives or modifications to the undertaking to avoid, minimize, or mitigate the adverse effects on the property.		36 *CFR* 800.5(a) and (d) 36 *CFR* 800.6

ARAR = applicable or relevant and appropriate requirement
CFR = *Code of Federal Regulations*
D&D = decontamination and decommissioning
NHPA = National Historic Preservation Act of 1966
NRHP = National Register of Historic Places
OAC = Ohio Administrative Code
TBC = to be considered

Table B.3. Action-specific ARARs and TBC guidance for D&D of the X-746 Building

Action	Requirements	Prerequisite	Citations
	General construction standards		
Activities causing airborne radionuclide emissions	Shall not exceed those amounts that would cause any member of the public to receive an EDE of 10 mrem per year.	Radionuclide emissions from point sources, as well as diffuse or fugitive emissions, at a DOE facility — **applicable.**	40 *CFR* 61.92
Emission restrictions for fugitive dust.	All emissions of fugitive dust shall be controlled.	Pertains to sites which may have fugitive emissions (non-stack) of dust. Consider for sites that will undergo grading, loading operations, demolition, clearing and grubbing and construction utilize incineration or fuel recovery - **applicable**.	OAC 3745-17-08 Para. A1,A2,B,D
Radiation protection of the public and the environment.	Except as provided in 5400.1(II)(1)(a)(4), the exposure of members of the public to radiation sources as a consequence of all routine DOE activities shall not cause, in a year, an EDE greater than 100 mrem per year. The ALARA process shall be implemented for all DOE activities and facilities that cause public doses.	Dose received from all exposure modes from all DOE activities (including remedial actions) at a DOE facility – **TBC.**	DOE O 5400.5(II)(1)(a) and (2)
Activities causing storm water runoff.	Utilize best management practices to control pollutants in storm water discharges during and after construction which may include, as appropriate, soil stabilization practices (e.g., seeding); perimeter structural practices (e.g., gabions, silt fences, sediment traps); and storm water management devices.	Storm water discharge associated with construction activities, including clearing, grading, and excavating, that result in land disturbance of equal to or greater than one (1) acre and less than five (5) acres, except where otherwise exempt as specified in OAC 3745-39-04—**applicable.** Storm water discharge associated with construction activity at industrial sites, including clearing, grading, and excavation, that result in the disturbance of five (5) acres or	OAC 3745-39-04(B)(16)(a)

Table B.3. Action-specific ARARs and TBC guidance for D&D of the X-746 Building

Action	Requirements	Prerequisite	Citations
		more total land area— **applicable.**	
	Decontamination and waste removal standards		
Removal of regulated asbestos-containing material (RACM) from a facility	Substantive requirements for asbestos emission control per 40 *CFR* 61.145(c)(1-10) shall be followed, as applicable.	Demolition of a facility containing RACM exceeding the volume requirements of 40 *CFR* 61.145(a)(1) — **applicable.**	40 *CFR* 61.145(c)
Waste generation, characterization, segregation, and storage—removed wastes, debris, and secondary wastes			
Characterization of solid waste (*all primary and secondary wastes)*	Must determine if solid waste is hazardous waste or if waste is excluded under 40 *CFR* 261.4(b); and	Generation of solid waste (as defined in 40 *CFR* 261.2) that is not excluded — **applicable.**	40 *CFR* 262.11(a); OAC 3745-52-11
	Must determine if waste is listed under 40 *CFR* Part 261; or		40 *CFR* 262.11(b); OAC 3745-52-11(B)
	Must characterize waste by using prescribed testing methods or applying generator knowledge based on information regarding material or processes used.	Generation of solid waste that is not listed in subpart D of 40 *CFR* 261 and not excluded under 40 *CFR 261.4* or other RCRA regulation – **applicable.**	40 *CFR* 262.11(c) OAC 3745-52-11(C)(1)(2)
	Must refer to Parts 261, 262, 264, 265, 266, 268, and 273 of Chapter 40 and OAC 3745-51-02 for possible exclusions or restrictions pertaining to management of the specific waste.	Generation of solid waste that is determined to be hazardous — **applicable.**	40 *CFR* 262.11(d) OAC 3745-52-11(A)
Characterization of hazardous waste (*all primary and secondary wastes)*	Must obtain a detailed chemical and physical analysis on a representative sample of the waste(s), which at a minimum contains all the information that must be known to treat, store, or dispose of the waste in accordance with pertinent sections of 40 *CFR* 264 and 268.	Generation of RCRA hazardous waste for storage, treatment, or disposal — **applicable.**	40 *CFR* 264.13(a)(1) OAC 3745-54-13(2)
	Must determine the underlying hazardous constituents [as defined in 40 *CFR* 268.2(i)] in the D001, D002, D012-D043 waste.	Generation of RCRA characteristic hazardous waste [other then D001 High total organic carbon (TOC) Subcategory or treated by technology codes "CMBST" or "RORGS"] for storage, treatment or disposal — **applicable.**	40 *CFR* 268.9(a) OAC 3745-51-10

Table B.3. Action-specific ARARs and TBC guidance for D&D of the X-746 Building

Action	Requirements	Prerequisite	Citations
	Must determine if the waste is restricted from land disposal under 40 *CFR* 268 *et seq.* by testing in accordance with prescribed methods or use of generator knowledge of waste.		40 *CFR* 268.7; OAC 3745-270-07
	Must determine each EPA Hazardous Waste Number (Waste Code to determine the applicable treatment standards under to *CFR* 268.40 *et seq.*		40 *CFR* 268.9(a) OAC 3745-270-09(A)
Temporary storage of hazardous waste in containers	A generator may accumulate hazardous waste at the facility provided that	Accumulation of RCRA hazardous waste on-site (as defined in 40 *CFR* 260.10) — **applicable.**	40 *CFR* 262.34(a) OAC 3745-52 &53
	• waste is placed in containers that comply with 40 *CFR* 265.171-173, and		40 *CFR* 262.34(a)(1)(i); OAC 3745-52-34(A)(1)(a)
	• the date upon which accumulation begins is clearly marked and visible for inspection on each container,		40 *CFR* 262.34(a)(2); OAC 3745-52-34(A)(2)
	• container is marked with the words "hazardous waste," or		40 *CFR* 262.34(a)(3) OAC 3745-52-34(3)
	• container may be marked with other words that identify the contents.	Accumulation of 55 gal. or less of RCRA hazardous waste at or near any point of generation — **applicable.**	40 *CFR* 262.34(c)(1) OAC 3745-52-34(C)(1)(b)
Management of hazardous waste in containers	If container is not in good condition (e.g., severe rusting, structural defects) or if it begins to leak, must transfer waste into container in good condition.	Storage of RCRA hazards waste in containers — **applicable.**	40 *CFR* 265.171 OAC 3745-55-70 thru 77
	Use container made or lined with materials compatible with waste to be stored so that the ability of the container is not impaired.		40 *CFR* 265.172 OAC 3745-55-72
	Keep container closed during storage, except to add/remove waste.		40 *CFR* 265.173(a) OAC 3745-55-73(A)
	Open, handle, and store containers in a manner that will not cause containers to rupture or leak.		40 *CFR* 265.173(b) OAC 3745-55-73(B)

Table B.3. Action-specific ARARs and TBC guidance for D&D of the X-746 Building

Action	Requirements	Prerequisite	Citations
Storage of RCRA lamps (*e.g., fluorescent, mercury vapor)*	Must contain any lamp in containers or packages that are structurally sound, adequate to prevent breakage, and compatible with the contents of the lamps.	Management of "universal waste lamp" as defined in 40 *CFR* 273.9 that are RCRA characteristic hazardous waste — **applicable.**	40 *CFR* 273.13(d)(1); OAC 3745-273-13(D)(1)
	Containers must be closed, structurally sound, compatible with the contents of the lamps and must lack evidence of leakage, spillage, or damage that could cause leakage or releases of mercury or other hazardous constituents to the environment under reasonably foreseeable conditions.		40 *CFR* 273.13(d)(2); OAC 3745-273
	Each lamp or a container or package in which such lamps are contained must be labeled or marked clearly with one of the following phrases: "Universal Waste-Lamp(s)," or "Waste Lamps," or "Used Lamps."		40 *CFR* 273.14(e); OAC 3745-273-14(E)
	Mark or label the individual item with the date the lamp(s) became a waste, or mark or label the container or package with date wastes received.		40 *CFR* 273.15(c)(1)-(6) OAC 3745-273-15(2)
Characterization of LLW (*e.g., radioactively contaminated equipment, debris)*	Shall be characterized using direct or indirect methods and the characterization documented in sufficient detail to ensure safe management and compliance with the WAC of the receiving facility.	Generation of LLW for storage or disposal at a DOE facility — **TBC.**	DOE M 435.1-1(IV)(I)
	Characterization data shall, at a minimum, include the following information relevant to the management of the waste:		DOE M 435.1-1(IV)(I)(2)(a)
	• Physical and chemical characteristics;		DOE M 435.1-1(IV)(I)(2)(a)
	• volume, including the waste and any stabilization or absorbent media;		DOE M 435.1-1(IV)(I)(2)(b)
	• weight of the container and contents;		DOE M 435.1-1(IV)(I)(2)(c)
	• identities, activities, and concentration of major radionuclides;		DOE M 435.1-1(IV)(I)(2)(d)
	• characterization date;		DOE M 435.1-1(IV)(I)(2)(e)
	• generating source; and		DOE M 435.1-1(IV)(I)(2)(f)
	• any other information that may be needed to prepare and maintain the disposal facility performance assessment or demonstrate		DOE M 435.1-1(IV)(I)(2)(g)

Table B.3. Action-specific ARARs and TBC guidance for D&D of the X-746 Building

Action	Requirements	Prerequisite	Citations
	compliance with performance objectives.		
Temporary storage and/or staging of LLW (*e.g., radioactively contaminated equipment, debris)*	Shall not be readily capable of detonation, explosive decomposition, reaction at anticipated pressures and temperatures, or explosive reaction with water.	Management of LLW at a DOE facility — **TBC.**	DOE M 435.1-1(IV)(N)(1)
	Shall be stored in a location and manner that protects the integrity of waste for the expected time of storage.		DOE M 435.1-1(IV)(N)(3)
	Shall be managed to identify and segregate LLW from mixed waste.		DOE M 435.1-1(IV)(N)(6)
	Shall be for the purpose of the accumulation of such quantities of wastes necessary to facilitate transportation, treatment, and disposal.		DOE M 435.1-1(IV)(N)(7)
Packaging of solid LLW for storage (*e.g., radioactively contaminated equipment, debris)*	Shall be packaged in a manner that provides containment and protection for the duration of the anticipated storage period and until disposal is achieved or until the waste has been removed from the container.	Storage of LLW in containers at a DOE facility — **TBC.**	DOE M 435.1-1(IV)(L)(1)(a)
	Vents or other measures shall be provided if the potential exists for pressurizing or generating flammable or explosive concentrations of gases within the waste container. Containers shall be marked such that their contents can be identified.		DOE M 435.1-1(IV)(L)(1)(b) DOE M 435.1-1(IV)(L)(1)(c)
Management of asbestos-containing waste prior to disposal (*e.g., transite siding, pipe lagging, insulation, and ceiling tiles)*	Discharge no visible emissions to the outside air, or use one of the emission control and waste treatment methods specified in paragraphs (a)(I) through (a)(4) of 40 *CFR* 61.150.	Collection, processing, packaging, or transporting of any asbestos-containing waste material generated by demolition activities — **applicable.**	40 *CFR* 61.150(a) OAC 3745-20-07(A-C)
Air emissions from hazardous waste facilities.	No hazardous waste facility shall emit any particulate matter, dust, fumes, gas, mist, smoke, vapor or odorous substance that interferes with the comfortable enjoyment of life or property or is injurious to public health.	Pertains to any site at which hazardous waste will be managed such that air emissions may occur. Consider for sites that will undergo movement of earth or incineration — **applicable**.	ORC 3734.02 (I)
Analytical and collection	Specifies analytical methods and collection procedures	Pertains to both discharges to	OAC 3745-1-03

Table B.3. Action-specific ARARs and TBC guidance for D&D of the X-746 Building

Action	Requirements	Prerequisite	Citations
procedures.	for surface water discharges.	surface waters as a result of remediation and any on-site surface waters affected by site conditions — **applicable**.	
The "Five Freedoms" for surface water.	All surface waters of the state shall be free from: A) objectionable suspended solids. B) floating debris, oil and scum. C) materials that create a nuisance. D) toxic, harmful or lethal substances. E) nutrients that create nuisance growth	Pertains to both discharges to surface waters as a result of remediation and any on-site surface waters affected by site conditions — **applicable**.	OAC 3745-1-04 Para. A,B,C,D,E
Water quality criteria.	Establishes water quality criteria for pollutants which do not have specific numerical or narrative criteria identified in tables 7-1 through 7-15 of this rule.	Pertains to both discharges to surface waters as a result of remedial action and any surface waters affected by site conditions — **applicable**.	OAC 3745-1-07 Para. C
Air pollution nuisances prohibited.	Defines air pollution nuisance as the emission or escape into the air from any sources(s) of smoke, ashes, dust, dirt, grime, acids, fumes, gases, vapors, odors and combinations of the above that endanger health, safety or welfare.	Pertains to any site which causes, or may reasonably cause, air pollution nuisances. Consider for sites that will undergo excavation, demolition, cap installation, methane production, clearing and grubbing, water treatment, incineration — **applicable**.	OAC 3745-15-07 Para. A
Development of water quality based effluent limitations.	Used by DSW to determine waste load allocations for discharges to surface water. Impacts discharge limits.	Consider for any site with discharge to surface waters — **applicable**.	OAC 3745-2-04 Para. A-G
Disposal/Decon of equipment, structures and soil.	Requires that all contaminated equipment, structures and soils be properly disposed of or decontaminated. Removal of hazardous wastes or constituents from a unit may constitute generation of hazardous wastes.	Pertains to any site at which hazardous waste is to be treated, stored or disposed of (or has been treated, stored or disposed of) — **applicable**.	OAC 3745-55-14
Treatment/disposal of waste—removed wastes, debris, and secondary wastes			
Disposal of RCRA-hazardous waste in a land-based unit	May be land disposed if it meets the requirements in the table "Treatment Standards for Hazardous Waste" at 40 *CFR* 268.40 before land disposal.	Land disposal (as defined in 40 *CFR* 268.2) of restricted RCRA waste — **applicable.**	40 *CFR* 268.40(a) OAC 3745-270-40
Disposal of prohibited RCRA hazardous waste in land-based units	Are not prohibited unless the wastes are subject to a specified method of treatment other than DEACT in 40 *CFR* 268.40, or are D003 reactive cyanide. (RCRA	Restricted RCRA characteristic hazardous waste waters managed in a treatment system that is	40 *CFR* 268.1(c)(4)(iv) OAC 3745-270-01

Table B.3. Action-specific ARARs and TBC guidance for D&D of the X-746 Building

Action	Requirements	Prerequisite	Citations
	regulations contain exemption from CWA permit.)	NPDES permitted — **applicable.**	
Disposal of hazardous debris	May be land disposed if it meets the requirements in the table "Alternative Treatment Standards for Hazardous Debris" at 40 *CFR* 268.45 before land disposal or the debris is treated to the waste-specific treatment standard provided in 40 *CFR* 268.40 for the waste contaminating the debris.	Land disposal (as defined in 40 *CFR* 268.2) of restricted RCRA-hazardous debris — **applicable.**	40 *CFR* 268.45(a) OAC 3745-270-45
Disposal of treated hazardous debris	Debris treated by one of the specified extraction or destruction technologies on Table 1 of 40 *CFR* 268.45 and which no longer exhibits a characteristic is not a hazardous waste and need not be managed in RCRA Subtitle C facility. Hazardous debris contaminated with listed waste that is treated by immobilization technology must be managed in a RCRA Subtitle C facility.	Treated debris contaminated with RCRA-listed or characteristic waste — **applicable.**	40 *CFR* 268.45(c)
Disposal of hazardous debris treatment residues	Except as provided in 268.45(d)(2) and (d)(4), residues from treatment of hazardous debris must be separated from debris, and such residues are subject to the waste-specific treatment standards for the waste contaminating the debris.	Treated debris contaminated with RCRA-listed or characteristic waste — **applicable.**	40 *CFR* 268.45(d)(1)
Treatment of LLW	Treatment to provide more stable waste forms and to improve the long-term performance of a LLW disposal facility shall be implemented as necessary to meet the performance objectives of the disposal facility.	Generation of LLW for disposal at a LLW disposal facility — **TBC.**	DOE M 435.1-1(IV)(O)
Disposal of solid LLW (*e.g., radioactively contaminated equipment, debris)*	LLW shall be certified as meeting waste acceptance requirements before it is transferred to the receiving facility.	Generation of LLW for disposal at a DOE facility — **TBC.**	DOE M 435.1-01(IV)(J)(2)
Disposal of asbestos-containing waste material (*e.g., transite siding, pipe lagging, insulation, and ceiling tiles)*	Shall be deposited as soon as practicable at • an approved waste disposal site operated in accordance with 40 *CFR* 61.154 or • an EPA-approved site that converts RACM and asbestos-containing waste material into non-asbestos (asbestos-free) material according to the provisions of 40 *CFR* 61.155.	Asbestos-containing waste material or RACM (except Category I non-friable asbestos-containing material) from demolition activities — **applicable.**	40 *CFR* 61.150(b) 40 *CFR* 61.150(b)(1) 40 *CFR* 61.150(b)(2)
Land use controls—contaminated structures and facilities left in place			
Dilution prohibited as a	Forbids dilution as a means of achieving land disposal	Consider for remedial options	OAC 3745-270-03 Para. A-D

Table B.3. Action-specific ARARs and TBC guidance for D&D of the X-746 Building

Action	Requirements	Prerequisite	Citations
substitute for treatment.	restriction levels.	including land disposal or leaving wastes in-place — **applicable**.	
Universal treatment standards.	Gives contaminant chemical specific standards for land disposal.	Consider for sites with waste generation or on-site disposal — **applicable**.	OAC 3745-270-48 Para. A
	Transportation		
Transportation of hazardous materials (including Class 7 radioactive materials)	Shall be subject to and must comply with all applicable provisions of the Hazardous Materials Transportation Act (HMTA) and HMR at 49 *CFR* 171-180 related to marking, labeling, placarding, packaging, emergency response, etc.	Any person who, under contract with a department or agency of the federal government, transports "in commerce," or causes to be transported or shipped, a hazardous material — **applicable.**	40 *CFR* 171.1(c)
Transportation of LLW	To the extent practical, the volume of the waste and the number of the shipments shall be minimized.	Shipment of LLW off-site — **TBC.**	DOE M 435.1-1(IV)(L)(2)
Transportation of hazardous waste off-site	Must comply with the generator requirements of 40 *CFR* 262.20-23 for manifesting. Sect. 262.30 for packaging, Sect. 262.31 for labeling, Sect. 262.32 for marking, Sect. 262.33 for placarding, Sect. 262.40, 262.41(a) for record keeping requirements, and Sect. 262.12 to obtain EPA ID number.	Off-site transportation of RCRA-hazardous waste — **applicable.**	40 *CFR* 262.10(h)
	Must comply with the requirements of 40 *CFR* 263.11-263.31. A transporter who meets all applicable requirements of 49 *CFR* 171-179 and the requirements of 40 *CFR* 263.11 and 263.31 will be deemed in compliance with 40 *CFR* 263.	Transportation of hazardous waste within the United States requiring a manifest — **applicable.**	40 *CFR* 263.10(a)
Transportation of hazardous waste on-site	The generator manifesting requirements of 40 *CFR* 262.20-262.32(b) do not apply. Generator or transporter must comply with the requirements set forth in 40 *CFR* 263.30 and 263.31 in the event of a discharge of hazardous waste on a private or public right-of-way.	Transportation of hazardous wastes on a public or private right-of-way within or along the border of contiguous property under the control of the same person, even if such contiguous property is divided by a public or private right-of-way —	40 *CFR* 262.20(f)

Table B.3. Action-specific ARARs and TBC guidance for D&D of the X-746 Building

Action	Requirements	Prerequisite	Citations
		applicable.	
Transportation of hazardous materials	Shall be subject to and must comply with all applicable provisions of the HMR at 49 *CFR* 171-180 related to marking, labeling, placarding, packaging, emergency response, etc.	Any person who, under contract with a department or agency of the federal government, transports "in commerce," or causes to be transported or shipped, a hazardous material—**applicable.**	49 *CFR* 171.1(c)
Transportation of hazardous materials on-site	Shall comply with 49 *CFR* Parts 171-174, 177, and 178 or the site- or facility-specific Operations of Field Office approved Transportation Safety Document that describes the methodology and compliance process to meet equivalent safety for any deviation from the Hazardous material Regulations [i.e., Transportation Safety Document for the On-Site Transfer of Hazardous Material within the Portsmouth Gaseous Diffusion Plant, LPP-0021/R3, LPP November 2008].	Any person who, under contract with the DOE, transports a hazardous material on the DOE facility—**TBC.**	DOE O 460.1B(4)(b)
Transportation of hazardous materials off-site	Off-site hazardous materials packaging and transfers shall comply with 49 *CFR* Parts 171-174, 177, and 178 and applicable tribal, State, and local regulations not otherwise preempted by DOE and special requirements for Radioactive Material Packaging.	Preparation of off-site transfers of LLW—**TBC.**	DOE O 460.1B(4)(a)
Hazardous waste manifest – general requirements.	Requires a generator who transports or offers for transportation hazardous waste for off-site treatment, storage or disposal to prepare a uniform hazardous waste manifest.	Pertains to sites where hazardous waste will be transported off-site for treatment, storage or disposal — **applicable.**	OAC 3745-52-20
Hazardous waste manifest – number of copies.	Specifies the number of manifest copies to be prepared.	Pertains to sites where hazardous waste will be transported off-site for treatment, storage or disposal — **applicable.**	OAC 3745-52-22
Hazardous waste manifest – use.	Specifies procedures for the use of hazardous waste manifests including a requirement that they be hand signed by the generator.	Pertains to sites where hazardous waste will be transported off-site for treatment, storage or disposal — **applicable.**	OAC 3745-52-23
Hazardous waste packaging.	Requires a generator to package hazardous waste in accordance with U.S. DOT regulations for transportation off-site.	Pertains to any site where hazardous waste will be generated by on-site activities and shipped off-site for	OAC 3745-52-30

Table B.3. Action-specific ARARs and TBC guidance for D&D of the X-746 Building

Action	Requirements	Prerequisite	Citations
		treatment and/or disposal — **applicable**.	
Hazardous waste labeling.	Requires packages of hazardous waste to be labeled in accordance with U.S. DOT regulations for off-site transportation.	Pertains to any site where hazardous waste will be generated by on-site activities and shipped off-site for treatment and/or disposal — **applicable**.	OAC 3745-52-31
Hazardous waste marking.	Specifies language for marking packages of hazardous waste prior to off-site transportation.	Pertains to any site where hazardous waste will be generated by on-site activities and shipped off-site for treatment and/or disposal — **applicable**.	OAC 3745-52-32
Hazardous waste placarding.	Generator shall placard hazardous waste prior to off-site transportation.	Pertains to any site where hazardous waste will be generated by on-site activities and shipped off-site for treatment and/or disposal — **applicable**.	OAC 3745-52-33

ALARA = as low as reasonably achievable
ARAR = applicable or relevant and appropriate requirement
CFR = Code of Federal Regulations
CMBST = technology code defined in Table 1 of 40 *CFR* 268.42, summarized as "high temperature organic destruction technologies…and certain non-combustive technologies…"
CWA = Clean Water Act
D&D = decontamination and decommissioning
DEACT = deactivation
DOE = U.S. Department of Energy
DOE M = *Radioactive Waste Management Manual*
DOT = U.S. Department of Transportation
EDE = effective dose equivalent
HMR = hazardous materials regulations
HMTA = Hazardous Materials Transportation Act
mrem = millirem
OAC = Ohio Administrative Code
ORC = Ohio Revised Code

RACM = regulated asbestos-containing material
RORGS = technology code defined in Table 1 of 40 *CFR* 268.42; summarized as "recovery of organics utilizing one or more of the…technologies" specified in Table 1.
TOC = total organic carbon

APPENDIX C

SUMMARY OF CHARACTERIZATION DATA COLLECTED PURSUANT TO THE CONSENT DECREE

DOE OFFICE OF OVERSIGHT INVESTIGATION

In 2000, the DOE Environmental Safety & Health (ES&H) Office of Oversight conducted an investigation at PORTS which included evaluating solid waste management units that had not been investigated during the previous Resource Conservation and Recovery Act (RCRA) Facility Investigation. The surface soils and groundwater around the X-746 Building were identified as requiring additional characterization.

To determine if contamination was released to the surface soils in this area, hand augered soil samples from 1 ft to 2 ft below ground surface and 3 ft to 4 ft below ground surface were collected from five locations within ditches near the asphalt area as shown on Fig. C1. Five soil borings were drilled through the asphalt near three large storm drains and two soil borings were drilled near two small storm drains beside the loading docks as shown on Fig. C1. Boring of X746-01G was also completed as a groundwater-monitoring well. Soil was collected at every 4 ft interval from 4 ft below ground surface to 16 ft below ground surface (maximum depth to groundwater). Soil from each boring sample was analyzed for volatile organic compounds and radiological parameters. Groundwater collected from Boreholes X746-SB04, X746-SB05, and X746-SB06 was analyzed for volatile organic compounds. A summary of sample identification and associated analyses are presented in Table C1.

Groundwater samples were analyzed from two wells and three boreholes in the area of the X-746 Building. The groundwater samples were analyzed for volatile organic compounds and radiological parameters, as shown in Fig. C1 and Table C1.

Table C1. X-746 Building sampling summary

Sample ID	Matrix	Analyses
X746-HA01-02, 04	Soil	Radiological Parameters
X746-HA02-02, 04	Soil	Radiological Parameters
X746-HA03-02, 04	Soil	Radiological Parameters
X746-HA04-02, 04	Soil	Radiological Parameters
X746-HA05-02, 04	Soil	Radiological Parameters
X746-SB01-04, 08, 12, 16	Soil	VOCs, Radiological Parameters
X746-SB02-04, 08, 12, 16	Soil	VOCs, Radiological Parameters
X746-SB03-04, 08, 12, 16	Soil	VOCs, Radiological Parameters
X746-SB04-04, 08, 12, 16	Soil	VOCs, Radiological Parameters
X746-SB05-04, 08, 12, 16	Soil	VOCs, Radiological Parameters
X746-SB06-04, 08, 12, 16	Soil	VOCs, Radiological Parameters
X746-01G*-04, 08, 12, 16	Soil	VOCs, Radiological Parameters
X746-01G***	Groundwater	VOCs, Radiological Parameters
X747F-03G	Groundwater	VOCs, Radiological Parameters
X746-SB04**	Groundwater	VOCs
X746-SB05**	Groundwater	VOCs
X746-SB06**	Groundwater	VOCs

VOCs – volatile organic compounds

* Boring was completed as a monitoring well.

** Groundwater was collected from the open borehole and analyzed for VOCs.

*** Monitoring well was installed prior to sampling.

Analytical data from the soil and groundwater sampling were compared to preliminary remediation goals that have been established by the Ohio Environmental Protection Agency (Ohio EPA) and EPA. Preliminary remediation goals are the maximum concentrations of a

constituent in environmental media (soil, groundwater, etc.) that is considered protective of human health and the environment.

Trichloroethene, a volatile organic compound, was detected above the soil preliminary remediation goal of 48 micrograms per kilogram at one location (130 micrograms per kilogram at X746-SB03-08 ft). Total uranium was detected above the soil preliminary remediation goal of 7.4 micrograms per gram at one location (9.15 micrograms per gram at X746-01G-04 ft). No other volatile organic compounds or radiological parameters were detected above their respective preliminary remediation goals.

Cis-1,2-dichloroethene, a volatile organic compound, was detected above the Gallia groundwater preliminary remediation goal of 70 micrograms per liter in one water sample (150 micrograms per liter in X746-SB06). Trichloroethene was detected above the Gallia groundwater preliminary remediation goal of five micrograms per liter in one water sample (320 micrograms per liter in X746-SB06).

Based on these analytical results, Ohio EPA requested DOE complete further investigation. Details of this investigation are found in *Investigation of Potential Additional Solid Waste Management Units at the Portsmouth Gaseous Diffusion Plant DOE/OR/11-3109&D1 (July 2002)*.

2004 GROUNDWATER MONITORING REPORT FOR THE PORTSMOUTH GASEOUS DIFFUSION PLANT, PIKETON, OHIO

The Ohio EPA supplied comments in October 2002 on the report, *Investigation of Potential Additional Solid Waste Management Units at the Portsmouth Gaseous Diffusion Plant DOE/OR/11-3109&D1 (July 2002)*. To address Ohio EPA comments on this investigation, four wells near the X-746 Building were sampled in April 2004. (DOE installed two groundwater monitoring wells in completion of an Enforceable Agreement milestone on March 31, 2004). Samples were analyzed for volatile organic compounds, radionuclides, and water quality parameters. Appendix A of the 2004 Groundwater Monitoring Report includes the data for this sampling event in a section entitled "X-746 Solid Waste Management Unit Special Study". No volatile organic compounds or radiological parameters were detected above their respective preliminary remediation goals. Based on the data collected for this special study, no additional activities were recommended for this area.

Ohio EPA completed their review of the 2004 Annual Groundwater Monitoring Report for the Portsmouth Gaseous Diffusion Plant in July 2005 and no additional investigation was required for the X-746 area.

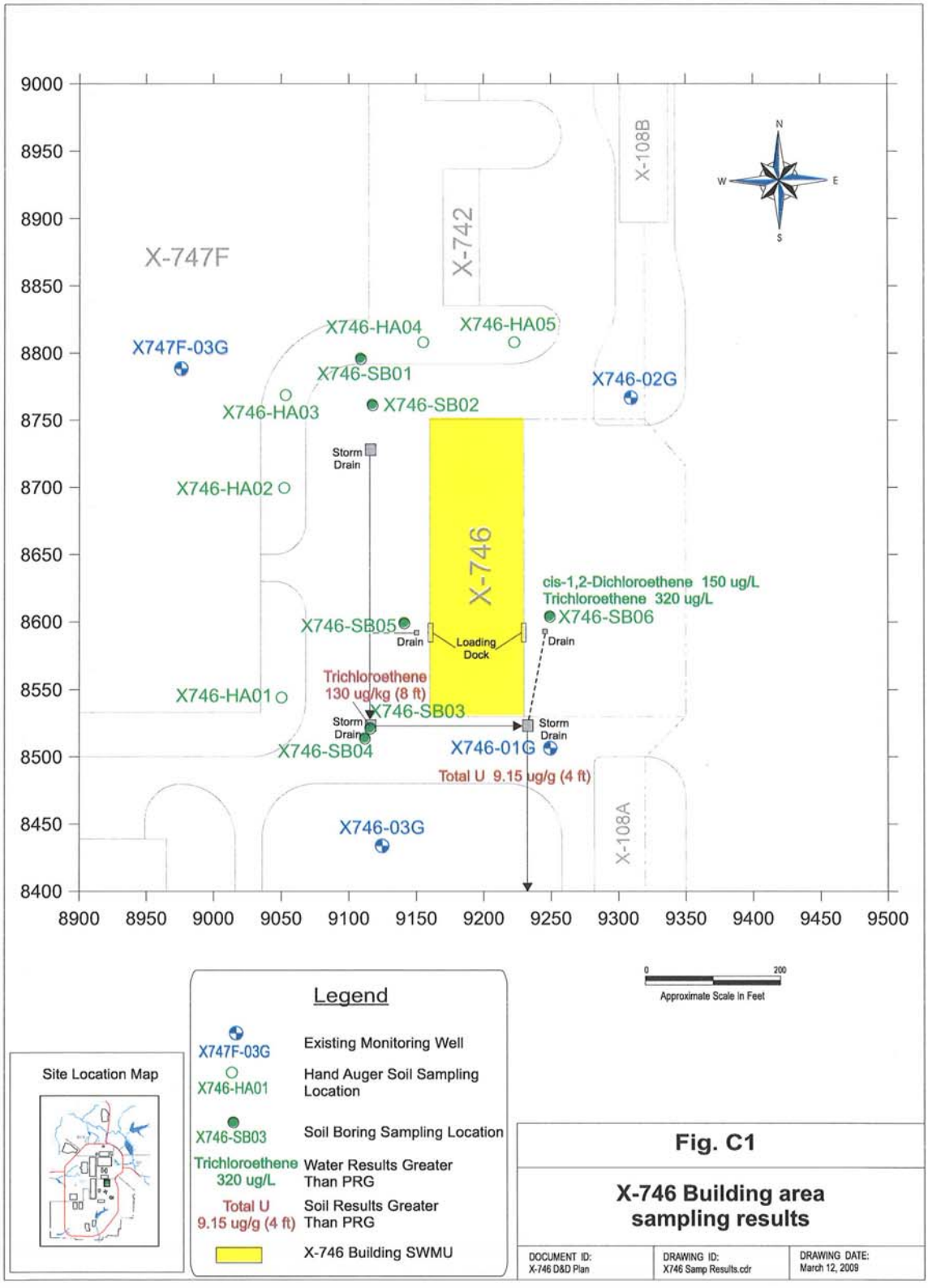

Fig. C1

X-746 Building area sampling results

DOCUMENT ID:	DRAWING ID:	DRAWING DATE:
X-746 D&D Plan	X746 Samp Results.cdr	March 12, 2009

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